INTERNATIONAL COLLEGE
of YAYASAN MELAKA

ICYM

Open Distance Learning

TCIT1013
Introduction to Computer System

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Developed by: International College of Yayasan Melaka

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Topic 12 Database Systems

UNDERSTANDING COURSE GUIDE

Refer and understand this *Course Guide* carefully from the beginning to the end. It describes the course and how you use the course material. It suggests the learning time to complete the course successfully. Referring the *Course Guide* will help you to clarify important contents that you might miss or overlook.

ABOUT THE COURSE

TCIT 1013 Introduction to Computer System is subject for Diploma Information Technology that offered by School of Engineering and Computing Technology in ICYM. This course is worth 3 credit hours and should be covered to 14 weeks

You should be acquainted with learning independently and being able to optimize the learning modes and environment available to you. Make sure refer right course material and understand the course requirements as well as how the course is conducted.

LEARNING TIME SCHEDULE

It is a standard ICYM practice that learner accumulate 40 study hours for every credit hour. As for this three-credit hour course, you are expected to spend 120 study hours. Table 1 gives an estimation of how the 120 study hours could be accumulated.

Table 1: Estimation of Student Learning Time

Distribution of Student Learning Time by Chapter	CLO	Teaching and Learning Activities					
		Face to Face				Non-Face to Face (Independent Learning)	Total
		L	T	P	O		
Topic 1	1					6	
Topic 2	1					6	
Topic 3	1					6	
Topic 4	1					6	
Topic 5	1					6	
Topic 6	1					6	
Topic 7	1					6	
Topic 8	2					8	
Topic 9	3					10	
Topic 10	3					10	
Topic 11	3					10	
Topic 12	3					10	
						Sub-Total SLT	90

Continuous Assessment		%	Face to Face		Non-Face to Face (Independent Learning)	
			Physical	Online		
1	Quiz	5		1	2	
2	Participations	15			4	
3	Test	15		2	4	
4	Assignment	15			9	
					Sub-Total SLT	22

Final Assessment		%	Face to Face		Non-Face to Face (Independent Learning)	
			Physical	Online		
1	Final Examination	50	2.5		5.5	
					Sub-Total SLT	8
					GRAND-Total SLT	**120**

COURSE LEARNING OUTCOME

By the end of this course, you should be able to:

1. Define today's technology theories and concepts (C1, PLO1)
2. Describe digital security, ethics and privacy (C2, PLO2)
3. Construct documents, spreadsheet, slides presentation and database on an assignment task using Microsoft Office Suite (C3A, PLO3)

COURSE SYNOPSIS

This course is divided into 10 topics. The synopsis for each topic can be listed as follows:

Topic 1 students will learns the basic computer concepts, such as what a computer is, how it works, and what makes it a powerful tool

Topic 2 students will learns about the Internet, World Wide Web, browsers, e-mail, FTP, and instant messaging.

Topic 3 students are introduced to a variety of business software, graphics and multimedia software, home/personal/educational software, and communications software.

Topic 4 students are introduced to the components of the system unit; how memory stores data, instructions, and information; and how the system unit executes an instruction.

Topic 5 students will learns describes the various methods of input and output, and commonly used input and output devices

Topic 6 students will learns about various storage media and storage devices

Topic 7 students learn about a variety of stand-alone operating systems, network operating systems, and embedded operating systems.

Topic 8 students will learns about computer and Internet risks, ethical issues surrounding information accuracy, intellectual property rights, codes of conduct, information privacy, and computer-related health issues.

Topic 9 students learn how to create document using Microsoft Word to construct letter, article, simple poster, and memo.

Topic 10 students learn how to create presentation slide using Microsoft PowerPoint

Topic 11 students learn how to create a simple data analysis using Microsoft Excel

Topic 12 students learn how to create database using Microsoft Access

LEARNING GUIDANCE

The learning guidance is important to understand before you go through this module. Understanding the learning guidance will help you to organize your study of this course in a more objective and effective way. Generally, learning guidance for each topic is as follows:

Learning Outcomes: This part is to measurable, observable, and specific

statement that clearly indicates what you should know and be able to do because of learning in each chapter. By go through each topic, you can continuously gauge your understanding of the topic.

Self-Learning Material: To aid you in your subsequent learning and to report on what you have learned. The activities are in-text questions (ITO) and self-assessment questions (SAQ), assignment on each chapter of the material to monitor and develop your own learning.

Activity: Question and activity within module can be constructed to put back the dialogue between student and module in learning activity. With the given question or task, you are encouraged to read the description or explanation within a module, so you can answer the question or solve the problem proposed.

You are encouraged to read since you realize that without reading the description or explanation, you will not be able to answer the question or the assignment. Text question is applied to you to pay attention to a certain problem rather than to assess the learning progress.

Self-assessment question is such a task that requires written answer form you. If you complete the task, you are asking to check your answer with the answer key provided in the module.

Self -assessment is be developed in various form of test questions, there are easy question, fill in the blank, multiple choices, true-false and matching.

Summary: You will find this part at the end of each topic. This component helps you to recap the whole topic. By going through the

summary, you should be able to gauge your knowledge retention level. Should you find points in the summary that you do not fully understand, it would be a good idea for you to revisit the details in the module.

Key Terms: This component can be found at the end of each topic. You should go through this component to remind yourself of important terms or jargon used throughout the module. Should you find terms here that you are not able to explain, you should look for the terms in the module.

References: The References section is where a list of relevant and useful textbooks, journals, articles, electronic contents, or sources can be found. The list can appear in a few locations such as in the *Course Guide* (at the References section), at the end of every topic or at the back of the module. You are encouraged to read or refer to the suggested sources to obtain the additional information needed and to enhance your overall understanding of the course.

TOPIC 1

Introduction to Computer System

LEARNING OUTCOMES

By the end of topic, you should be able to:

1. Recognize the importance of computer literacy
2. Identify the components of a computer
3. Differentiate Data and Information
4. Discuss the uses of the Internet and World Wide Web
5. Explain the advantages and disadvantages of a computer

1.1 Computer Literacy

Nowadays, many people use computer in daily life. They use it to communicate, information searching, doing personal task to increase their productivity and helps them in their daily routine.

Computer literacy is about having knowledge on how to use computer.

Figure 1.1 shows the relationship of digital literacy and human activities. Many aspects of digital computer use have affected human life today. Among them are functional skills in improving quality of life, stimulating creativity, enabling people to think critically and make evaluation more easily. Cultural issues are also affected by this digital exposure where more people can understand the culture of a race that was previously ignored.

The ability to quickly and accurately search for information can preside over the quality of human life. Communication has also become more effective with the use of technology that enables humans to collaborate in conducting matters. However, safety aspects must also be taken into account to ensure

that human life remains peaceful in line with the natural nature of human life.

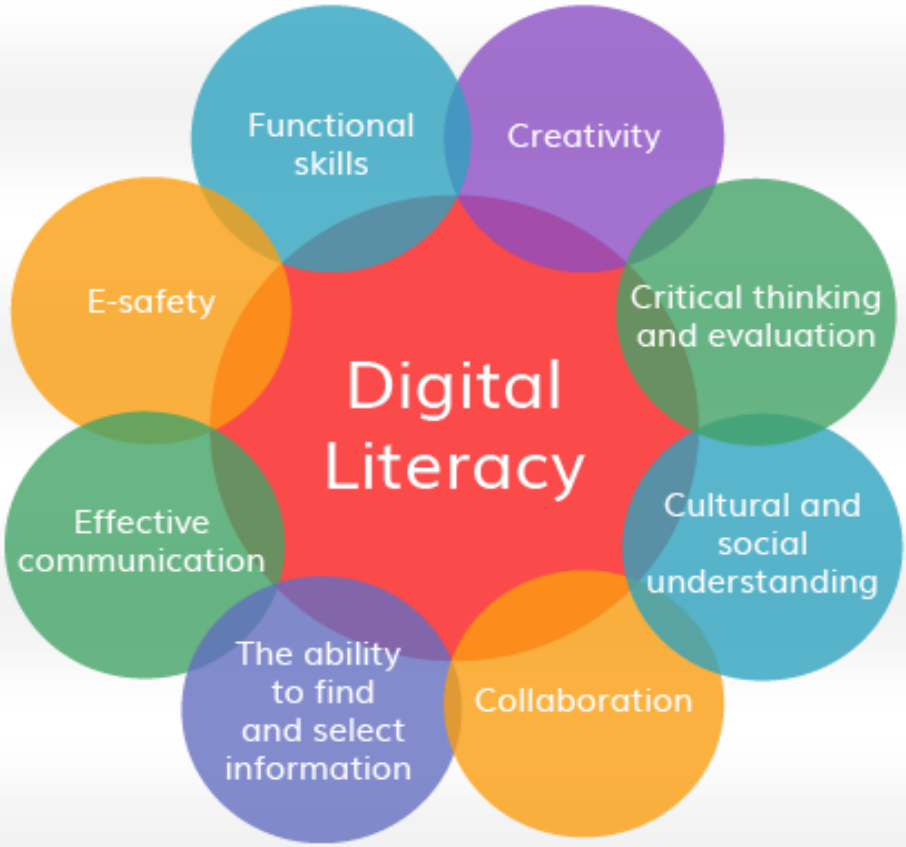


Figure 1.1 : Digital Literacy

1.2 Definition Of Computer

Computer is a device that operates under the instruction given. These instructions are stored in its own memory and can be modified at anytime. Computer receives data and instructions, process it and produce the result.

Figure 1.2 : The flow of computer processing

Figure 1.2 shows that input will be processed in such a way that the output can be used by human.

1.3 Data and Information

Computer process data to produce an information. Data can be text such as names, address, or any other details or, number such as age, price or picture, video or even sound. Data can be entered into the computer and computer will process it and display the data in an organized layout that we called information.

Figure 1.3 show the relationship of how data can be turn into information. Data is a single input, whereas information is the combined of some data that gives a meaningfull intepretation to it.

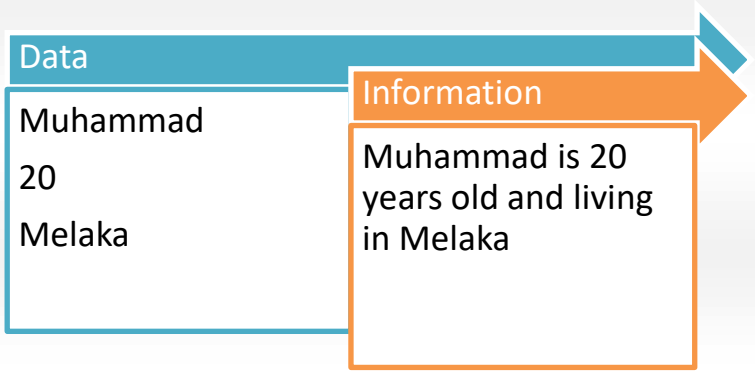


Figure 1.3 : Data vs Information

1.4 Components of Computer

Components of a computer is any devices that can be connected to form the functional computer. Common components are;

a. **Input device** –used to enter data or instruction into computer
b. **Output device** –used to display the result of computer process
c. **Processor** – process data into information
d. **Storage** - to hold data and information
e. **Communication device** – device that conveys data across computer

Figure 1.4 shows the components of computer. It can be any devices that connected into system unit to make it functional.

Figure 1.4 : The components of computer

1.5 Disadvantages And Advantages Of Computer

The use of computer can give several effects into human life. It can be beneficial if used correctly. It can also have a detrimental effect if not used properly.

The advantages

Speed: When data, instructions, and information flow along electronic circuits in a computer, they travel at incredibly fast speeds. Many computers process billions or trillions of operations in a single second.

Reliability: The electronic components in modern computers are dependable and reliable because they rarely break or fail.

Consistency: Given the same input and processes, a computer will produce the same results — consistently. Computers generate error-free results, provided the input is correct and the instructions work.

Storage: Computers store enormous amounts of data and make this data available for processing anytime it is needed.

Communications: Most computers today can communicate with other computers, often wirelessly. Computers allow users to communicate with one another.

The disadvantages

Violation of Privacy: Personal and confidential records were not properly protected may affected individuals in protecting their privacy violated and identities stolen.

Public Safety: Some information that people shared may be used by other people that can do harm to others.

Impact on Labor Force: People can be jobless since computers can replaced human labor in many sectors.

Health Risks: Prolonged or improper computer use can lead to health injuries or disorders.

Impact on Environment: Computer manufacturing processes and computer waste are depleting natural resources and polluting the environment.

1.6 Definition Of Network And Advantages Of Network

A network is a collection of computers and devices connected together, often wirelessly, via communications devices and transmission media (Figure 1.5). When a computer connects to a network, it is online.

Networks allow computers to share resources, such as hardware, software, data, and information. Sharing resources saves time and money.

Figure 1.5 : Computer Network.

1.7 The Uses Of The Internet And World Wide Web

The Internet is a worldwide collection of networks that connects millions of businesses, government agencies, educational institutions, and individuals.

Figure 1.6 shows that several network connected together to form the Internet.

Figure 1.6 : The flow of computer processing

Checkpoint

Instructions: Find the true statement below. Then, rewrite the remaining false statements so they are true.

1. A personal computer contains a processor, memory, and one or more input, output, and storage devices.
2. A network is a collection of computers and devices connected together, often wirelessly, via communications devices and transmission media.

Short Questions

1. What are some ways people use computers in the home, at work, and at school? _____
2. What does it mean to be computer literate? _____
3. In what ways do people use the Internet to communicate with each other?
4. How do computers benefit individuals' health care? _____

5. How can telemedicine benefit health care? _____
6. Explain FIVE (5) components of a Computer
7. Explain the advantages of using Computers
8. Explain the disadvantages of using Computers

ACTIVITY

Among the advantages of using computers is speed, reliability, consistency, storage, and communications.

Explain why you use computer/mobile device in your daily life in terms of the above advantages.

Self Assessment

Login to Elearning to do Self Assessment1

SUMMARY

- Technology and interactive media are learning tools that are able to support childrens education, growth and relationship.
- Computers cause challnes in social , emotional and languages development.
- Computers encourage us to think effectively
- Technology and interactive media are learning tools that are able to support childrens education, growth and relationship.

KEY TERM

Computer	**Network**
Data	**Information**
Memory	**Component**

REFERENCES

Misty E. Vermaat, Susan L. Sebok, Steven M. Freund etc. *Discovering Computers ©2018: Digital Technology, Data, and Devices*. Cengage Learning. 20182.

TOPIC 2

The Internet and World Wide Web

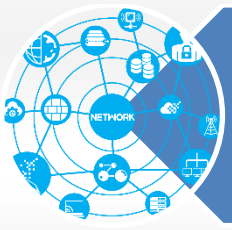
LEARNING OUTCOMES

By the end of topic, you should be able to:

1. Explain how to access and connect to the Internet
2. Explain how to view pages and search for information on the Web
3. Describe the types of Web sites Identify the steps required for Web publishing
4. Describe the types of e-commerce
5. Explain how e-mail, FTP, newsgroups and message boards, mailing lists, chat rooms, instant messaging, and Internet telephony work

2.1 The Evolution Of The Internet

The Internet has its roots in a networking project started by an agency of the U.S. Department of Defense. That network, called ARPANET, became functional in September 1969, linking scientific and academic researchers across the United States



Allowed scientists at different locations to share information and work together on military and scientific projects

Could function even if part of the network were disabled or destroyed by a disaster such as a nuclear attack.

Figure 2.1 : Arpanet Goals

2.2 Internet Connections

Data sent over the Internet travels via networks and communications media owned and operated by many companies. Connecting to the Internet, employees and students often connect to the Internet through a business or school network.

Connection	Description
DSL (digital subscriber line)	Technology that provides high-speed Internet connections using regular telephone lines. A cable modem allows access to high-speed Internet services through the cable television network.
Wi-Fi (wireless fidelity)	A network uses radio signals to provide Internet connections to wireless computers and devices.
Mobile broadband	Connections over the cellular radio network
Fixed wireless	Using a dish shape antenna for use in a house or business using radio signals
Satellite modem	A communicates with a satellite dish to provide high-speed Internet connections via satellite.

2.3 Internet Service Providers

Users access the Internet through ISPs, online service providers, and wireless Internet service providers.

An **ISP (Internet service provider)** is company that provides Internet access to their customers.

In Malaysia, there are many companies that provides Internet services to its customer. Among the popular company for home users are TM, Astro Broadband, and YES. For mobile users, ALL cellular companies provides data connections for its users.

Figure 2.2 : TM Unifi and Streamyx

Figure 2.3 : yes Internet Provides

2.4 IP Address And Domain Name

The Internet relies on an addressing system much like the postal service to send data to a computer at a specific destination.

An **IP address**, short for Internet Protocol address, is a number that uniquely identifies each computer or device connected to the Internet.

A **domain name** is the text version of an IP address.

As with an IP address, the components of a domain name are separated by periods.

A **DNS server** translates the domain name into its associated IP address

Example : IP address for www.kym.edu.my is 10.100.4.250

Given an IP number, we are able to know its location.

2.5 Web Browser

A **Web browser**, or **browser**, is application software that allows users to access and view Web pages. To browse the Web, you need a computer that is connected to the Internet and that has a Web browser. The browser retrieves and displays a starting Web page, sometimes called the browser's home page.

Home page, refers to the first page that a Web site displays. Similar to a book cover or a table of contents for a Web site, the home page provides information about the Web site's purpose and content.

Downloading is the process of a computer receiving information, such as a Web page, from a server on the Internet.

Web Addresses A Web page has a unique address, which is called a URL (Uniform Resource Locator) or Web address.

Figure 2.4 : The popular web Browser

2.6 Search Engine

A search engine is particularly helpful in locating Web pages about certain topics or in locating specific Web pages, images, videos, news, and other information for which you do not know the exact Web address.

Instead of clicking through links, search engines require that you enter a word or phrase, called search text, that define the item about which you want information.

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Figure 2.5 : Google

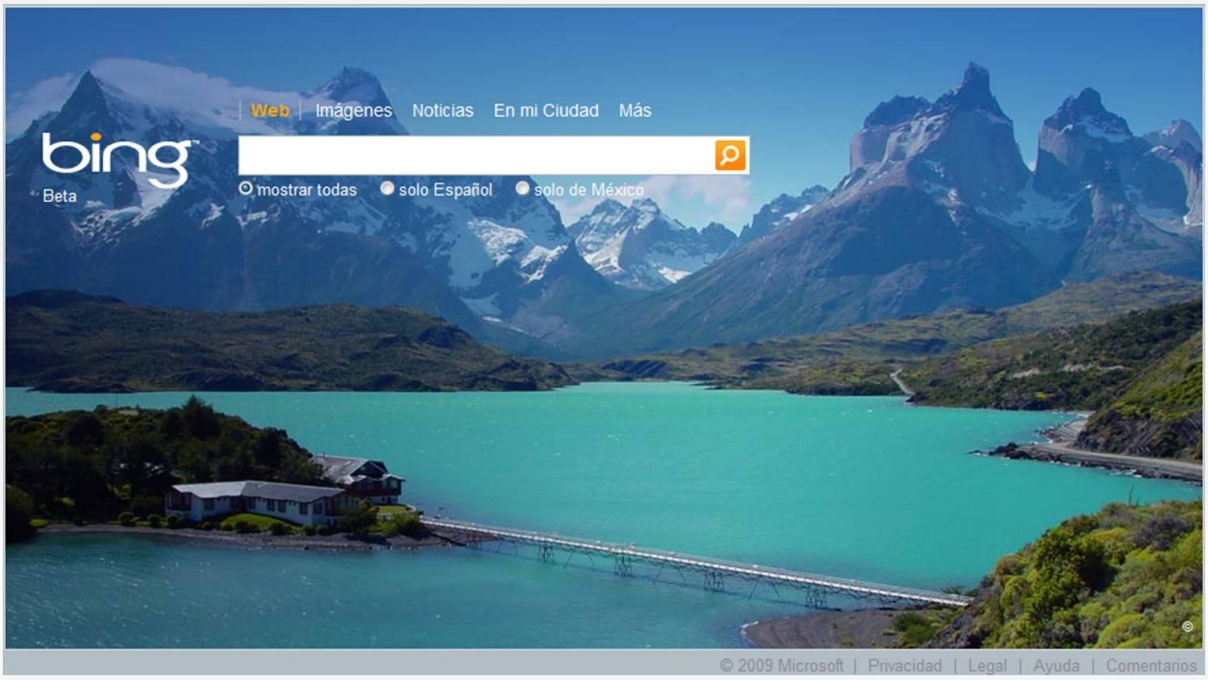

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Figure 2.6 : Bing Search Engine

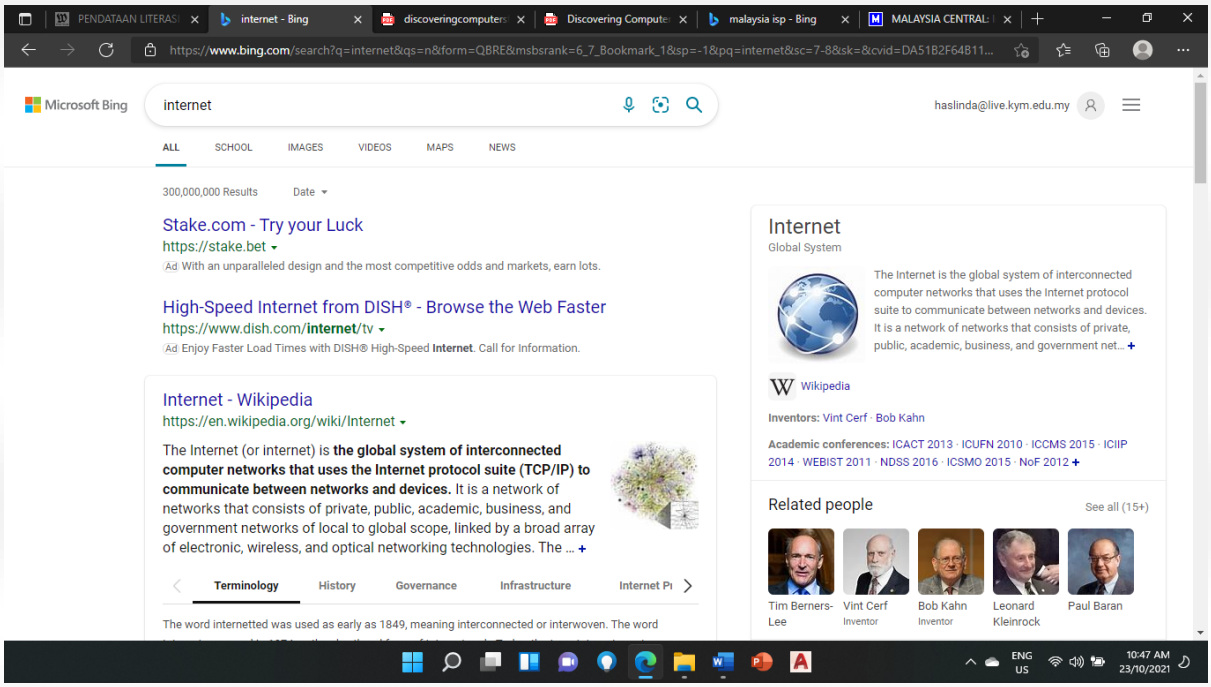

Figure 2.6 : Search Hit

Checkpoint 2

Instructions: Find the true statement below. Then, rewrite the remaining false statements so they are true.

1. DSL is a technology that provides high-speed Internet connections over the cable television network.
2. A domain name is the text version of an IP address.
3. A Web 2.0 Web site may include application software built into the site for visitors to use.
4. Tabbed browsing refers to the practice of Web sites keeping tabs on their visitors.
5. A search engine is a program that finds Web sites, Web pages, images, videos, news, and other information.

SHORT QUESTIONS

1. How is a regional ISP different from a national ISP? _____
2. How are an ISP, OSP, and WISP different? _____
3. How is a Web page different from a Web site? _____

4. How can you use a Web address to display a Web page? _____
5. What are the differences between blogs, wikis, and podcasts? _____
6. When might you use each? _____
7. What is one specification used by content aggregators to distribute content? _____
8. How might you evaluate the accuracy of a Web site? _____
9. When might you use an online payment system? _____
10. How does the service work? _____

ACTIVITY

Describe how you connect the Internet by using your handphone. Do you need to pay for it?

SUMMARY

- Internet are widely used nowadays
- Need to connect to internet to enable us to use browser to search for information
- DSL, WIFI, satellite dish is among the popular way to connect to Internet

KEY TERM

Internet	**Network**
Browser	**Internet service provider**
Wifi	**Search engine**
Ip	**Domain**

REFERENCES

Misty E. Vermaat, Susan L. Sebok, Steven M. Freund etc. *Discovering Computers ©2018: Digital Technology, Data, and Devices*. Cengage Learning. 20182.

TOPIC 3

Software

LEARNING OUTCOMES

By the end of topic, you should be able to:

1. Explain application software
2. List types of application software
3. Explain System Software
4. List types of system software

3.1 Application Software

Most computer users rely on task -oriented software or better known as application software. Therefore, such software can be classified according to the function of the software.

Application software is available in various forms of software, namely:

Package. This software is usually produced in large quantities, protected by copyright, produced to meet the needs of users either for individual or organizational use widely. A good example of this type is Ms Office.

Custom. There are some companies that hire computer programmers solely to produce software that meets their needs. This software is only used for the use of certain companies only.

Shareware. Software like this is commonly found on the internet, available for free can be used in certain usually within 30 days. To use it after 30

days payment must be made to the company or individual who developed it.

Freeware. Software like this is commonly found on the internet, anyone can use it without time limit. It is protected by copyright so users cannot sell this software for profit.

Public domain. This software is free from copyright can be used without error. Usually, this software has been donated by its maker for anyone to use without limit.

Software Categories.

There are many categories of software that can be found in the market. This software is used to helps user to complete their task in many ways. These categories are.

Business software. Business software is application software used to help users to be more efficient and effective in carrying out daily business tasks. Business software includes Word processing, Data spreadsheets Graphic presentation databases, PIM, PDA business software, package software, project management software and accounting.

Software	Function
Word Processing	The most widely used and widely used software. This software allows tasks such as editing, formatting, saving, and printing text to be done easily. Features of this software Change the shape, type, size and colour of the text. Produce and organize documents into specific layouts such as newspapers. Ability to combine images, graphics, clip art or photographs. Ability to identify spelling errors Ability to determine document size

Spreadsheets	Used to manage and analyse data such as examination score data, finance, name list etc. In a spreadsheet, data is filled in the form of rows and columns known as worksheets. Complete data can be analysed easily such as counting numbers, arranging names in alphabetical order. With it you can also visualize data in the form of bar charts, pies etc.
Presentation	This software is used to show charts, maps or graphics as a viewing or presentation. By using an LCD or projector on -screen content can be displayed on the screen for public viewing.
Note taking	This software allows users to insert handwriting, drawings or sketches on any part of the page screen and save and become part of the document.
Software Suite	A collection of application software sold in packages. When the user installs this software, the entire package will be installed in the user's computer. The advantage of packaged software is that it costs less than buying the software individually.
Project Management	This software allows users to plan, identify, analyse everything that happens in a project including costs, available resources, and time of a project.
Accounting	Software used by a company to assist the company in in financial activities such as recording, financial reporting, this buying and selling journey allows a complete financial report for the use of company managers.

Graphics And Multimedia Software. This software is commonly used by users involved in the fields of engineering, architecture, publishing, and graphic design.

Software	Function
Computer Aided Design	This software helps users such as engineers to design tools before the actual tools are produced. For architects, this software helps to design building plans in terms of site structure and overall building. For scientists this software helps to design the shape of the molecular structure.
Desktop Publishing	Allows users to design and produce high quality documents containing text, graphics, colour etc. as in magazines or newspaper publications.
Image Editing	Graphic artists, multimedia developers, magazine publishers use this software to modify graphic images for use in their products. The software allows users to draw, create objects assisted by tools such as pens, pencils, and brushes digitally.

Video And Audio Editing	Software allows users to modify video segments into video clips. For example, the video can have subtitles added, cut out whichever is not needed, and take only a few excerpts. Examples of audio editing software such as adobe premiere. Audio editing software allows users to modify audio segments into audio clips. These modifications such as removal of background noise, removal of background noise during recording, and modifying the audio tempo from short tones to long tones. Examples of audio editing software such as sound forge.
Multimedia Authoring	Multimedia developer software is application software that can integrate all multimedia elements in one package. These multimedia elements include text, graphics, audio, video, and animation. With this the software works to produce an application that contains these elements. Examples of multimedia developer software include Director, Authorware. The examples of applications developed using multimedia developer software are game applications, children's learning applications and let's cook applications.
Web Page Authoring	Website developer software helps users develop websites. This software allows all multimedia elements to be included on the website. Users are allowed to enter, maintain, and update the website.

Figure 3.1 : Desktop Publishing Software

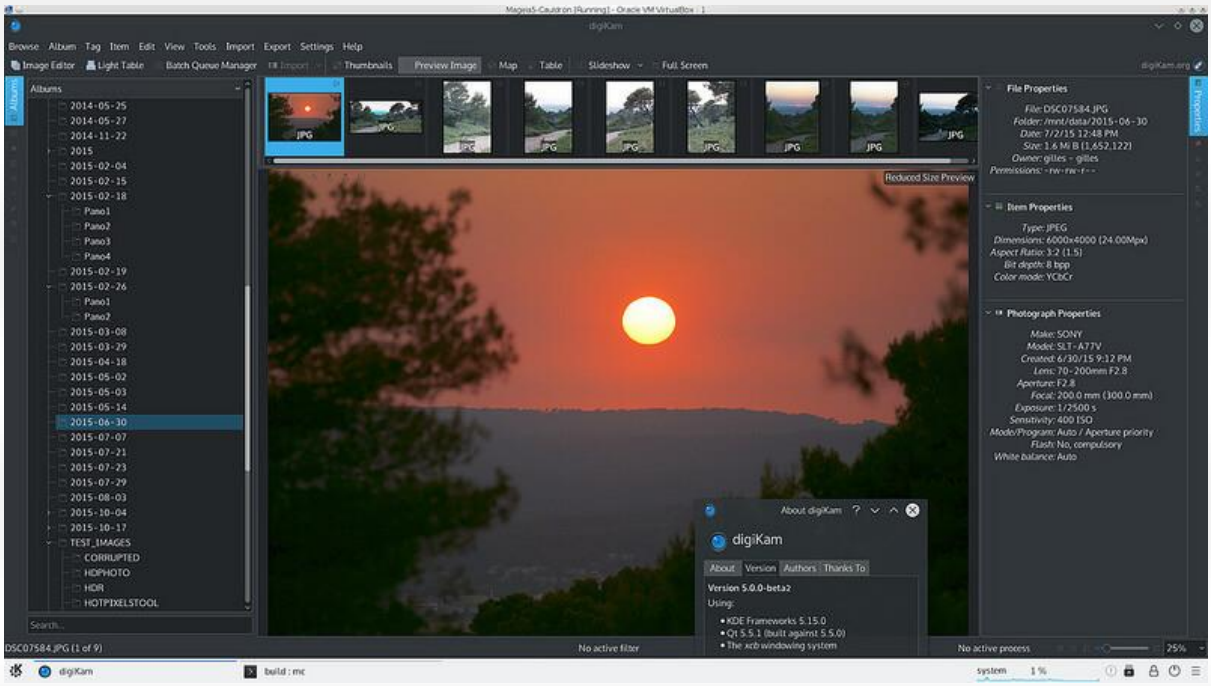

Figure 3.2 : Image Editing Software

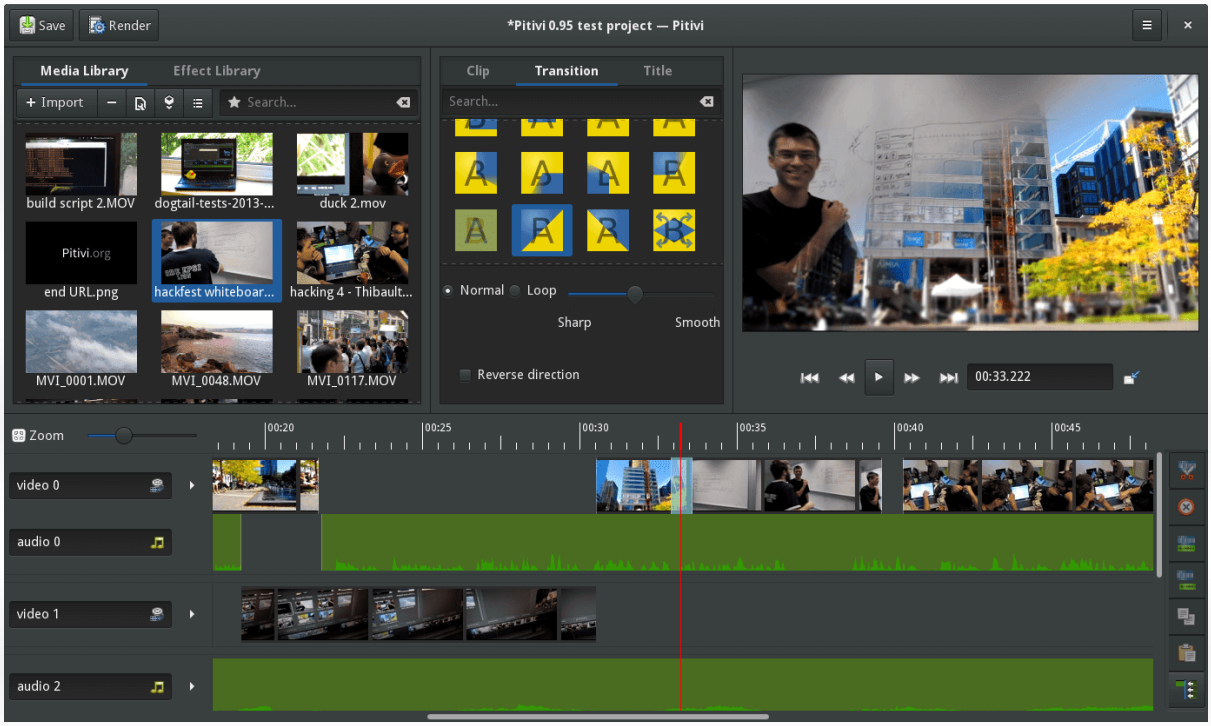

Figure 3.3 : Video Editing Software

Individual user software, home, and education

Most computer users are so dependent on software that is 'task oriented' or better known as application software.

Software	Function
Software Suite	This software is a collection of application software sold in packages. When the user installs this software, the entire package will be installed in the user's computer. Examples are Microsoft office. The advantage of packaged software is that it costs less than buying the software individually.
Personal Accounting Software	The software used by the company to assist the company in in financial activities such as recording, financial reporting, buying, and selling journey allows a complete financial report for the use of company managers.
Image Editing	The software allows users to draw, create objects assisted by tools such as pens, pencils, and brushes digitally.
Education And Reference	Educational and reference software is software that provides instruction to users on how to do something. For example, the Learn to Cook software teaches users how to cook.
Entertainment	Entertainment software is software that provides entertainment to users such as game software, software that supports hobbies and video.
Communication	Software that enables user to communicate with other people around the world. Example is media social application such as Facebook, Instagram, and Forum.

Figure 3.4 : Microsoft Office Software

3.2 Operating system and utility program

To enable application software to be implemented we need a type of software called **system software**. The system software acts as an agent that allows communication between users, applications, and computer hardware to take place. The system software consists of programs referred to as operating systems.

What Is System Software?

System software is defined as all programs including operating systems whose function is to control all operations of hardware computer. Among the functions of system software are:

- ✓ Control when starting a computer system
- ✓ Loading and executing application software
- ✓ Store and receive files or information

Operating System.

Operating System is a program/software that functions to control all operations that take place in a computer and acts as an interface between users, application software and computer hardware. A computer will not operate without this OS.

The Operating System is stored in the user's hard disk, every time we start the computer the Operating System will be transferred and brought from the hard disk into the computer's memory until all important programs are completed. This process is called loading.

One of the important features in which Operating System provide is the user interface, where this interface serves to determine how users and computers interact. The interface also controls how we enter data, commands and how information is displayed on a computer screen.

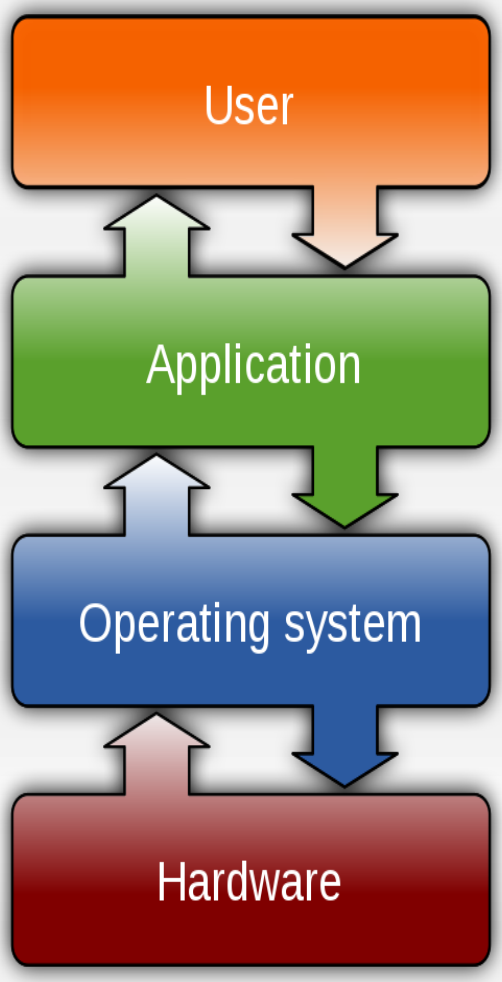

Figure 3.5 : Operating System Role

Program Utilities.

This type of software that are installed on an Operating System and have a function that is specific to a task.

Type	Description
File Conversion	When a user uses application software, this software will name the file with one name and have a specific symbol such as MS Word using the name .doc on each named file. With the conversion file we can read the typed document without using Ms Word or other word processing software.

Backup Software	Allows us to re -copy important programs in storage such as disk cartridges or other secondary storage devices.
Diagnostic	Allows a computer system to maintain its performance in both software and hardware. A faulty system can be easily detected.
Antivirus	Antivirus programs are very important to prevent computers from being infected with computer viruses that can damage the entire computer system.

Checkpoint

Instructions: Find the true statement below. Then, rewrite the remaining false statements so they are true.

1. Application software serves as the interface between the user, the apps, and the computers or mobile device's hardware.
2. While a computer or mobile device is running, the operating system remains in memory.
3. When downloading shareware, freeware, or public-domain software, it is good practice to seek websites with ratings for and reviews of products.
4. With database software, users run functions to retrieve data.

ACTIVITY

Explain software that you use every day to facilitate your daily life.

FILL IN THE BLANKS

1. A _____, consists of a series of related instructions, organized for a common purpose, that tells the computer what tasks to perform and how to perform them
2. An _____, consists of programs designed to make users more productive and/or assist them with personal tasks

3. An _____ is a set of programs that coordinates all the activities among computer or mobile device hardware
4. _____ applications can assist you in becoming more effective and efficient while performing daily activities at work, school, and home
5. _____ software allows users to create and manipulate documents
6. _____ is a collection of drawings, photos, and other images
7. _____ software allows users to create visual aids for presentations to communicate ideas, messages, and other information to a group
8. _____ software allows users to organize data in rows and columns and perform calculations
9. A _____ is a collection of data organized in a manner that allows access, retrieval, and use of that data
10. A _____ is a collection of individual programs available together as a unit

SUMMARY

This chapter presented a variety of programs and apps available for computers and mobile devices. You learned about the role of the operating system and the various ways software is distributed. The chapter presented the features of a variety of productivity applications, graphics and media applications, and personal interest applications.

KEY TERM

Application	**Program**
Operating system	**Utilities**
Antivirus	**software**
blog	**execute**
desktop computer	**application software**

REFERENCES

Misty E. Vermaat, Susan L. Sebok, Steven M. Freund etc. *Discovering Computers ©2018: Digital Technology, Data, and Devices*. Cengage Learning. 20182.

TOPIC 4

Input and Output

LEARNING OUTCOMES

By the end of topic, you should be able to:

1. Explain input and its device
2. Explain output and its device

4.1 What is Input?

Input refers to the process of entering data, programs, commands, and user actions into computer memory. There are 4 types of inputs used by computers, namely:

Data: refers to raw data such as numbers, words, images or sounds received by a computer from an input device and processed to produce information.

Program: all the instructions that instruct the computer to perform an operation and then process the data into information.

Command: is a keyword or phrase for input that directs the computer to perform an activity such as using a mouse or keyboard or other types of input tools.

User Response: refers to the data entered by the user because of the response by the example software as below:

4.2 Input Device

Input device is any tools that have been used to enter data or instruction into the computer. There are many types of input device in variation of the way how it is used.

Keyboard is the most used input tool. Using the keyboard, input is entered by pressing keys on the keyboard.

Figure 4.1 : Keyboard

Pointing Devices allow users to control symbols/icons on the computer screen. The Pointer Tool is also known as a mouse pointer. We also use pointing tools to select text, images or move objects on the screen and start a program.

Mouse

A palm -sized pointer is used to control the movement of the cursor on the screen. Mouse is usually placed on a flat surface or use a mouse pad (mouse pad).

Figure 4.2 : Mouse

Touchpad

The touchpad is a flat square surface, which detects the movement of a fingertip on its surface to control the movement of the cursor on the screen. Touch pads are usually only found on a laptop because of their space - saving nature.

Figure 4.3 : Touch pad

Joystick

A common input device used for computer games only. Joysticks are essential for vertical and horizontal movement and there are buttons that can be pressed on this gadget.

Figure 4.4 : Joystick

Pen Input

Pen like stick that can be used write on the surface of the smartphone or tablet.

Figure 4.5 : Pen Input

Touch Screen

This tool allows the user to touch the surface of the screen to enter data or make selections from the provided icons.

Figure 4.6 : Touch Screen

Scanner

A scanner is an input device that electronically scans text or images and is inserted into a computer. The scanner converts the original text or image into a form of digital data that will be stored on the hard disk and processed in the computer. To scan the text, the scanner uses a technology called OCR (Optical Character Recognition) along with OCR software to scan the text in hardcopy to softcopy.

Figure 4.7 : Scanner

Sound Input/Voice Input

It is usually recorded using a microphone connected to a sound card or a musical instrument such as an electronic music keyboard to a sound card. Sound editing software is used to change the sound.

Figure 4.8 : Voice input

Digital Camera.

Digital camera stores the image taken in a memory in digital form. This image can be used in a computer for display, or editing.

Figure 4.9 : Digital Camera

Digital Camcorder.

Digital camcorder records video in digital form. The video can be edit using video editing software.

Figure 4.10 : Digital Camcorder

4.3 What is Output?

Output refers to data that has been processed into a useful form called information, it can be used by computers or users.

Output can be in two forms, that is printed version or on the screen. The printed output is called **hard copy**, while the output displayed on the screen is called **soft copy**. Audio and video are also output.

4.4 Output Device

Audio Output

Consists of sound including words or music generated by a computer. Speakers are audio output devices especially for multimedia computers.

Figure 4.11 : Speaker

Monitor

A display surface called a screen, and the internal electronic part is protected by plastic on the outside.

Figure 4.12 : Monitor

Flat panel display

A thin display device and does not use CRT technology.

Resolution

Resolution (intensity) can be said to be the ability of a monitor to display the highest image quality that can be achieved by the monitor. This resolution depends on the type of video adapter card and the capabilities of the monitor itself.

Printer

The printer allows all output in softcopy form to be transferred to form hardcopy. Generally, printers can be divided into 2:

1. Impact
2. Nonimpact

This classification is based on how the printer transfers characters to the printing paper.

Impact Printer

This type of printer transfers the image onto paper using a typewriter -like mechanism, where paper, ink ribbons and tapers encounter each other to produce an alphabet.

Dot Matrix

Printer This printer produces an image by tapping a pin on an inked ribbon. The printer head consists of tubes containing pins which when pressed onto ribbon and paper, small dots will form. The combination of these small dots produces a character. Dot matrix printers usually have a different number of pins such as 9 pins or 24 pins, the higher the number of pins the better the print quality.

Non-impact Printer

Nonimpact printers because the printing process takes place without any contact mechanism on the printing medium. Examples of this type of printer:

Injet.

This printer works by spraying ink on the printing medium. Paint quality is usually determined based on dpi (dot per inch) which is how much spray to produce dots in one square inch.

Figure 4.13 : Dot matrix

Figure 4.13 : InkJet

Laser.

Printer This printer acts like a photocopier where the laser radiation is converted into different charge forms and the charged toner (ink) is transferred to the printing medium.

Figure 4.14 : Laser Printer

Therma printer.

This type of printer uses heated coloured wax and the resulting combination of the heated wax is transferred to the printing medium.

Figure 4.15 : Thermal Printer

Plotter.

A non-impact printer used to draw lines as in building plans and engineering designs.

Figure 4.16 : Plotter

Checkpoint 4

Instructions: Find the true statement below. Then, rewrite the remaining false statements so they are true.

1. On notebook and some handheld computers, PDAs, and smart phones, the keyboard is built in the top of the system unit.
2. An air mouse is a newer type of motion-sensing mouse that allows you to control objects, media players, and slide shows by moving the mouse in predetermined directions through the air.
3. Resolution is the number of horizontal and vertical pixels in a display device.

ACTIVITY

Explain the most common input device that you used every day.

Short Questions

1. What is input?
2. List FOUR (4) types of input by users.
3. Give examples of input types of pointing devices (pointing devices)
4. What does the output say?
5. Give an example of an output tool.
6. How do impact and nonimpact printers differ? Give examples of printers for both types of printers.

SUMMARY

- Technology and interactive media are learning tools that are able to support childrens education, growth and relationship.
- Computers cause challnes in social , emotional and languages development.
- Computers encourage childreen to think effectively
- Technology and interactive media are learning tools that are able to support childrens education, growth and relationship.

KEY TERM

Input	**Output**
Mouse	**Keyboard**
Scanner	**Printer**
Touch pen	**Plotter**

REFERENCES

Misty E. Vermaat, Susan L. Sebok, Steven M. Freund etc. *Discovering Computers ©2018: Digital Technology, Data, and Devices*. Cengage Learning. 20182.

TOPIC 5

Components of System Unit

LEARNING OUTCOMES

By the end of topic, you should be able to:

1. Describe the components in system unit
2. Define processor
3. Explain the function of a bus
4. Explain the purpose of a power supply and batteries

5.1 The system unit

The system unit is a case that contains electronic components of the computer used to process data. System units are available in a variety of shapes and sizes. The case of the system unit is made of metal or plastic and protects the internal electronic components from damage. All computers have a system unit (Figure 5.1).

Figure 5.1 : System Unit

System unit have a variety of components inside it. Some of these components, which include the processor, memory, adapter cards, drive bays, and the power supply.

The processor interprets and carries out the basic instructions that operate a computer.

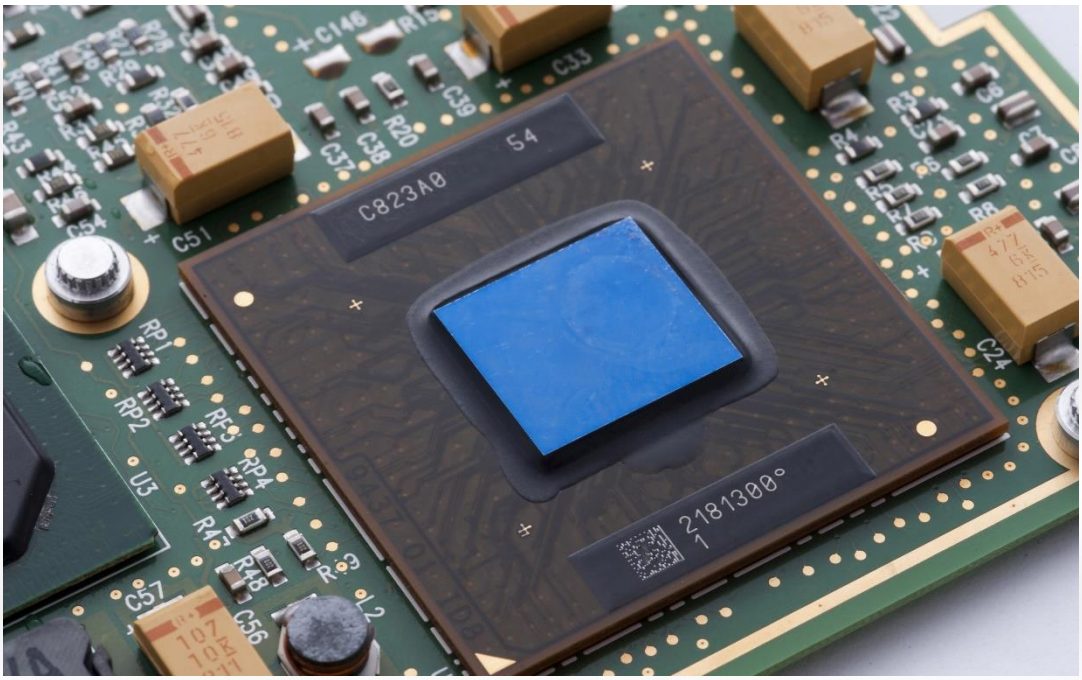

Figure 5.2 : Processor

Memory typically holds data waiting to be processed and instructions waiting to be executed.

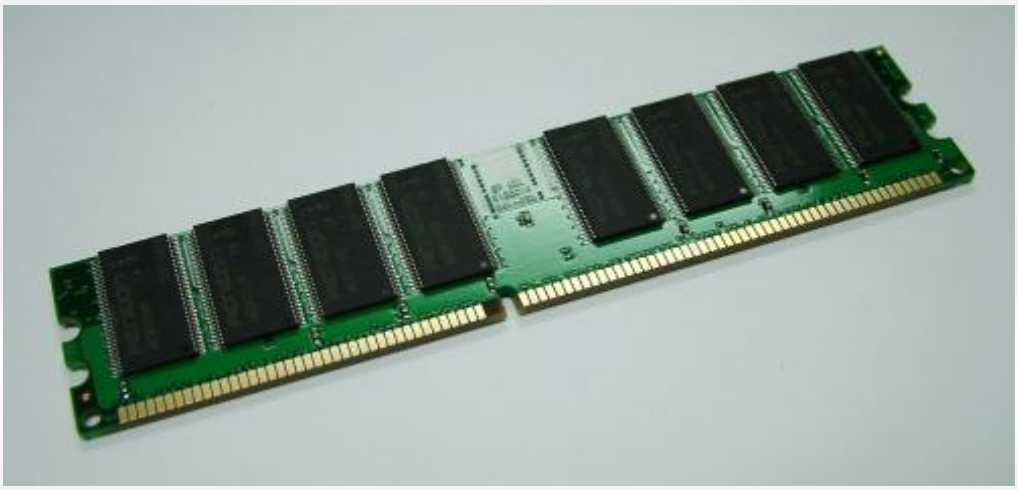

Figure 5.3 :Memory

The electronic components and circuitry of the system unit, such as the processor and memory, usually are part of or are connected to a circuit board called the motherboard.
Many motherboards also integrate sound, video, modem, and networking capabilities.

The motherboard, sometimes called a system board, is the main circuit board of the system unit. Many electronic components attach to the motherboard; others are built into it.

Figure 5.4 :Motherboard

5.2 Processor

The processor, also called the central processing unit (CPU), interprets and carries out the basic instructions that operate a computer. The processor significantly impacts overall computing power and manages most of a computer's operations. On a personal computer, all functions of the processor usually are on a single chip. Some computer and chip manufacturers use the term microprocessor to refer to a personal computer processor chip.

Processors contain a control unit and an arithmetic logic unit (ALU). These two components work together to perform processing operations.

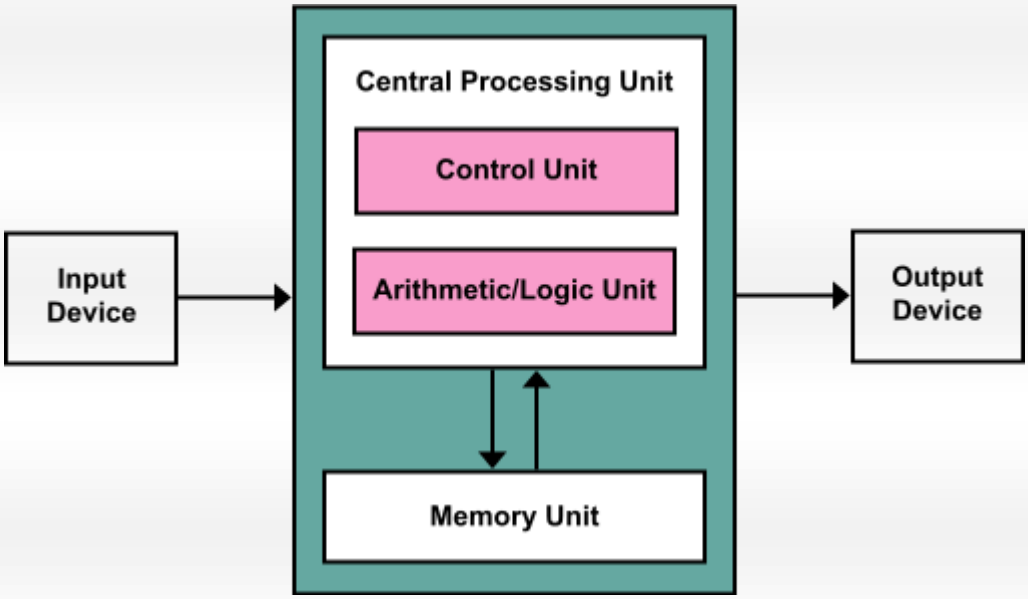

Figure 5.5 :Processor Components

The Control Unit

The control unit is the component of the processor that directs and coordinates most of the operations in the computer.

The Arithmetic Logic Unit

The arithmetic logic unit (ALU), another component of the processor, performs arithmetic, comparison, and other operations. Arithmetic operations include basic calculations such as addition, subtraction, multiplication, and division. Comparison operations involve comparing one data item with another to determine whether the first item is greater than, equal to, or less than the other item. Depending on the result of the comparison, different actions may occur.

5.3 Memory

Memory consists of electronic components that store instructions waiting to be executed by the processor, data needed by those instructions, and the results of processed data (information). Memory usually consists of one or more chips on the motherboard or some other circuit board in the computer.

Memory stores three basic categories of items:

- ✓ the operating system and other system software that control or maintain the computer and its devices;
- ✓ application programs that carry out a specific task such as word processing; and
- ✓ the data being processed by the application programs and resulting information. This role of memory to store both data and programs is known as the stored program concept

Types of Memory

The system unit contains two types of memory: volatile and nonvolatile.

Volatile memory loses its contents when the computer's power is turned off.

Nonvolatile memory, by contrast, does not lose its contents when power is removed from the computer. Thus, volatile memory is temporary and nonvolatile memory is permanent.

RAM

Random Access Memory (RAM) is the most common type of volatile memory. Examples of nonvolatile memory include ROM, flash memory, and CMOS.

ROM

Read-only memory (ROM pronounced rahm) refers to memory chips storing permanent data and instructions. The data on most ROM chips cannot be modified — hence, the name read-only. ROM is nonvolatile, which means its contents are not lost when power is removed from the computer.

Flash Memory

Flash memory is a type of nonvolatile memory that can be erased electronically and rewritten. Most computers use flash memory to hold their startup instructions because it allows the computer easily to update its contents.

5.4 Expansion slot and adapter cards

An expansion slot is a socket on the motherboard that can hold an adapter card. An adapter card, sometimes called an expansion card, is a circuit board that enhances functions of a component of the system unit and/or provides connections to peripherals. A peripheral is a device that connects to the system unit and is controlled by the processor in the computer. Examples of peripherals are modems, disk drives, printers, scanners, and keyboards.

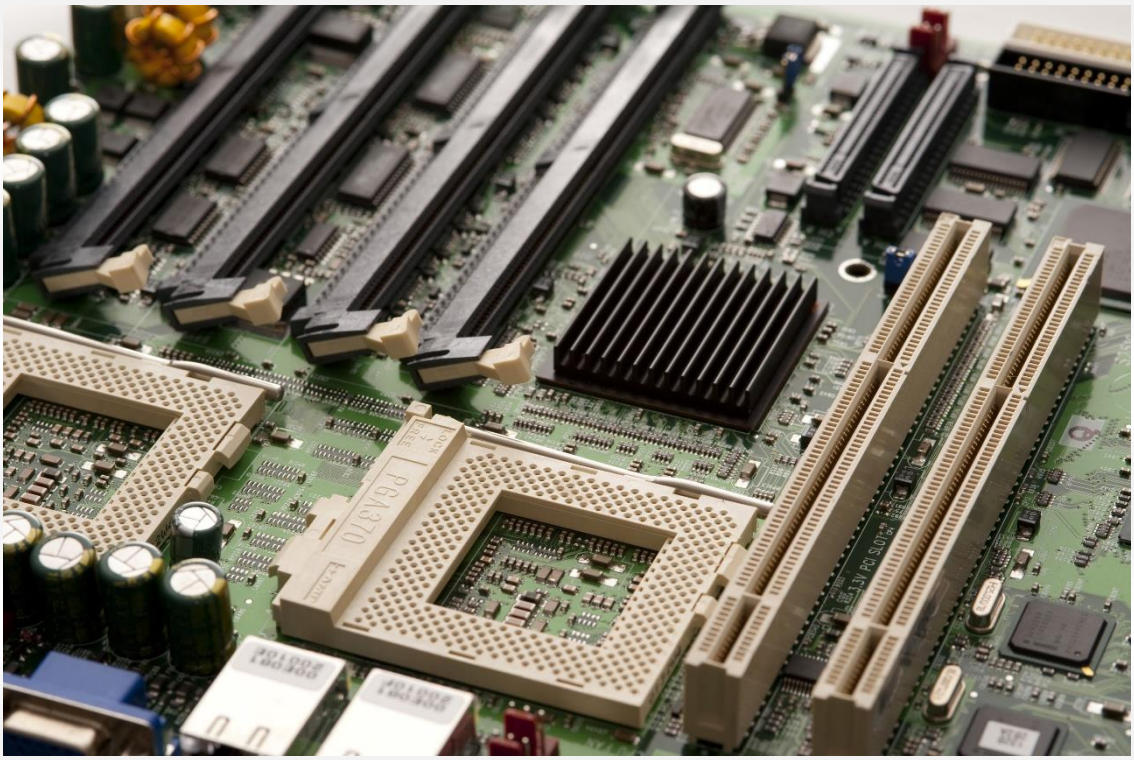

Figure 5.6 : Expansion Slot

5.5 Ports and connectors

PORTS AND CONNECTORS

A port is the point at which a peripheral attaches to or communicates with a system unit so the peripheral can send data to or receive information from the computer. An external device, such as a keyboard, monitor, printer, mouse, and microphone, often attaches by a cable to a port on the system unit.

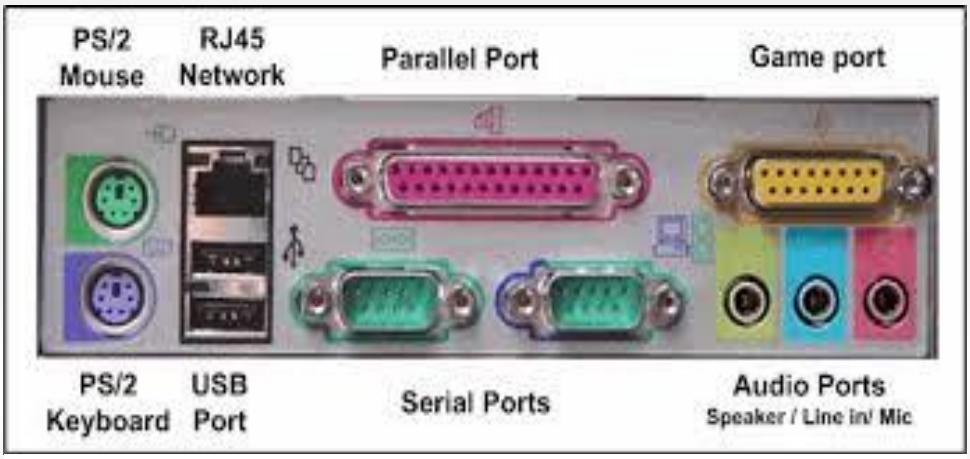

Figure 5.7 : Variety of Ports

Serial Ports

A serial port is a type of interface that connects a device to the system unit by transmitting data one bit at a time. Serial ports usually connect devices that do not require fast data transmission rates, such as a mouse, keyboard, or modem.

Figure 5.8 : Serial Ports

Parallel Ports

Unlike a serial port, a parallel port is an interface that connects devices by transferring more than one bit at a time. Parallel ports originally were developed as an alternative to the slower speed serial ports. Some printers can connect to the system unit using a parallel port. This parallel port can transfer eight bits of data (one byte) simultaneously through eight separate lines in a single cable.

Figure 5.9 : Parallel Port

USB Ports

A USB port, short for universal serial bus port, can connect up to 127 different peripherals together with a single connector. Devices that connect to a USB port include the following: mouse, printer, digital camera, scanner, speakers, portable media player, CD, DVD, smart phone, PDA, game console, and removable hard disk.

Figure 5.10 : USB Ports

5.6 Buses

BUSES

A computer processes and stores data as a series of electronic bits. These bits transfer internally within the circuitry of the computer along electrical channels. Each channel, called a bus, allows the various devices both inside and attached to the system unit to communicate with each other. Just as vehicles travel on a highway to move from one destination to another, bits travel on a bus. Buses transfer bits from input devices to memory, from memory to the processor, from the processor to memory, and from memory to output or storage devices.

Figure 5.11 : Computer Buses

Checkpoint 5

Instructions: Find the true statement below. Then, rewrite the remaining false statements so they are true.

1. The motherboard also is called a system boar
2. On a personal computer, all functions of the processor usually are on a single chip.
3. The system clock keeps track of the date and time in a computer.
4. In cloud computing, the back end consists of the servers and storage devices that manage and store the
5. Most RAM is nonvolatile
6. The processor interprets and executes a program or application's instructions while the program or application

ACTIVITY

Explain the specifications of your computer

Short Question

1. Explain 2 parts of a processor
2. A computer might have these three types of buses. Explain it
3. The system unit contains two types of memory. Volatile and nonvolatile. Explain it
4. List two common types of RAM chips
5. Differentiate RAM and ROM

SUMMARY

- Technology and interactive media are learning tools that are able to support childrens education, growth and relationship.
- Computers cause challnes in social , emotional and languages development.
- Computers encourage childreen to think effectively
- Technology and interactive media are learning tools that are able to support childrens education, growth and relationship.

KEY TERM

central processing unit	**computer**
computer literacy	**data**
developer	**embedded computer**
blog	**execute**
desktop computer	**application software**

REFERENCES

Misty E. Vermaat, Susan L. Sebok, Steven M. Freund etc. *Discovering Computers ©2018: Digital Technology, Data, and Devices*. Cengage Learning. 20182.

TOPIC 6

Storage

LEARNING OUTCOMES

By the end of topic, you should be able to:

1. Describe the characteristics of magnetic disks
2. Describe the characteristics of a hard disk
3. Discuss various types of miniature, external, and removable hard disks
4. Describe the characteristics of optical discs
5. Differentiate among various CD and DVD formats
6. Identify the uses of tape

6.1 Storage

Storage holds data, instructions, and information for future use.

A **storage medium** (media is the plural), also called secondary storage, is the physical material on which a computer keeps data, instructions, and information. Examples of storage media are hard disks, floppy disks, CDs and DVDs, tape, PC Cards and ExpressCard modules, flash memory cards, USB flash drives, smart cards, and microfilm.

Figure 6.1 : Computer Storage

Capacity is the number of bytes (characters) a storage medium can hold. Figure 6-2 identifies the terms manufacturers use to define the capacity of storage media. For example, a reasonably priced USB flash drive can store

up to 512 MB of data (approximately 512 million bytes) and a typical hard disk has 250 GB (approximately 250 billion bytes) of storage capacity.

Nombre	Abrev.	Factor binario
bytes	B	$2^0 = 1$
kilo	k	$2^{10} = 1024$
mega	M	$2^{20} = 1\,048\,576$
giga	G	$2^{30} = 1\,073\,741\,824$
tera	T	$2^{40} = 1\,099\,511\,627\,776$
peta	P	$2^{50} = 1\,125\,899\,906\,842\,624$
exa	E	$2^{60} = 1\,152\,921\,504\,606\,846\,976$
zetta	Z	$2^{70} = 1\,180\,591\,620\,717\,411\,303\,424$
yotta	Y	$2^{80} = 1\,208\,925\,819\,614\,629\,174\,706\,176$

Figure 6.2 : Memory Capacity Measurement

A **storage device** is the computer hardware that records and/or retrieves items to and from storage media.

Writing is the process of transferring data, instructions, and information from memory to a storage medium.

Reading is the process of transferring these items from a storage medium into memory. When storage devices write data on storage media, they are creating output.

The **speed** of storage devices is defined by access time. Access time measures the amount of time it takes a storage device to locate an item on

a storage medium. The access time of storage devices is slow, compared with the access time of memory.

6.2 Hard disk

A **hard disk** is a storage device that contains one or more inflexible, circular platters that store data, instructions, and information. People use hard disks to store all types of documents, spreadsheets, presentations, databases, e-mail messages, Web pages, digital photographs, music, videos, and software.

The system unit on most desktop and notebook computers contains at least one hard disk. The entire device is enclosed in an airtight, sealed case to protect it from contamination. A hard disk that is mounted inside the system unit sometimes is called a fixed disk because it is not portable

Characteristics Of A Hard Disk

Characteristics of a hard disk include capacity, platters, read/write heads, cylinders, sectors and tracks, revolutions per minute, transfer rate, and access time.

The **capacity** of a hard disk is determined from the number of platters it contains, together with composition of the magnetic coating on the platters.

A **platter** is made of aluminum, glass, or ceramic and is coated with an alloy material that allows items to be recorded magnetically on its surface. The coating usually is three millionths of an inch thick. On desktop computers, platters most often have a size of approximately 3.5 inches in diameter. A typical hard disk has multiple platters stacked on top of one another. Each platter has two read/write heads, one for each side. The hard

disk has arms that move the read/write heads to the proper location on the platter.

Figure 6.3 : Hard Disc

6.3 Flash memory

Flash Memory Cards

Common types of flash memory cards include CompactFlash (CF), Secure Digital (SD), xD Picture Card, and Memory Stick. Depending on the device, manufacturers claim miniature mobile storage media can last from 10 to 100 years. To view, edit, or print images and information stored on miniature mobile storage media, you transfer the contents to your desktop computer or other device. Some printers have slots to read flash memory cards. If your computer or printer does not have a built-in slot, you can purchase a card reader/writer, which is a device that reads and writes data, instructions, and information stored on flash memory cards. Card

reader/writers usually connect to the USB port or FireWire port on the system unit. The type of card you have will determine the type of card reader/writer needed.

Figure 6.4 : Flash Drive

6.4 Cloud storage

Some users choose online storage instead of storing data locally on a hard disk. Online storage is a service on the Web that provides hard disk storage to computer users, for free or for a minimal monthly fee.

Users subscribe to an online storage service for a variety of reasons:

- ✓ To access files on the Internet hard disk from any computer or device that has Internet access
- ✓ To allow others to access files on their Internet hard disk so others can listen to an audio file, watch a video clip, or view a picture — instead of e-mailing the file to them
- ✓ To view time-critical data and images immediately while away from the main office or location; for example, doctors can view x-ray images from another hospital, home, or office
- ✓ To store offsite backups of data Once users subscribe to the online storage service, they can save on the Internet hard disk in the same manner they save on their local hard disk.

Figure 6.5 : Cloud Storage

6.5 Optical disc

An optical disc is a type of optical storage media that consists of a flat, round, portable, disc made of metal, plastic, and lacquer. These discs usually are 4.75 inches in diameter and less than one-twentieth of an inch thick.

Optical discs primarily store software, data, digital photographs, movies, and music. Some optical disc formats are read only, meaning users cannot write (save) on the media. Others are read/write, which allows users to save on the disc just as they save on a hard disk.

Figure 6.6 : Optical Disc

6.6 Solid State Drive

A solid-state drive (SSD) is a new generation of storage device used in computers. SSDs use flash-based memory, which is much faster than a traditional mechanical hard disk.

The new solid-state drives work completely differently. They use a simple memory chip called NAND flash memory, which has no moving parts and near-instant access times.

Why SSD Is Better than HDD

Speed: Speed is the most prominent and significant advantage of an SSD over an HDD. Since it doesn't have moving parts, an SSD can read data 10 times faster than an HDD and write 20 times faster. Moreover, the HDD's copying process ranges between 30 MB/s and 150 MB/s, whereas a standard SSD takes 500 MB/s. This way, SSDs deliver faster boot times, load times for applications and files (e.g. games and videos), and data transfer.

Energy Efficiency: Due to an HDD's dependency on lots of mechanical operations, it's power-hungry storage. In contrast, SSDs are more energy-efficient and consume less power, prolonging battery life.

No Overheating: SSDs are more heat-resistant, whereas HDDs tend to overheat, compromising the system's overall performance.

Build: Having no moving parts gives an SSD an edge over HDD in terms of durability. It's a more reliable storage device, doesn't vibrate, and can

endure shocks, which HDD can't. SSDs are also quiet, whereas HDDs are noisy.

Weight: SSDs are lightweight compared to HDDs, making them more efficient in performance and functionality.

Figure 6.7 : SSD

Checkpoint 6

Instructions: Find the true statement below. Then, rewrite the remaining false statements so they are true.

1. Storage devices can be categorized as input or output devices.
2. A storage medium is volatile; that is, items stored on it remain intact even when you turn off a computer or mobile device.
3. Compared with the access time of memory, the access time of storage devices is slow.
4. On storage media, a higher density means less storage capacity.

ACTIVITY

What type of memory that you used in your handphone? Can you differentiate it?

Short Questions

1. In terms of storage devices, what is reading and writing?
2. Is a screen display volatile or nonvolatile?
3. What does access time measure?
4. Explain FIVE (5) types of storage.

SUMMARY

- This chapter discussed different types of memory used in computer system

KEY TERM

Memory	**RAM**
ROM	**Harddisk**
Flash Memory	**Cloud Storage**

REFERENCES

Misty E. Vermaat, Susan L. Sebok, Steven M. Freund etc. *Discovering Computers ©2018: Digital Technology, Data, and Devices*. Cengage Learning. 20182.

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TOPIC 7

Operating System

LEARNING OUTCOMES

By the end of topic, you should be able to:

1. Identify the types of system software
2. Describe the functions of an operating system
3. Explain the purpose of the utilities included with most operating systems
4. Summarize the features of several stand-alone operating systems
5. Identify devices that use embedded operating systems
6. Explain the purpose of several stand-alone utility programs

7.1 System Software

When you purchase a personal computer, it usually has system software installed on its hard disk.

System software consists of the programs that control or maintain the operations of the computer and its devices. System software serves as the interface between the user, the application software, and the computer's hardware. Two types of system software are operating systems and utility programs. This chapter discusses the operating system and its functions, as well as several types of utility programs for personal computers

7.2 Operating Systems

An operating system (OS) is a set of programs containing instructions that coordinate all the activities among computer hardware resources. Most operating systems perform similar functions that include;

- ✓ starting a computer
- ✓ providing a user interface
- ✓ managing programs
- ✓ managing memory
- ✓ scheduling jobs
- ✓ configuring devices
- ✓ establishing an Internet connection
- ✓ monitoring performance
- ✓ providing file management utilities
- ✓ control a network
- ✓ administer security

7.3 Operating System Functions

Many different operating systems exist; however, most operating systems provide similar functions. The following sections discuss functions common to most operating systems. The operating system handles many of these functions automatically, without requiring any instruction from a user.

Starting a Computer

Booting is the process of starting or restarting a computer. When turning on a computer that has been powered off completely, you are performing

a cold boot. A warm boot, by contrast, is the process of using the operating system to restart a computer.

Figure 7.1 : Operating System Interface

Providing a User Interface

You interact with software through its user interface. That is, a user interface controls how you enter data and instructions and how information is displayed on the screen.

Managing Programs

Some operating systems support a single user and only one running program at a time. Others support thousands of users running multiple programs. How an operating system handles programs directly affects your productivity. A single user/single tasking operating system allows only one user to run one program at a time. PDAs, smart phones, and other small computing devices often use a single user/single tasking operating system. A single user/multitasking operating system allows a single user to work on

two or more programs that reside in memory at the same time. Users today typically run multiple programs concurrently. It is common to have an e-mail program and Web browser open at all times, while working with application programs such as word processing or graphics

Managing Memory

The purpose of memory management is to optimize the use of random access memory (RAM). RAM consists of one or more chips on the motherboard that hold items such as data and instructions while the processor interprets and executes them. The operating system allocates, or assigns, data and instructions to an area of memory while they are being processed. Then, it carefully monitors the contents of memory. Finally, the operating system releases these items from being monitored in memory when the processor no longer requires them.

Scheduling Jobs

The operating system determines the order in which jobs are processed. A job is an operation the processor manages. Jobs include receiving data from an input device, processing instructions, sending information to an output device, and transferring items from storage to memory and from memory to storage. A multiuser operating system does not always process jobs on a first-come, first-served basis. Sometimes, one user may have a higher priority than other users. In this case, the operating system adjusts the schedule of jobs. Sometimes, a device already may be busy processing one job when it receives a second job. This occurs because the processor operates at a much faster rate of speed than peripheral devices.

Configuring Devices

A driver is a small program that tells the operating system how to communicate with a specific device. Each device on a computer, such as the mouse, keyboard, monitor, printer, and scanner, has its own specialized

set of commands and thus requires its own specific driver. When you boot a computer, the operating system loads each device's driver. If you attach a new device to a computer, such as a printer or scanner, its driver must be installed before you can use the device. For many devices, the computer's operating system includes the necessary drivers. Today, many devices and operating systems support Plug and Play. Plug and Play means the operating system automatically configures new devices as you install them. With Plug and Play, a user can plug in a device, turn on the computer, and then use the device without having to configure the system manually.

Establishing an Internet Connection

Operating systems typically provide a means to establish Internet connections. Some operating systems also include a Web browser and an e-mail program, enabling you to begin using the Web and communicate with others as soon as you set up the Internet connection. Some also include utilities to protect computers from unauthorized intrusions and unwanted software such as viruses and spyware

Monitoring Performance

Operating systems typically contain a performance monitor. A performance monitor is a program that assesses and reports information about various computer resources and devices. The information in performance reports helps users and administrators identify a problem with resources so they can try to resolve any problems.

Providing File Management and Other Utilities

Operating systems often provide users with the capability of managing files, searching for files, viewing images, securing a computer from unauthorized access, uninstalling programs, scanning disks, defragmenting disks, diagnosing problems, backing up files and disks, and setting up screen savers.

Some operating systems have network features built into them. In other cases, the network OS is a set of programs separate from the operating system on the client computers that access the network. When not connected to the network, the client computers use their own operating system. When connected to the network, the network OS may assume some of the operating system functions.

Administering Security

The network administrator uses the network OS to establish permissions to resources. These permissions define who can access certain resources and when they can access those resources. For each user, the network administrator establishes a user account, which enables a user to access, or log on to, a computer or a network. Each user account typically consists of a user name and password. A user name, or user ID, is a unique combination of characters, such as letters of the alphabet or numbers, that identifies one specific user.

7.4 Utility Programs

A utility program, also called a utility, is a type of system software that allows a user to perform maintenance-type tasks, usually related to managing a computer, its devices, or its programs.

Utility programs included with most operating systems provide the following functions:

- ✓ managing files, searching for files
- ✓ viewing images
- ✓ securing a computer from unauthorized access
- ✓ uninstalling programs

- ✓ scanning disks
- ✓ defragmenting disks
- ✓ diagnosing problems
- ✓ backing up files and disks
- ✓ setting up screen savers

File Manager

A file manager is a utility that performs functions related to file management. Some of the file management functions that a file manager performs are displaying a list of files on a storage medium organizing files in folders; and copying, renaming, deleting, moving, and sorting files. A folder is a specific named location on a storage medium that contains related documents.

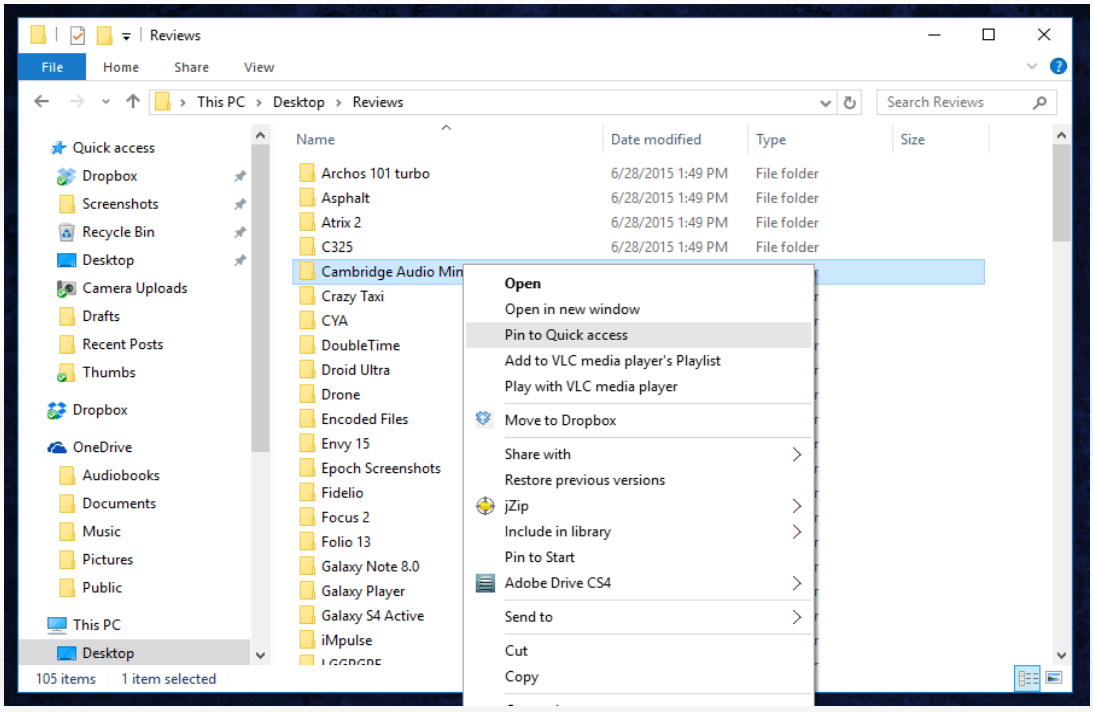


Figure 7.2 : File Manager

Search Utility

A search utility is a program that attempts to locate a file on your computer based on criteria you specify. The criteria could be a word or words contained in a file, date the file was created or modified, size of the file, location of the file, file name, author/artist, and other similar properties. Search utilities can look through documents, pictures, music, and other files.

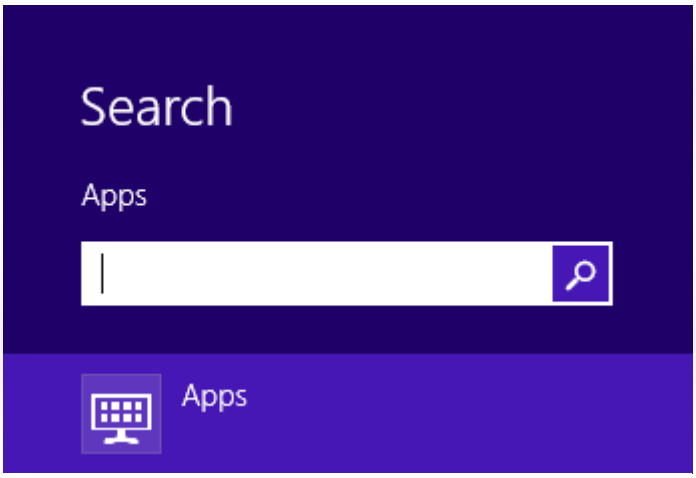


Figure 7.3 : Searching

Personal Firewall

A personal firewall is a utility that detects and protects a personal computer from unauthorized intrusions. Personal firewalls constantly monitor all transmissions to and from a computer. When connected to the Internet, your computer is vulnerable to attacks from a hacker. A hacker is someone who tries to access a computer or network illegally.

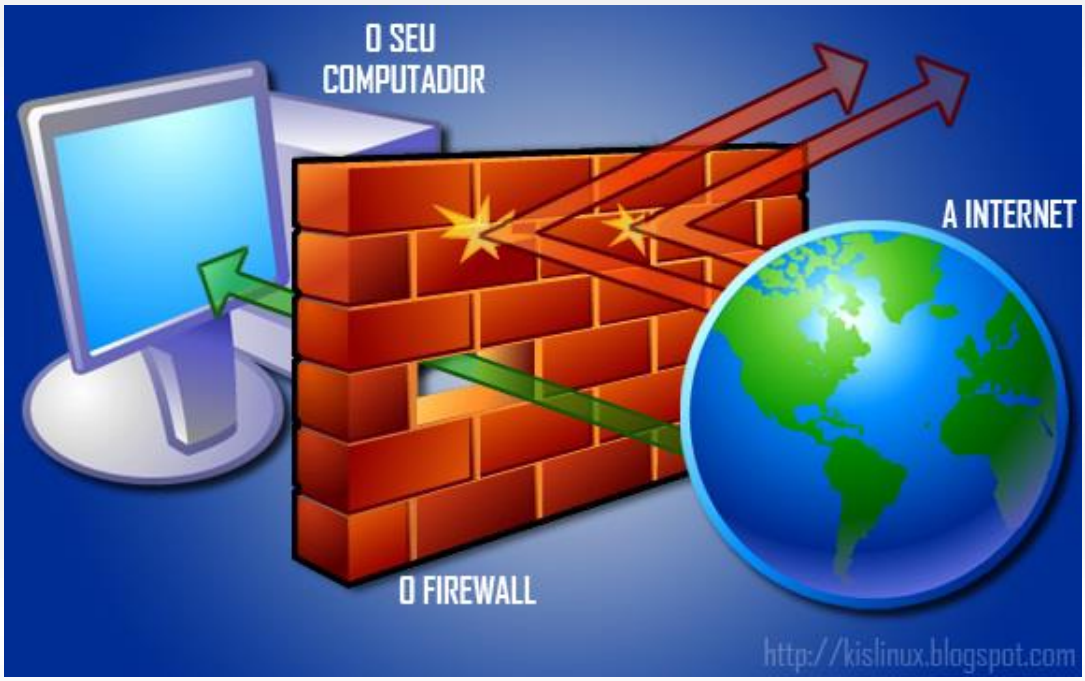


Figure 7.4 : Firewall

Uninstaller

An uninstaller is a utility that removes a program, as well as any associated entries in the system files. When you install a program, the operating system records the information it uses to run the software in the system files. The uninstaller deletes files and folders from the hard disk, as well as removes program entries from the system files.

Disk Scanner

A disk scanner is a utility that searches for and removes unnecessary files.

Disk Defragmenter

A disk defragmenter is a utility that reorganizes the files and unused space on a computer's hard disk so the operating system accesses data more quickly and programs run faster. When an operating system stores data on a disk, it places the data in the first available sector on the disk. It attempts

to place data in sectors that are contiguous (next to each other), but this is not always possible. When the contents of a file are scattered across two or more noncontiguous sectors, the file is fragmented. Fragmentation slows down disk access and thus the performance of the entire computer. Defragmenting the disk, or reorganizing it so the files are stored in contiguous sectors, solves this problem.

Diagnostic Utility

A diagnostic utility compiles technical information about your computer's hardware and certain system software programs and then prepares a report outlining any identified problems. Information in the report assists technical support staff in remedying any problems.

Backup Utility

A backup utility allows users to copy, or back up, selected files or an entire hard disk to another storage medium such as CD, DVD, external hard disk, tape, or USB flash drive. During the backup process, the backup utility monitors progress and alerts you if it needs additional discs or tapes. Many backup programs compress, or shrink the size of, files during the backup process. By compressing the files, the backup program requires less storage space for the backup files than for the original files. Because they are compressed, you usually cannot use backup files in their backed up form. In the event you need to use a backup file, a restore program reverses the process and returns backed up files to their original form. Backup utilities include restore programs. You should back up files and disks regularly in the event your originals ar

7.5 Types Of Operating Systems

When you purchase a new computer, it typically has an operating system preinstalled.The three basic categories of operating systems that exist today are desktop, network, and mobile operating system.

Desktop Operating System

A desktop operating system, sometimes called a stand-alone operating system, is a complete operating system that works on desktops, laptops, and some tablets. Desktop operating systems sometimes are called client operating systems because they also work in conjunction with a server operating system. Client operating systems can operate with or without a network.

Examples of the more widely used desktop operating systems are Windows, Mac OS, UNIX, Linux, and Chrome OS.

Windows is an operating system develop by Microsoft, which provided a graphical user interface. Since then, Microsoft continually has updated its Windows operating system, incorporating innovative features and functions with each subsequent version.

UNIX (pronounced YOU-nix) is a multitasking operating system and was implemented on many different types of computers. In the 1980s, the source code for UNIX was licensed to many hardware and software companies to customize for their devices and applications. As a result, several versions of this operating system exist, each with slightly different features or capabilities. Today, a version of UNIX is available for most computer.

Chrome Os introduced by Google, is a Linux-based operating system designed to work primarily with web apps. Apps are available through the Chrome Web Store, and data is stored on Google Drive.

Figure 7.5 : Windows Operating System

Figure 7.6 : Unix Operating System

Server Operating Systems

Network operating system is an operating system that is designed specifically to support a network. A network operating system typically resides on a server. The client computers on the network rely on the server(s) for resources. Many of the client operating systems discussed in the previous section work in conjunction with a network operating system.

Examples of server operating systems include the following:

Windows Server: Developed by Microsoft, Windows Server enables organizations to manage applications and websites on-site and/or on the cloud.

OS X Server: Developed by Apple, OS X Server enables organizations to collaborate, share files, host websites and mail servers, and more on Mac computers and iOS devices.

Mobile Operating Systems

The operating system on mobile devices and many consumer electronics is called a mobile operating system and resides on firmware. Popular mobile operating systems include Android, iOS, and Windows Phone.

Android

Android is an open source, Linux-based mobile operating system designed by Google for smartphones and tablets. A variety of manufacturers produce devices that run the Android operating system, adding their own interface elements and bundled software. As a result, an Android smartphone manufactured by Samsung may have different user interface features from one manufactured by Google.

Figure 7.6 : Android Operating System

Windows Phone

Windows Phone, developed by Microsoft, is a proprietary mobile operating system that runs on some smartphones.

ios

iOS (originally called iPhone OS), developed by Apple, is a proprietary mobile operating system specifically made for Apple's mobile devices. Supported devices include the iPhone, iPod Touch, and iPad.

Figure 7.7 :iOS

Checkpoint 7

Instructions: Find the true statement below. Then, rewrite the remaining false statements so they are true.

1. Every computer must have operating system
2. User interface is the same for all computers regardless of the operating system install
3. Desktop and mobile has the same operating system

ACTIVITY

Explain the operating system of Your computer and mobile device. Is it the same?

Short Question

1. Define the term, operating system. List the functions of an operating system.
2. List methods to start a computer or device.
3. Identify the five steps in the start-up process.
4. Explain the role of a boot drive.
5. List reasons why users might shut down computers or mobile devices regularly.
6. Define the term, user interface.
7. Describe how a computer manages memory.

SUMMARY

- Technology and interactive media are learning tools that are able to support childrens education, growth and relationship.
- Computers cause challnes in social , emotional and languages development.
- Computers encourage childreen to think effectively
- Technology and interactive media are learning tools that are able to support childrens education, growth and relationship.

KEY TERM

System software	**Operating system**
Booting	**File manager**
Utility Program	**Firewall**

REFERENCES

Misty E. Vermaat, Susan L. Sebok, Steven M. Freund etc. *Discovering Computers ©2018: Digital Technology, Data, and Devices*. Cengage Learning. 20182.

TOPIC 8

Computer Security and Safety: Ethics and Privacy

LEARNING OUTCOMES

By the end of topic, you should be able to:

1. Identify ways to safeguard against computer viruses, worms, Trojan horses, botnets, denial of service attacks, back doors, and spoofing
2. Discuss techniques to prevent unauthorized computer access and use
3. Identify safeguards against hardware theft and vandalism
4. Explain the ways to protect against software theft and information theft

8.1 Computer Security Risks

A **computer security risk** is any event or action that could cause a loss of or damage to computer hardware, software, data, information, or processing capability. Some breaches to computer security are accidental while others are planned intrusions.

Some intruders do no damage; they merely access data, information, or programs on the computer. Other intruders indicate some evidence of their presence either by leaving a message or by deliberately altering or damaging data.

An intentional breach of computer security often involves a deliberate act that is against the law. Any illegal act involving a computer generally is referred to as a computer crime.

The term **cybercrime** refers to online or Internet-based illegal acts.

Figure 8.1 : Cybercrime

8.2 Internet And Network Attacks

Information transmitted over networks has a higher degree of security risk than information kept on a company's premises. Internet and network attacks include computer viruses, worms, and Trojan horses; botnets; denial of service attacks; back doors; and spoofing.

A **computer virus** is a potentially damaging computer program that affects, or infects, a computer negatively by altering the way the computer works without the user's knowledge or permission. Once the virus infects the computer, it can spread throughout and may damage files and system software, including the operating system.

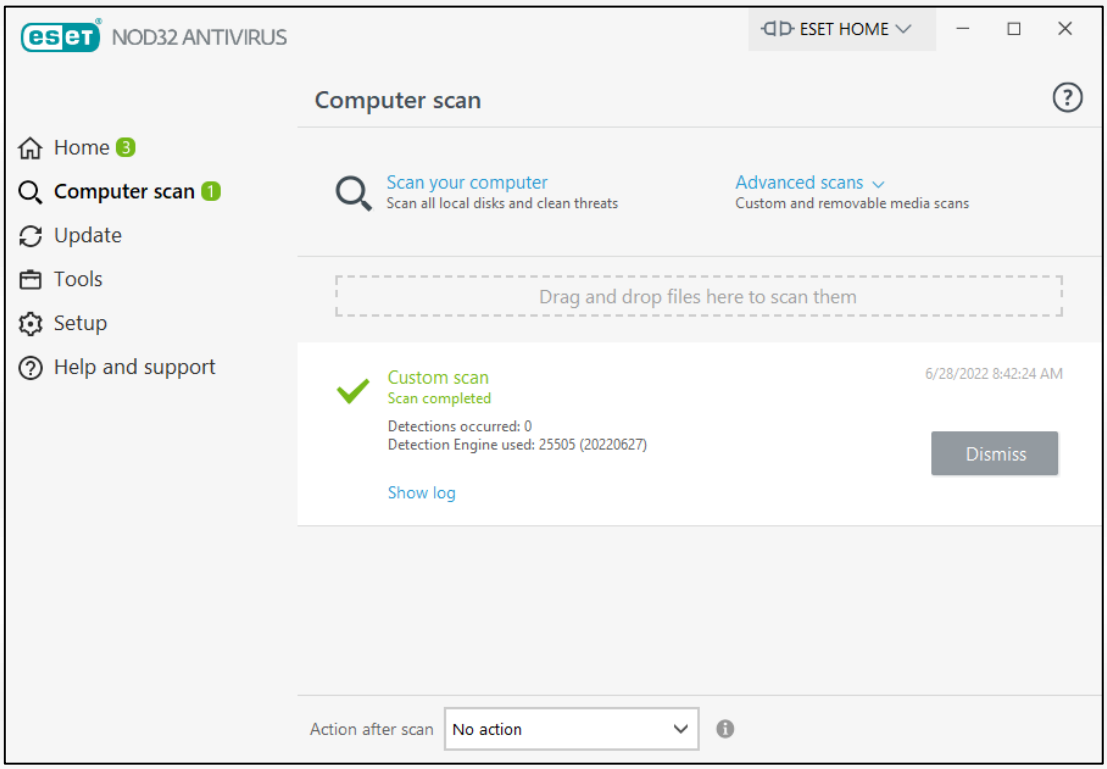


Figure 8.2 : Antivirus

A **worm** is a program that copies itself repeatedly, for example in memory or on a network, using up resources and possibly shutting down the computer or network.

A **Trojan** horse (named after the Greek myth) is a program that hides within or looks like a legitimate program. A certain condition or action usually triggers the Trojan horse. Unlike a virus or worm, a Trojan horse does not replicate itself to other computers.

Computer viruses, worms, and Trojan horses are classified as malware (short for malicious software), which are programs that act without a user's knowledge and deliberately alter the computer's operations.

A computer infected by a virus, worm, or Trojan horse often has one or more of the following symptoms:

- ✓ Screen displays unusual message or image
- ✓ Music or unusual sound plays randomly
- ✓ Available memory is less than expected
- ✓ Existing programs and files disappear
- ✓ Files become corrupted
- ✓ Programs or files do not work properly
- ✓ Unknown programs or files
- ✓ System properties change mysteriously appear

Users can take several precautions to protect their home and work computers from these malicious infections.

- ✓ Do not start a computer with removable media, such as CDs, DVDs, and USB flash drives, in the drives or ports
- ✓ Never open an e-mail attachment unless you are expecting the attachment and it is from a trusted source.
- ✓ Turn off message preview in your e-mail program. Some viruses are hidden in macros, which are instructions saved in software such as a word processing or spreadsheet program.
- ✓ In programs that allow users to write macros, you should set the macro security level so the application software warns users that a document they are attempting to open contains a macro.
- ✓ Users should install an antivirus program and update it frequently. An antivirus program protects a computer against viruses by identifying and removing any computer viruses found in memory, on storage media, or on incoming files.

Botnets

A botnet is a group of compromised computers connected to a network such as the Internet that are being used as part of a network that attacks other networks, usually for nefarious purposes.

A **compromised computer**, known as a zombie, is one whose owner is unaware the computer is being controlled remotely by an outsider. Cybercriminals use botnets to send spam via e-mail, spread viruses and other malware, or commit a denial of service attack.

Denial of Service Attacks

A denial of service attack, or DoS attack, is an assault whose purpose is to disrupt computer access to an Internet service such as the Web or e-mail. Perpetrators carry out a DoS attack in a variety of ways.

Back Doors

A back door is a program or set of instructions in a program that allow users to bypass security controls when accessing a program, computer, or network. Once perpetrators gain access to unsecure computers, they often install a back door or modify an existing program to include a back door, which allows them to continue to access the computer remotely without the user's knowledge.

Spoofing

Spoofing is a technique intruders use to make their network or Internet transmission appear legitimate to a victim computer or network.

Safeguards against Botnets, DoS Attacks, Back Doors, and Spoofing To defend against botnets, DoS attacks, improper use of back doors, and spoofing, users can implement firewall solutions and install intrusion detection software.

8.3 Unauthorized Access And Use

Another type of computer security risk is unauthorized access and use. Unauthorized access is the use of a computer or network without permission.

Unauthorized use is the use of a computer or its data for unapproved or possibly illegal activities. Unauthorized use includes a variety of activities: an employee using an organization's computer to send personal e-mail messages, an employee using the organization's word processing software to track his or her child's soccer league scores, or someone gaining access to a bank computer and performing an unauthorized transfer.

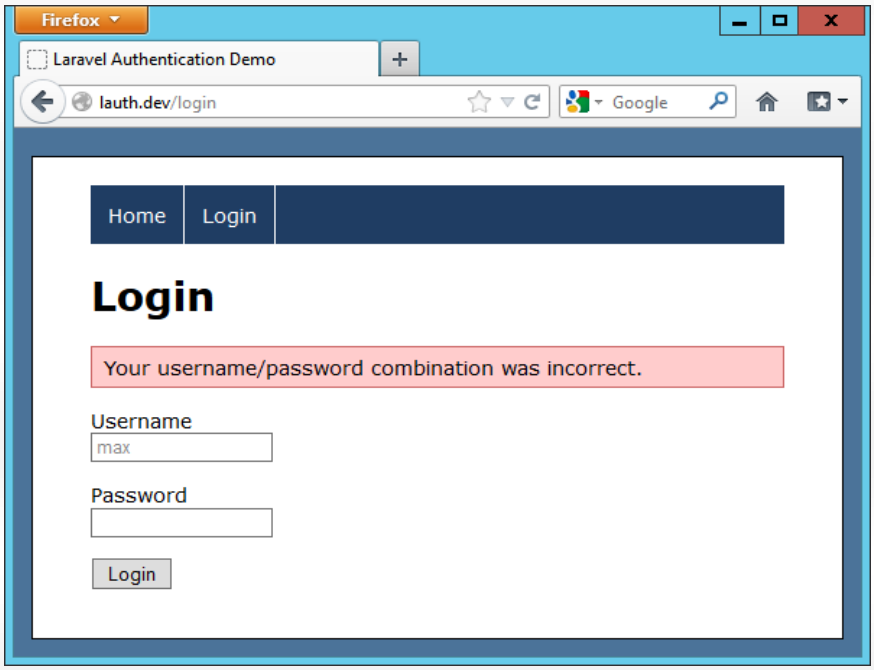


Figure 8.3 : Unauthorized Access

8.4 Hardware Theft And Vandalism

Hardware theft and vandalism are other types of computer security risks.

Hardware theft is the act of stealing computer equipment.

Hardware vandalism is the act of defacing or destroying computer equipment. Hardware vandalism takes many forms, from someone cutting a computer cable to individuals breaking into a business or school computer lab and aimlessly smashing computers. Mobile users are susceptible to hardware theft.

To help reduce the chances of theft, companies and schools use a variety of security measures. Physical access controls, such as locked doors and windows, usually are adequate to protect the equipment. Many businesses, schools, and some homeowners install alarm systems for additional security. School computer labs and other areas with a large number of semifrequent users often attach additional physical security devices such as cables that lock the equipment to a desk, cabinet, or floor.

Small locking devices also exist that require a key to access a hard disk or CD/DVD drive. Mobile computer users must take special care to protect their equipment. Some users attach a physical device such as a cable to lock a mobile computer temporarily to a stationary object.

Some notebook computers use passwords, possessed objects, and biometrics as methods of security. When you boot up these computers, you must enter a password, slide a card in a card reader, or press your finger on a fingerprint scanner before the hard disk unlocks. This type of security does not prevent theft, but it renders the computer useless if it is stolen.

Figure 8.4 : Laptop Lock

8.5 Software Theft

Another type of computer security risk is software theft.

Software theft occurs when someone steals software media, intentionally erases programs, or illegally copies a program.

One form of software theft involves someone physically stealing the media that contain the software or the hardware that contains the media, as described in the previous section.

Another form of software theft occurs when software is stolen from software manufacturers. This type of theft, called piracy, is by far the most common form of software theft.

Software piracy is the unauthorized and illegal duplication of copyrighted software.

To protect software media from being stolen, owners should keep original software boxes and media in a secure location. All computer users should back up their files and disks regularly, in the event of theft. To protect themselves from software piracy, software manufacturers issue users license agreements.

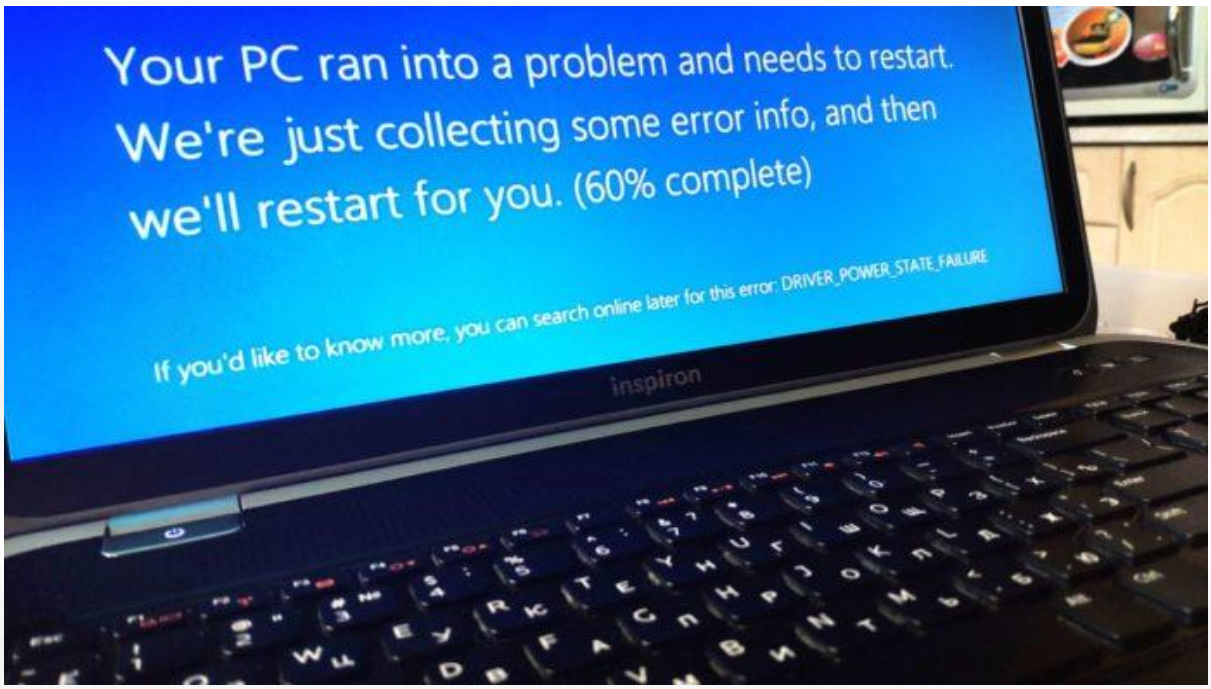


Figure 8.5 : Software Theft

Checkpoint 8

Instructions: Find the true statement below. Then, rewrite the remaining false statements so they are true.

1. Any illegal act involving a computer generally is referred to as a cybercrime.
2. Hackers often claim the intent of their security breaches is to improve security.
3. A firewall is hardware and/or software that allows users to bypass security controls when accessing a program, computer, or network.
4. In order to safeguard against unauthorized access and use of its computers, a company should have a digital certificate.

ACTIVITY

Share your experience regarding internet attack on your PC or mobile device.

Short Question

1. Define the terms, digital security risk, computer crime, cybercrime, and crimeware.
2. List common types of malwares.
3. Identify risks and safety measures when gaming.
4. Define these terms: botnet, zombie, and bot.
5. Describe the damages caused by and possible motivations behind DoS and DDoS attacks.
6. A(n) ___ allows users to bypass security controls when accessing a program, computer, or network.
7. Define the term, spoofing. How can you tell if an email is spoofed?
8. List ways to protect against Internet and network attacks.

SUMMARY

This chapter identified some potential computer risks and the safeguards that schools, businesses, and individuals can implement to minimize these risks. Wireless security risks and safeguards also were discussed.

KEY TERM

Virus	**Malware**
Cyber crime	**Zombie**
Software Theft	**Firewall**

REFERENCES

Misty E. Vermaat, Susan L. Sebok, Steven M. Freund etc. *Discovering Computers ©2018: Digital Technology, Data, and Devices*. Cengage Learning. 20182.

TOPIC 9

Microsoft Word

LEARNING OUTCOMES

By the end of topic, you should be able to:

1. Create document that contain formatted text, table, image, smart art
2. Create a simple poster that combined text box, and picture element.

9.1 Introduction

With Microsoft Word on your PC, Mac, or mobile device, you can:

- Create documents from scratch, or a template.
- Add text, images, art, and videos.
- Research a topic and find credible sources.
- MS Access your documents from a computer, tablet, or phone with OneDrive.
- Share your documents, and work with others.
- Track and review changes.

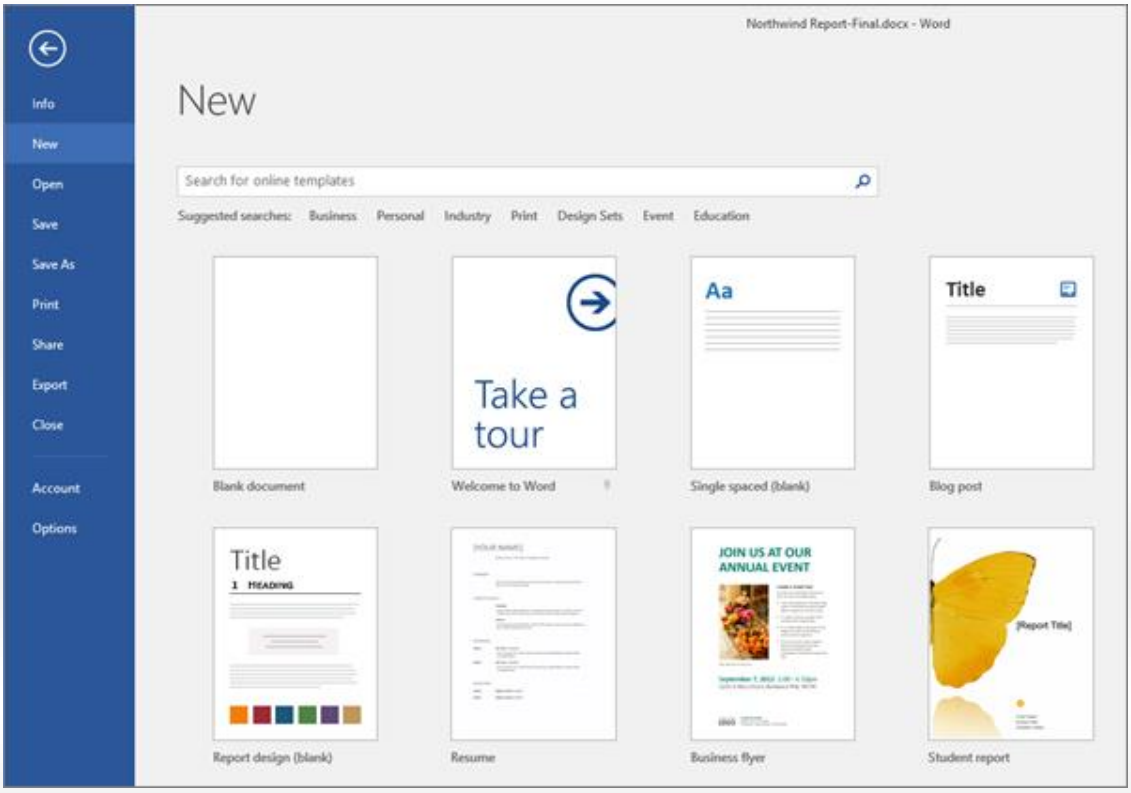
To create a document, simply open Word, select a blank document or template, and start typing. Word offers many professionally designed templates to help you create letters, resumes, reports, and more.

Create a blank document

1. Open Word. Or, if Word is already open, select **File** > **New**.
2. Select **Blank document**.

Create a document using a template

1. Open Word. Or, if Word is already open, select **File** > **New**.



2. Double-click a template to open it.

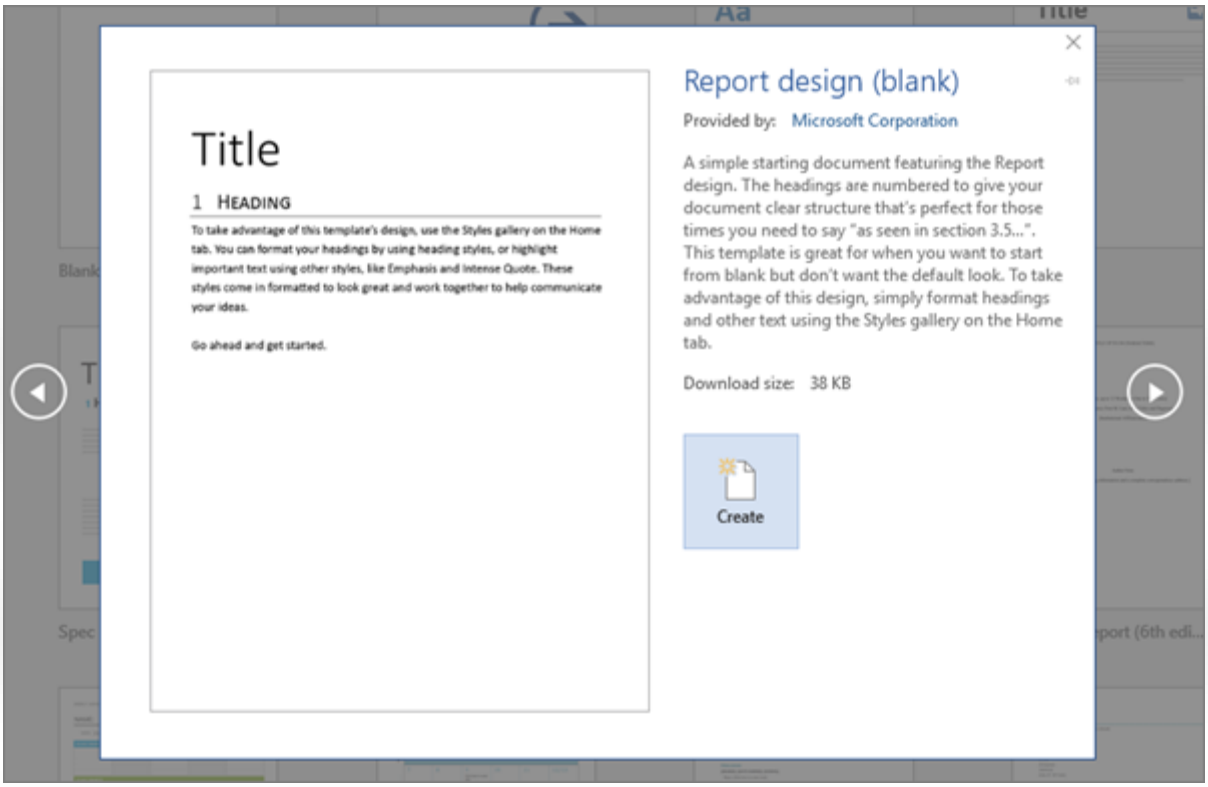
Tip: Pin templates you like, so you always see them when you start Word. Select the template and then select the pin icon that appears next to the name of the template.

Search for a template

1. Open Word. Or, if Word is already open, select **File** > **New**.
2. In the **Search for online templates** box, enter a search word like **letter**, **resume**, or **invoice**.

Or, select a category under the search box like **Business**, **Personal**, or **Education**.

3. Click a template to see a preview. Click the arrows on the side of the preview to see more templates.



4. Select **Create**.

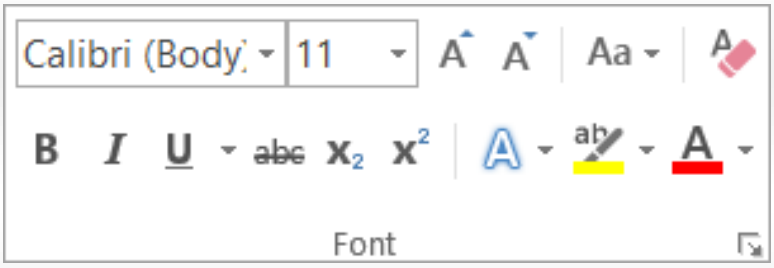
9.2 Working with Text

Add text

1. Place the cursor where you want to add the text.
2. Start typing.

Format text

1. Select the text you want to format.
2. Select an option to change the font, font size, font color, or make the text bold, italics, or underline.



Copy formatting

1. Select the text with the formatting you want to copy.
2. Click **Format painter**, and then select the text you want to copy the formatting to.

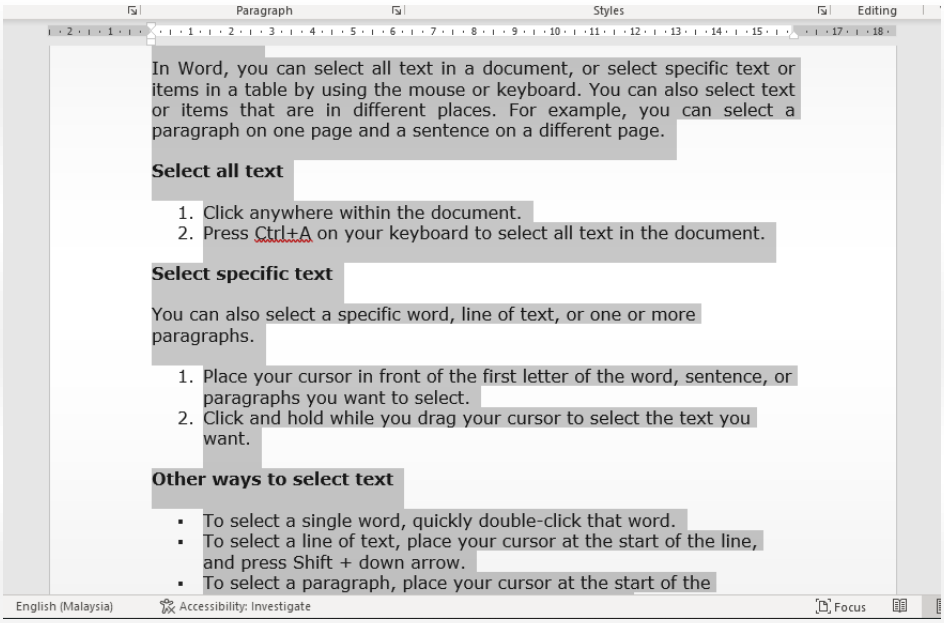
Tip: Double-click **Format painter** if you want to copy the formatting in more than one place.

Select text

In Word, you can select all text in a document, or select specific text or items in a table by using the mouse or keyboard. You can also select text or items that are in different places. For example, you can select a paragraph on one page and a sentence on a different page.

Select all text

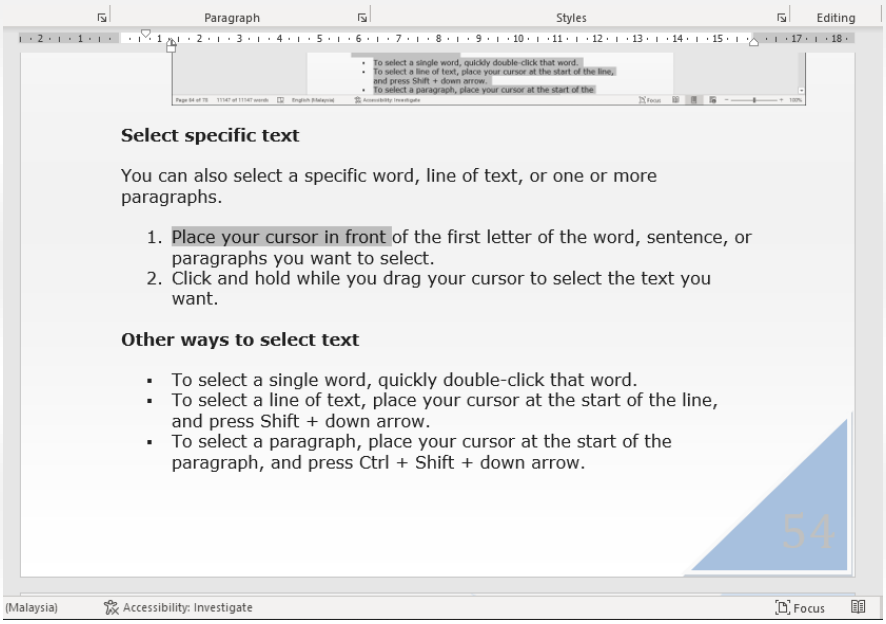
1. Click anywhere within the document.
2. Press Ctrl+A on your keyboard to select all text in the document.



Select specific text

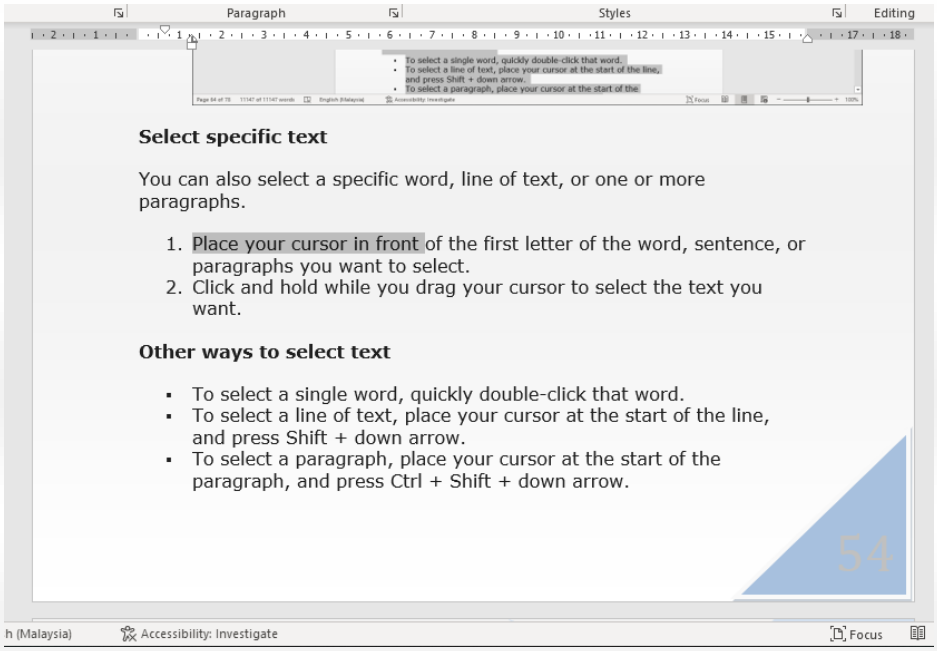
You can also select a specific word, line of text, or one or more paragraphs.

1. Place your cursor in front of the first letter of the word, sentence, or paragraphs you want to select.
2. Click and hold while you drag your cursor to select the text you want.



Other ways to select text

- To **select a single word**, quickly double-click that word.
- To **select a line of text**, place your cursor at the start of the line, and press Shift + down arrow.
- To **select a paragraph**, place your cursor at the start of the paragraph, and press Ctrl + Shift + down arrow.



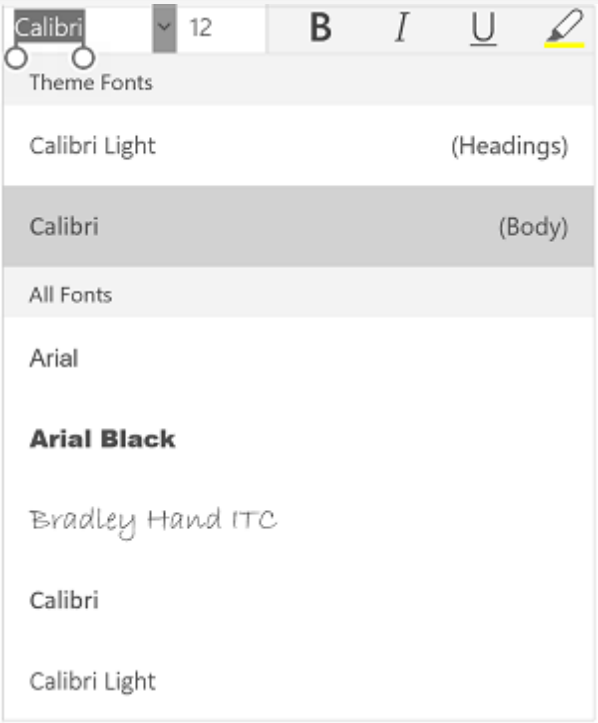
9.3 Formatting

You can use Word to select and format text, change line and paragraph spacing, change indentation, and add lists. You can also use the edit menu to cut, copy, paste, and delete text that you select.

Change the font, font size, or font style

You can use the formatting options available on the **Home** tab to format text.

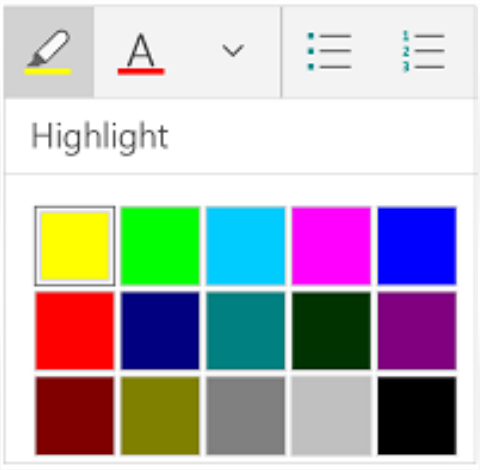
- **Change the font**: Select some text and then tap the font name box. Choose a font from the drop-down list.



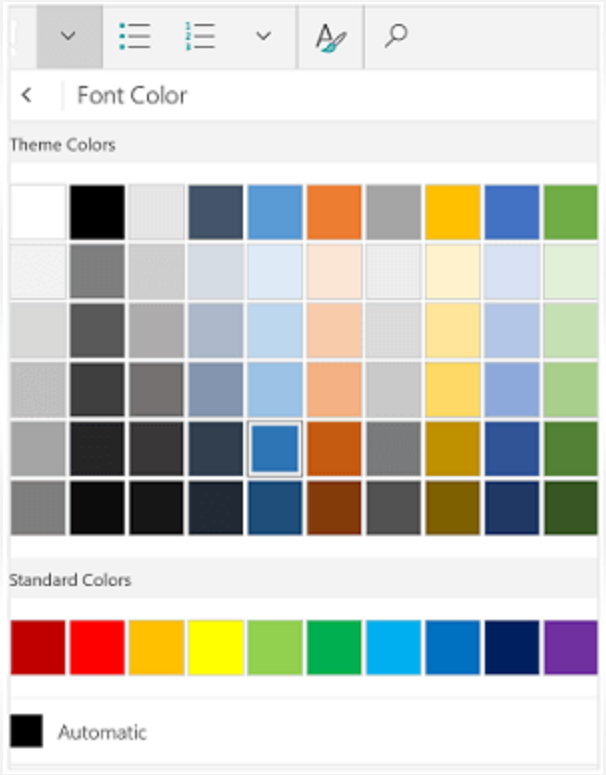
- **Change the font size**: Select some text, tap the font size box, and then choose a size from the drop-down list.

- **Add bold, italics, or underlining**: Select some text and then tap the appropriate icon to apply the formatting.

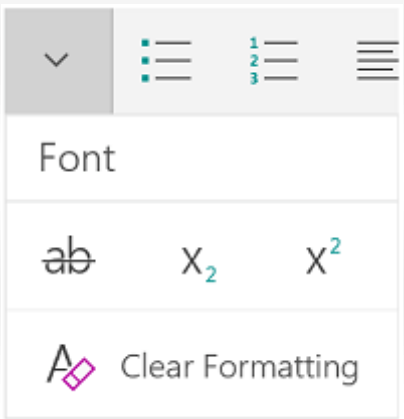
- **Highlight text**: Select some text, tap the highlight icon, and then choose a highlight color.



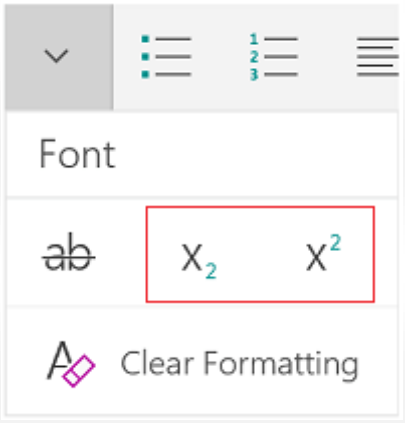
- **Change the font color**: Tap the font color icon, and then choose a color.



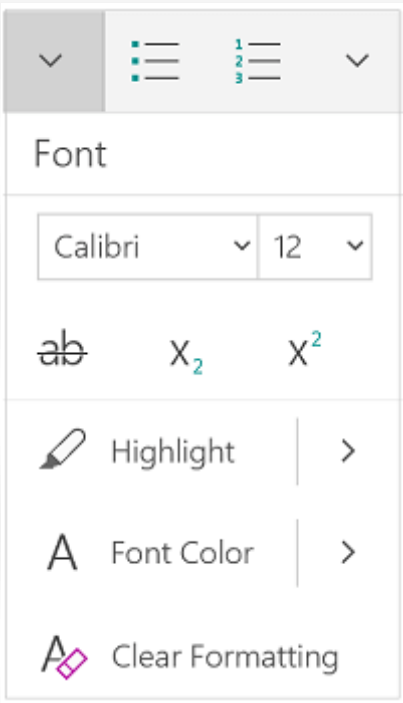
- **Add strikethrough**: Select the text, and then tap the down arrow. Tap the strikethrough icon on the **Font** menu.



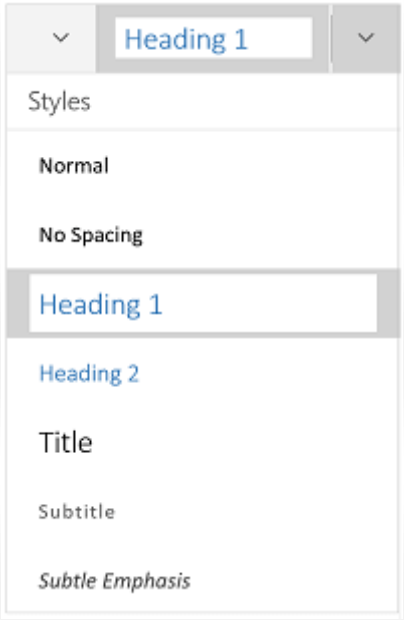
- **Remove formatting**: Select the text that has the formatting you want to remove, and then tap the down arrow. Tap **Clear Formatting** on the **Font** menu.
- **Add subscript or superscript**: Select some text, tap the down arrow, and select subscript or superscript on the **Font** menu



Notes: If you are using your device in portrait mode, many of the formatting options will appear on the Font menu.



- **Apply a style**: Select some text, tap the style icon, and then select from the list of defined styles.

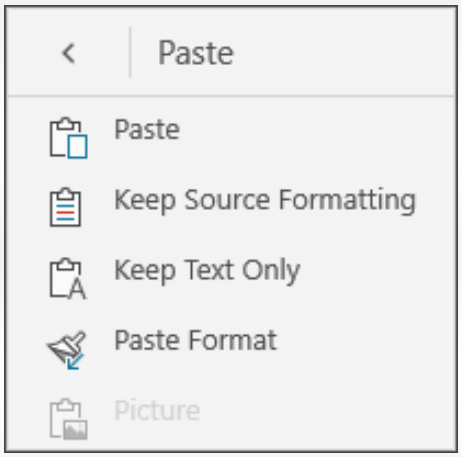


Use editing tools

You can also select formatting options from the edit menu.

Cut and paste or copy and paste

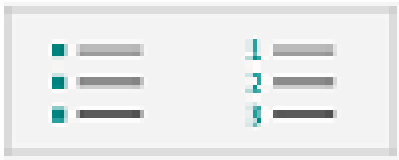
Select some text, tap the scissors icon to cut the text or the copy icon to copy the text, tap a new location, and then tap the clipboard icon. Tap the arrow next to the clipboard to see the **Paste** menu. You can select **Paste**, **Keep Source Formatting**, **Keep Text Only**, or **Paste Format**.



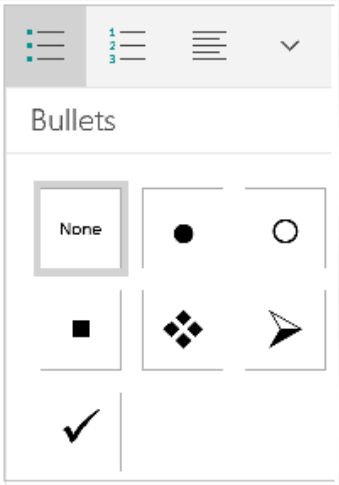
9.4 Bullets & Numbering

Add bullet or numbered lists

- Select the text and then tap the bullet or the numbered list icon.



You can select a bullet or numbering style.



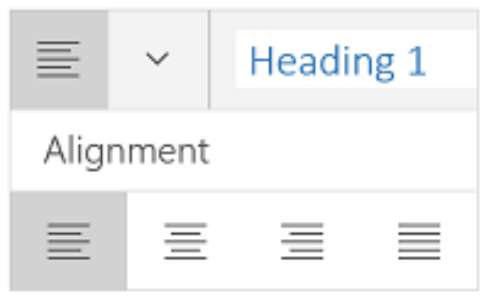
Indent a paragraph

- Tap anywhere in the paragraph, and then tap the indent icon or the negative indent icon.

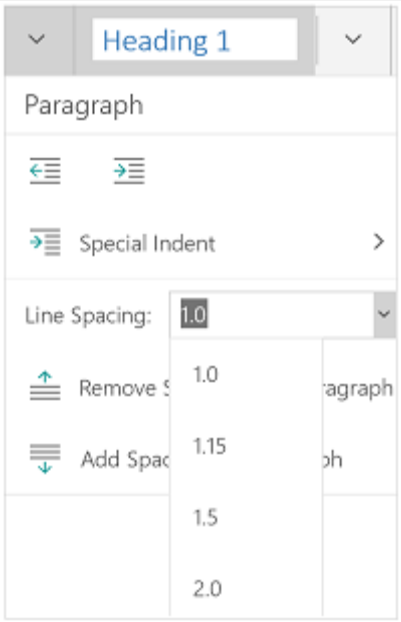
9.5 Paragraphing

Format Paragraphs

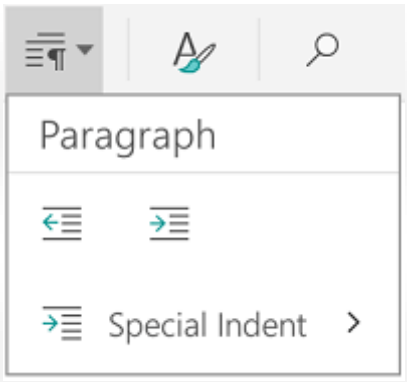
- **Align the text**: Tap the text and then tap the alignment icon to align the text left, center, right, or justified.



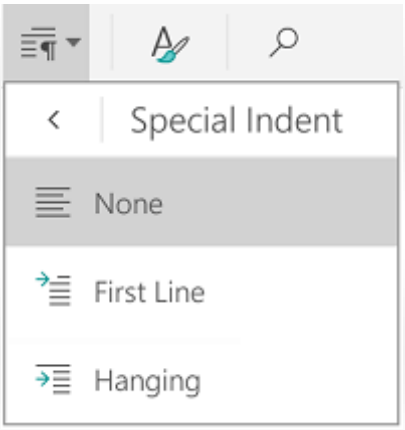
- **Line spacing**: To add or remove space before or after a line or paragraph, tap the arrow and then select from the spacing options.



- Insert or remove tabs: Tap the place where you want the tab to be located, tap the paragraph tab icon, and then tap the insert tab or remove tap icon.



To indent only the first line or use a hanging indent, tap the paragraph tab icon, tap **Special Indent**, and then make your selection.

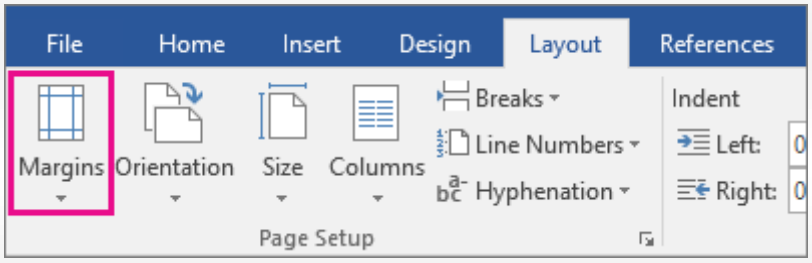


9.6 Margin & Alignment

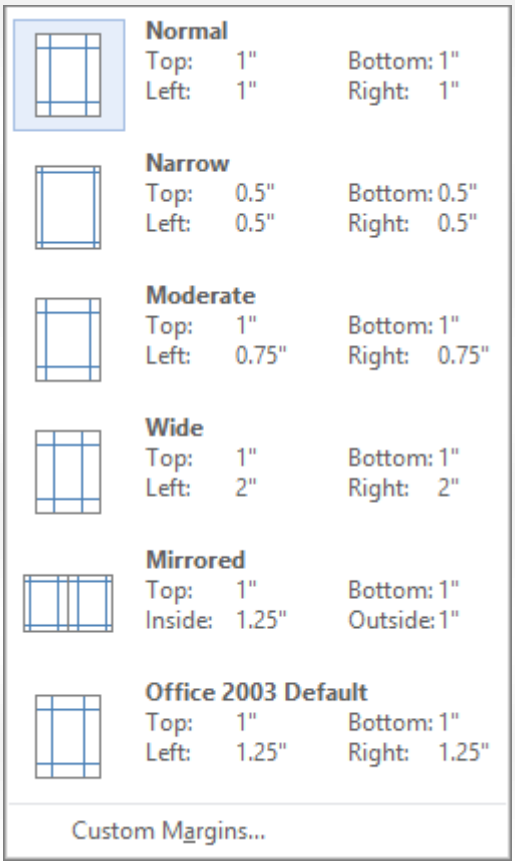
Change margins in your document to change the layout and make sure everything fits.

Apply a predefined margin setting

1. Select **Layout** > **Margins**.



2. Select the margin measurements you want.



Note: If your document contains multiple sections, the new margins apply only to the selected sections.

Create a custom margin

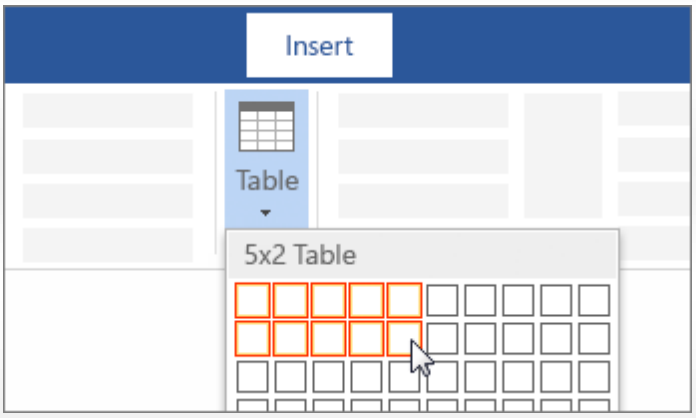
1. Select **Layout** > **Margins**.
2. Select **Custom Margins**.
3. In **Margins**, use the Up and Down arrows to enter the values you want.
4. Select **OK** when done.

Change default margins

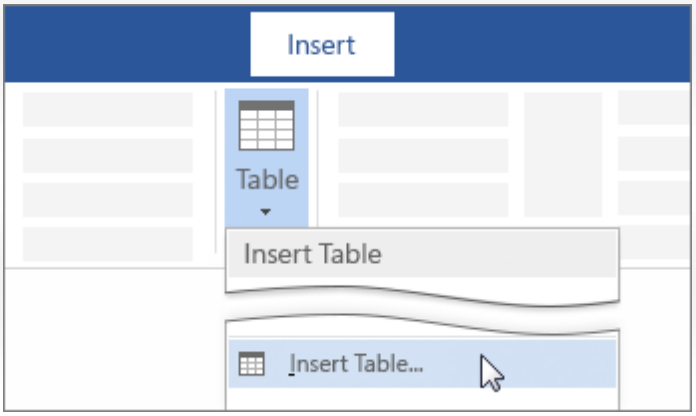
1. Select **Layout** > **Margins** > **Custom Margins**.
2. Set your margins.
3. Select **Set As Default**.
4. Confirm your selection.

9.7 Tables & Borders

For a basic table, click **Insert** > **Table** and move the cursor over the grid until you highlight the number of columns and rows you want.



For a larger table, or to customize a table, elect **Insert** > **Table** > **Insert Table**.



Tips:

- If you already have text separated by tabs, you can quickly convert it to a table. Select **Insert** > **Table**, and then select **Convert Text to Table**.
- To draw your own table, select **Insert** > **Table** > **Draw Table**.

Format a table

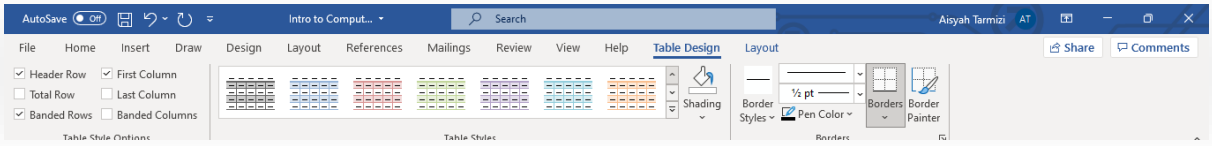
After you create a table, Word offers you many ways to format that table. If you decide to use Table Styles, you can format your table all at once, and even see a preview of what your table will look like formatted in a particular style before you actually apply the style.

You can create a custom look for tables by splitting or merging cells, adding or deleting columns or rows, or adding borders. If you're working with a long table, you can repeat the table headings on each page on which the table appears. To prevent awkward page breaks that disrupt the flow of your table, you can also specify just how and where the table should break across pages.

Use Table Styles to format an entire table

After you create a table, you can format the entire table by using Table Styles. By resting your pointer over each of the preformatted table styles, you can preview what the table will look like.

1. Click in the table that you want to format.
2. Under **Table Tools**, click the **Design** tab.
3. In the **Table Styles** group, rest the pointer over each table style until you find a style that you want to use.



Note: To see more styles, click the **More** arrow .

4. Click the style to apply it to the table.

5. In the **Table Style Options** group, select or clear the check box next to each the table element to apply or remove the selected style.

Add or remove borders

You can add or remove borders to format a table the way that you want.

Add table borders

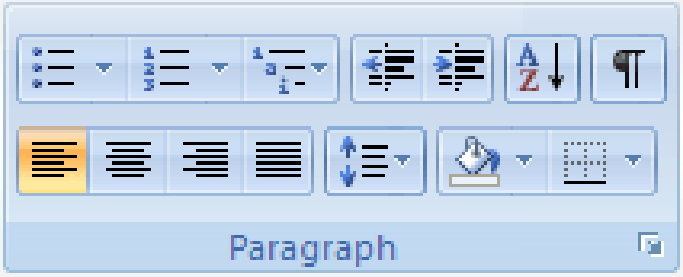
1. Under **Table Tools**, click the **Layout** tab.
2. In the **Table** group, click **Select**, and then click **Select Table.**
3. Under **Table Tools**, click the **Design** tab.
4. In the **Table Styles** group, click **Borders**, and then do one of the following:
    - Click one of the predefined border sets.
    - Click **Borders and Shading**, click the **Borders** tab, and then choose the options that you want.

Remove table borders from the whole table

1. Under **Table Tools**, click the **Layout** tab.
2. In the **Table** group, click **Select**, and then click **Select Table.**
3. Under **Table Tools**, click the **Design** tab.
4. In the **Table Styles** group, click **Borders**, and then click **No Border**.

Add table borders to specified cells only

1. On the **Home** tab, in the **Paragraph** group, click **Show/Hide**.

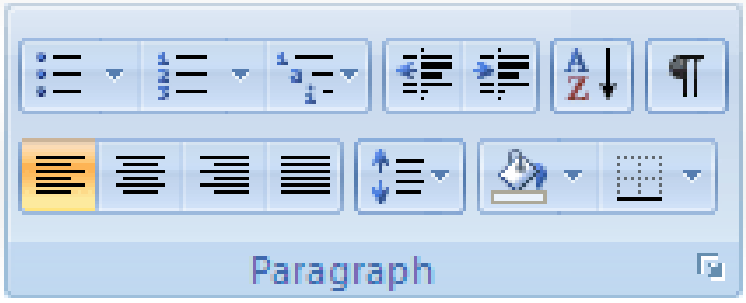


2. Select the cells that you want, including their end-of-cell marks.

3. Under **Table Tools**, click the **Design** tab.
4. In the **Table Styles** group, click **Borders**, and then click the border that you want to add.

Remove table borders from specified cells only

1. On the **Home** tab, in the **Paragraph** group, click **Show/Hide**.



2. Select the cells that you want, including their end-of-cell marks.

3. Under **Table Tools**, click the **Design** tab.
4. In the **Table Styles** group, click **Borders**, and then click **No Border**.

Display or hide gridlines

Gridlines show the cell boundaries of a table on the screen wherever the table doesn't have borders applied. If you hide the gridlines in a table that has borders, you won't see the change because the gridlines are behind the borders. To view the gridlines, remove the borders.

Unlike borders, gridlines appear only on the screen; they are never printed. If you turn off gridlines, the table is displayed as it will be printed.

Note: Gridlines are not visible when you view a document in a Web browser or in Print Preview.

Display or hide table gridlines in a document

- Under **Table Tools**, on the **Layout** tab, in the **Table** group, click **View Gridlines**.

Add a cell, row, or column

Add a cell

1. Click in a cell that is located just to the right of or above where you want to insert a cell.
2. Under **Table Tools**, on the **Layout** tab, click the **Rows & Columns** Dialog Box Launcher.
3. Click one of the following options:

Click this	To do this
Shift cells right	Insert a cell and move all other cells in that row to the right. **Note:** This option may result in a row that has more cells than the other rows.
Shift cells down	Insert a cell and move remaining existing cells in that column down one row each. A new row will be added at the bottom of the table to contain the last existing cell.
Insert entire row	Insert a row just above the cell that you clicked in.
Insert entire column	Insert a column just to the right of the cell that you clicked in.

Add a row

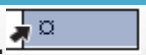
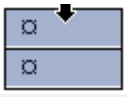
1. Click in a cell that is located just below or above where you want to add a row.
2. Under **Table Tools**, click the **Layout** tab.
3. Do one of the following:
   - To add a row just above the cell that you clicked in, in the **Rows and Columns** group, click **Insert Above**.
   - To add a row just below the cell that you clicked in, in the **Rows and Columns** group, click **Insert Below**.

Add a column

1. Click in a cell that is located just to the right or left of where you want to add a column.
2. Under **Table Tools**, click the **Layout** tab.
3. Do one of the following:
   - To add a column just to the left of the cell that you clicked in, in the **Rows and Columns** group, click **Insert Left**.
   - To add a column just to the right of the cell that you clicked in, in the **Rows and Columns** group, click **Insert Right**.

Delete a cell, row, or column

1. Do one of the following:

To select	Do this
A cell	Click the left edge of the cell.  .
A row	Click to the left of the row. 
A column	Click the column's top gridline or top border. 

2. Under **Table Tools**, click the **Layout** tab.
3. In the **Rows & Columns** group, click **Delete**, and then click **Delete Cells**, **Delete Rows**, or **Delete Columns**, as appropriate.

Merge or split cells

Merge cells

You can combine two or more cells in the same row or column into a single cell. For example, you can merge several cells horizontally to create a table heading that spans several columns.

1. Select the cells that you want to merge by clicking the left edge of a cell and then dragging across the other cells that you want.
2. Under **Table Tools**, on the **Layout** tab, in the **Merge** group, click **Merge Cells**.

Split cells

1. Click in a cell, or select multiple cells that you want to split.
2. Under **Table Tools**, on the **Layout** tab, in the **Merge** group, click **Split Cells**.
3. Enter the number of columns or rows that you want to split the selected cells into.

Repeat a table heading on subsequent pages

When you work with a very long table, it will be divided wherever a page break occurs. You can make adjustments to the table so that the table headings are repeated on each page.

Repeated table headings are visible only in Print Layout view and when you print the document.

1. Select the heading row or rows. The selection must include the first row of the table.
2. Under **Table Tools**, on the **Layout** tab, in the **Data** group, click **Repeat Header Rows**.

Note: Word automatically repeats the table headings on each new page that results from an automatic page break. Word does not repeat a heading if you insert a manual page break within a table.

Control where a table is divided

When you work with a very long table, it must be divided wherever a page break occurs. By default, if a page break occurs within a large row, Microsoft Word allows a page break to divide the row between the two pages.

You can make adjustments to the table to make sure that the information appears as you want it to when the table spans multiple pages.

Prevent a table row from breaking across pages

1. Click in the table.
2. Under **Table Tools**, click the **Layout** tab.
3. In the **Table** group, click **Properties**, and then click the **Row** tab.
4. Clear the **Allow row to break across pages** check box.

Force a table to break across pages at a particular row

1. Click in the row that you want to appear on the next page.
2. Press CTRL+ENTER.

9.8 Drawing

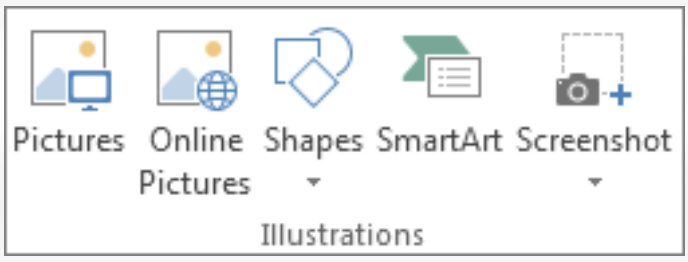
Add a drawing to a document

These are the basic types of graphics that you can use to enhance your Word documents: drawing objects, SmartArt, charts, pictures, and clip art. Drawings refer to a drawing object or a group of drawing objects.

Drawing objects include shapes, diagrams, flowcharts, curves, lines, and WordArt. These objects are part of your Word document. You can change and enhance these objects with colors, patterns, borders, and other effects.

Add a drawing to a document

1. Click in your document where you want to create the drawing.
2. On the **Insert** tab, in the **Illustrations** group, click **Shapes**.

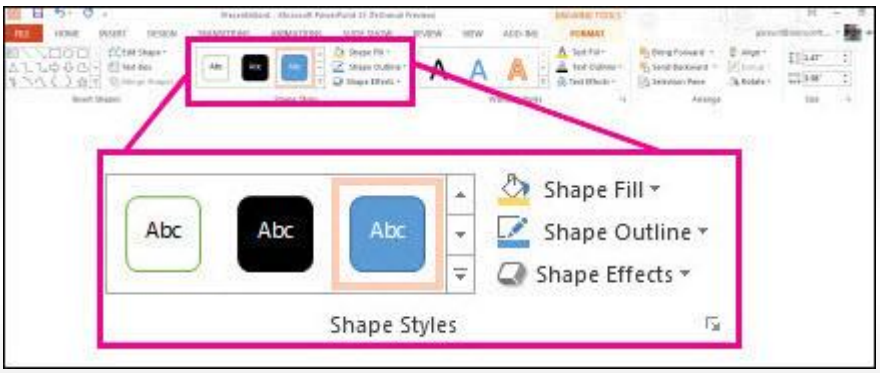


3. You can do any of the following on the **Format** tab, which appears after you insert a drawing shape:
4. **Insert a shape.** On the **Format** tab, in the **Insert Shapes** group, click a shape, and then click somewhere in the document.
5. **Change a shape.** Click the shape you want to change. On the **Format** tab, in the **Insert Shapes** group, click **Edit Shape**, point to **Change Shape**, and then choose a different shape.

6. **Add text to a shape.** Click the shape you where you want text, and then type.
7. **Group selected shapes.** Select several shapes at a time by pressing CTRL on your keyboard and clicking each shape you want to include in the group. On the **Format** tab in the **Arrange** group, click **Group** so that all of the shapes will be treated like a single object.
8. **Draw in the document.** On the **Format** tab, in the **Insert Shapes** group, expand the shapes options by clicking the arrow. Under **Lines** click **Freeform** or **Scribble**.

   Tip: To stop drawing with the Freeform or Scribble lines, double-click.

9. **Adjust the size of the shapes.** Select the shape or shapes you want to resize. On the **Format** tab, in the **Size** group, click the arrows or type new dimensions in the **Height** and **Width** boxes.
10. **Apply a style to a shape.** In the **Shape Styles** group, rest your pointer over a style to see what your shape will look like when you apply that style. Click the style to apply it. Or, click **Shape Fill** or **Shape Outline** and select the options that you want.



Note: If you want to apply a color and gradient that aren't available in the **Shape Styles** group, select the color first, and then apply the gradient.

11. **Add flow charts with connectors.** Before you create a flow chart, add a drawing canvas by clicking the **Insert** tab, clicking **Shapes** in the **Illustrations** group, and then clicking **New Drawing Canvas**. On the **Format** tab, in the **Insert Shapes** group, click a Flow chart shape. Under **Lines**, choose a connector line such as the **Curved Arrow Connector**.
12. **Use shadow and three-dimensional (3-D) effects** to add interest to the shapes in your drawing. On the **Format** tab, in the **Shape Styles** group, click **Shape Effects**, and choose an effect.
13. **Align the objects on the canvas.** To align the objects, press and hold CTRL while you select the objects that you want to align. On the **Format** tab, in the **Arrange** group, click **Align** to choose from an assortment of alignment commands.

Delete all or part of a drawing

1. Select the drawing object that you want to delete.
2. Press DELETE.

Add shapes

You can add shapes, such as boxes, circles, and arrows, to your documents, email messages, slide shows, and spreadsheets. To add a shape, click **Insert**, click **Shapes**, select a shape, and then click and drag to draw the shape.

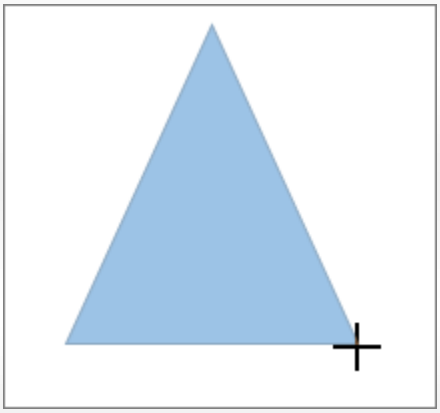
After you add one or more shapes, you can add text, bullets, and numbering to them, and you can change their fill, outline, and other effects on the **Format** tab.

Tip: You can add individual shapes to a chart, or add shapes on top of a SmartArt graphic to customize the chart or the graphic.

Add a shape in Excel, Outlook, Word, or PowerPoint

1. On the **Insert** tab, click **Shapes**.

2. Click the shape you want, click anywhere in the workspace, and then drag to place the shape.

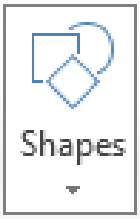


To create a perfect square or circle (or constrain the dimensions of other shapes), press and hold Shift while you drag.

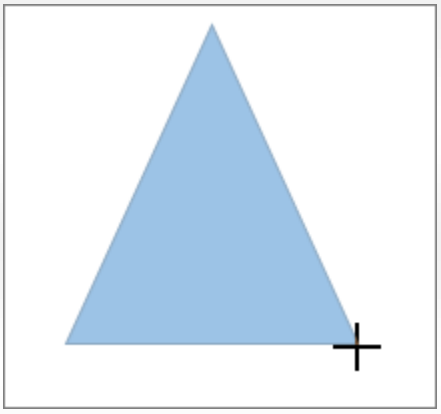
Add a shape in Project

To follow these steps, you need to open or create a report. To do that, on the **Report** tab, click **Recent** to open an existing report, or click **More Reports** to select a report from the list in the **Reports** dialog box or create a new report.

1. In the open report, on the **Design** tab, click **Shapes**.



2. Click the shape you want, click anywhere in the workspace, and then drag to place the shape.



To create a perfect square or circle (or constrain the dimensions of other shapes), press and hold Shift while you drag.

Add text to a shape

Insert a shape, or click an existing shape, and then enter text.

1. Right-click the shape and click **Add Text** or **Edit Text**, or just start typing.

   Note: The text that you add becomes part of the shape — if you rotate or flip the shape, the text rotates or flips also.

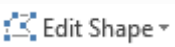
2. To format and align your text, click the **Home** tab, and then choose options from the **Font**, **Paragraph**, or **Alignment** groups, depending

on the program you're using and what kind of formatting you want to apply. (Text formatting options are limited in Project.)

Change from one shape to another shape

1. Click the shape you want to change.

   To change multiple shapes, press Ctrl while you click the shapes that you want to change.

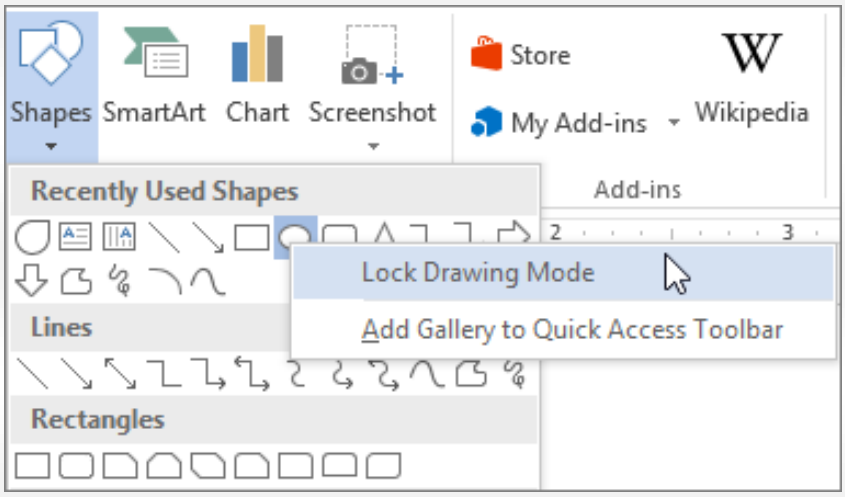
2. On the **Format** tab, in the **Insert Shapes** group, click **Edit Shape**  , point to **Change Shape**, and then click the new shape that you want.

Add the same shape multiple times

If you need to add the same shape repeatedly, you can do so quickly by using Lock Drawing Mode.

Note: Instead of adding individual shapes to create a drawing, you might want to choose a SmartArt graphic. In a SmartArt graphic, the arrangement of the shapes and the font size in those shapes is updated automatically as you add or remove shapes and edit your text.

1. On the **Insert** tab, click **Shapes**.
2. Right-click the shape you want to add, and then click **Lock Drawing Mode**.



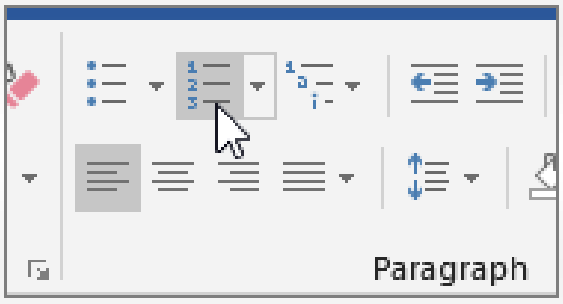
3. Click anywhere in the workspace, and then drag to place the shape.
4. Repeat step 3 to add the shape as many times as you like.

   Tip: To create a perfect square or circle (or constrain the dimensions of other shapes), press and hold Shift while you drag.

5. After you add all the shapes you want, press Esc to turn off Lock Drawing Mode.

Add a bulleted or numbered list to a shape

1. Select the text in the shape that you want to add bullets or numbering to.
2. Select the **Home** tab on the ribbon, and in the **Paragraph** group, select **Bullets** or **Numbering**.

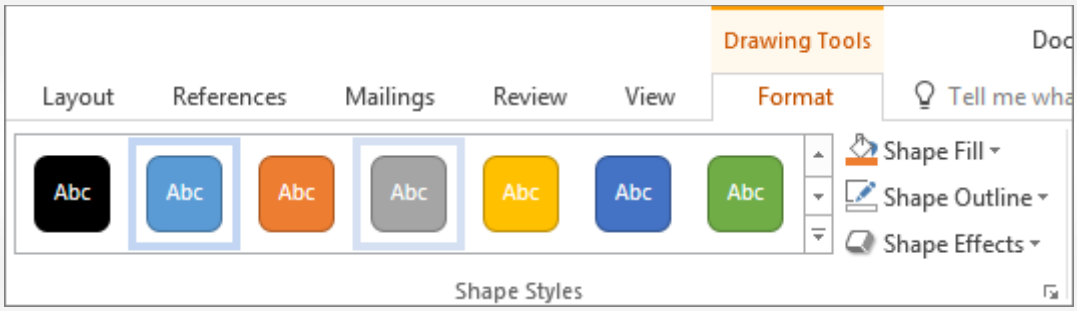


You can find different bullet styles and numbering formats by clicking the down arrow next to **Bullets** or **Numbering**.

Add a Quick Style to a shape

Quick Styles let you apply a style to your shape with one click. You'll find the styles in the Quick Style gallery. When you rest your pointer over a Quick Style thumbnail, you can see how the style affects your shape.

1. Click the shape you want to change.
2. Select the **Format** tab, and in the **Shape Styles** group, select the Quick Style you want to use.



To see more Quick Styles, click the **More** button .

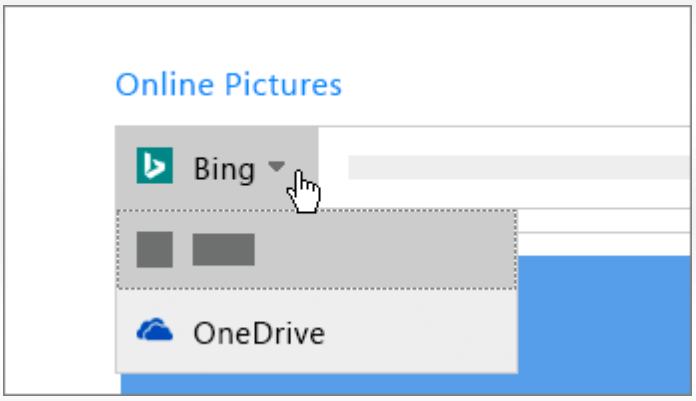
Delete a shape

Click the shape that you want to delete, and then press Delete. To delete multiple shapes, press Ctrl while you click the shapes that you want to delete, and then press Delete.

Insert pictures

1. Do one of the following:
    - Select **Insert** > **Pictures** > **This Device** for a picture on your PC.
    - Select **Insert** > **Pictures** > **Stock Images** for high quality images or backgrounds.
    - Select **Insert** > **Pictures** > **Online Pictures** for a picture on the web.

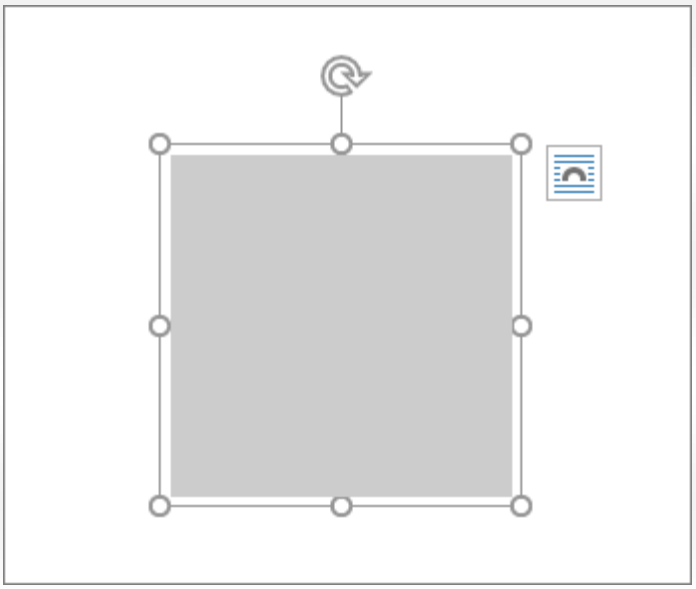
    Tip: For a picture from your OneDrive, go to the drop-down list at the top left, and switch from **Bing** to **OneDrive**.



2. Select the picture you want, and then select **Insert**.

Resize or move pictures

- To resize a picture, select the picture and drag a corner handle.
- To wrap text around a picture, select the picture, and then select a wrapping option.



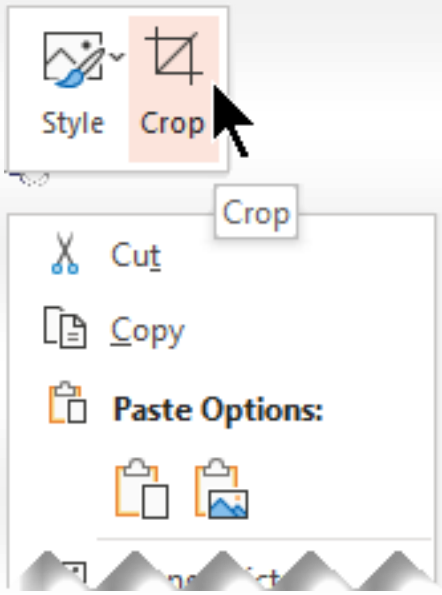
Tip: Pick something other than **In Line with Text**, and you can move the picture around the page: select the picture and drag it.

Crop a picture in Office

Crop a picture to trim away outer edges that are unnecessary.

Crop the margins of a picture

1. Use **Insert** > **Picture** to add the image to an Office file (such as a Word document, PowerPoint presentation, or Excel workbook).
2. Right-click the picture. A pop-up menu appears with two buttons either immediately above or below the menu. **Crop** is one of the buttons.



3. Select the **Crop** button.

   Black crop handles appear on the edges and corners of the picture.

4. Crop the image by doing one of the following:

Description	Action
Crop one side	Drag inward on the side cropping handle
Crop two adjacent sides at the same time	Drag inward on the corner cropping handle
Crop equally on two parallel sides at once	Press and hold Ctrl while dragging inward on the side cropping handle

5. You can also *outcrop*, or add a margin around a picture, by dragging the cropping handles outward rather than inward.
6. (Optional) To reposition the crop area, either change the crop area by dragging the edges or corners of the crop rectangle, or move the picture.
7. When you're finished, press Esc or click anywhere outside the picture within the document.

Note: Cropping tools are not available for shapes, but in Office 2010 and later, you can resize a shape and use the **Edit Points** tool to achieve an effect similar to cropping or to customize the shape.

9.9 Page Numbering

Page numbering in Word

A header or footer can contain text, information about the document, or even images. However, the most common elements in a header or footer are page numbers. Page numbers can be continuous though a document, all but the first page, or start over in each section.

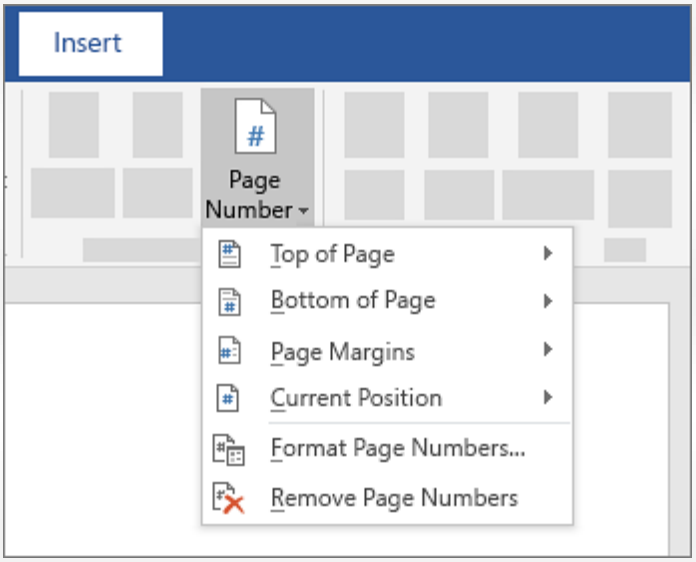
Note: The best way to work with page numbers is in Word on a laptop or desktop computer, rather than in a web browser or mobile app.

Add page numbers to a header or footer in Word

Add page numbers to a header or footer

1. Click or tap in the header or footer where you want the page numbers to go.

2. Go to **Insert** > **Page Numbering**.
3. Select **Current Position**.
4. Choose a style.



Change where the page number appears

1. In the header or footer area, select the page number.
2. Use the Tab key to position the page number left, center, or right. If the number is flush left, press Tab once for center, and twice for right. To go back, press Backspace until in position.

Change appearance of page number

1. Select the page number
2. On the **Home** tab, use the **Font** choices and dialog box to change the font family, style, size, and color.

9.10 Printing

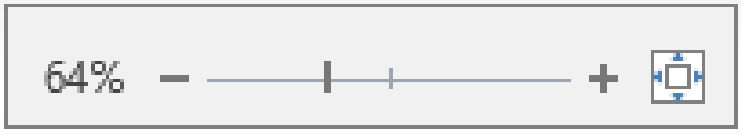
Print a document in Word

Before you print, you can preview your document and specify which pages you want to print.

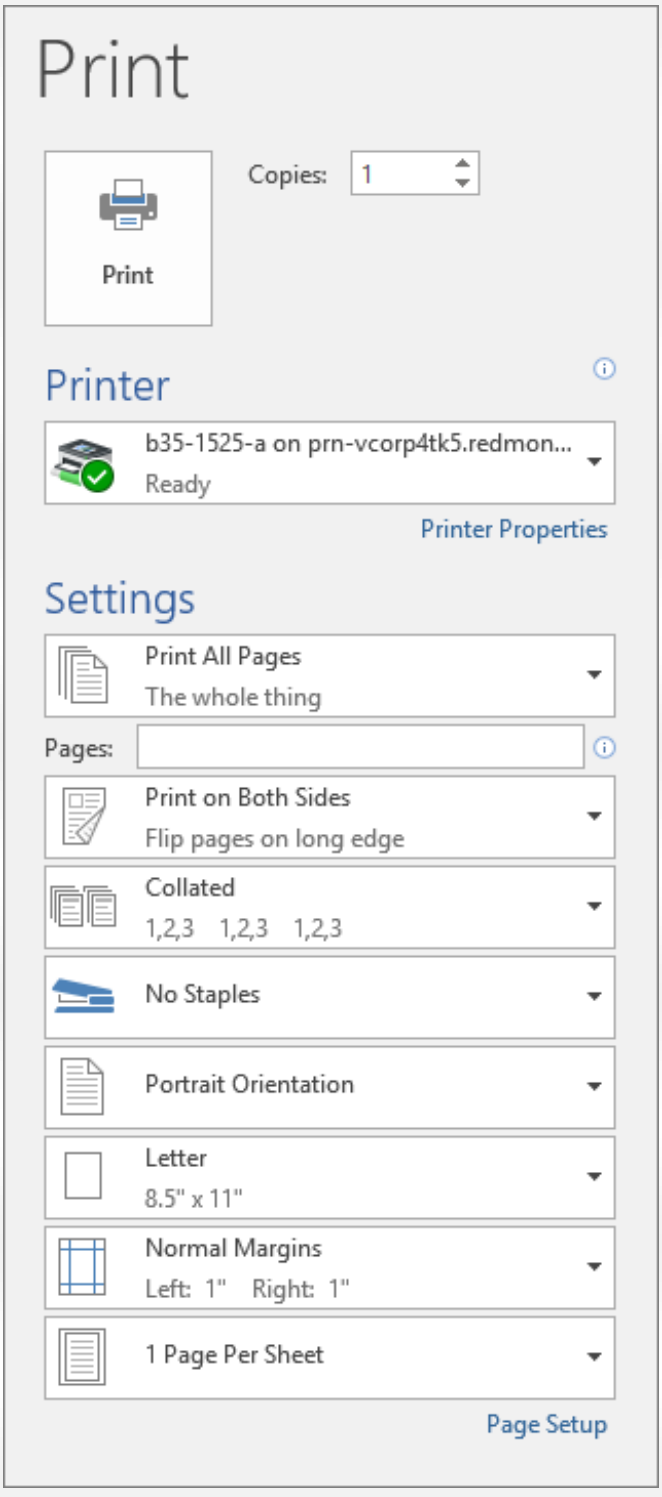
Preview your document

1. Click **File** > **Print**.
2. To preview each page, click the forward and backward arrows at the bottom of the page.

If the text is too small to read, use the zoom slider at the bottom of the page to enlarge it.

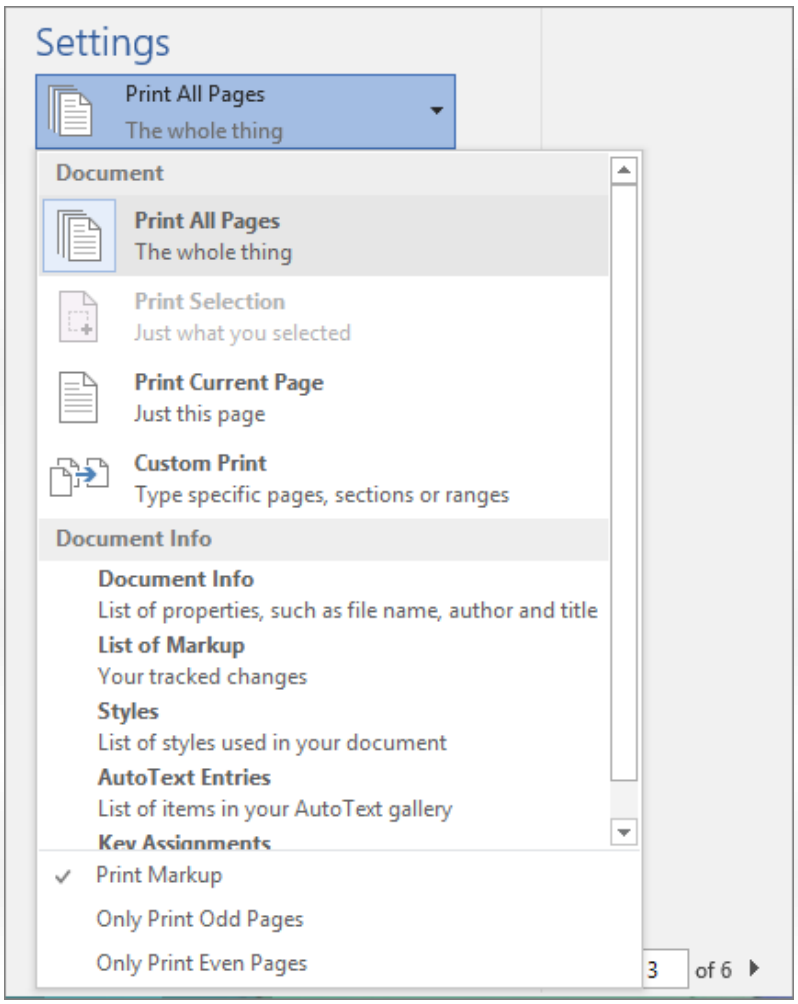


3. Choose the number of copies, and any other options you want, and click the **Print** button.


Print
Copies: 1
Print
Printer
b35-1525-a on prn-vcorp4tk5.redmon...
Ready
Printer Properties
Settings
Print All Pages
The whole thing
Pages:
Print on Both Sides
Flip pages on long edge
Collated
1,2,3 1,2,3 1,2,3
No Staples
Portrait Orientation
Letter
8.5" x 11"
Normal Margins
Left: 1" Right: 1"
1 Page Per Sheet
Page Setup

Print specific pages

1. Click **File** > **Print**.
2. To print only certain pages, print some of the document's properties, or print tracked changes and comments, click the arrow under **Settings**, next to **Print All Pages** (the default), to see all of your options.



3. To print only certain pages, do one of the following:
   - To print the page shown in preview, select **Print Current Page**.
   - To print consecutive pages like 1 -3, select **Custom Print** and enter the first and last page numbers in the **Pages** box.

- To print individual pages and a range of pages (like page 3, and pages 4-6) at the same time, select **Custom Print**, and enter the page numbers and ranges separated by commas (e.g. 3, 4-6).

Print in color

Note: If the printer you've chosen under **Printer** supports color, black and white, and grayscale printing options, the options will appear in the list under **Settings**.

1. Click **File** > **Print**.
2. Under **Settings**, choose the color printing option, and any other options you want, and click the **Print** button.

Checkpoint 9

Instructions: Find the true statement below. Then, rewrite the remaining false statements so they are true.

1. Italicizing a word is an example of character formatting.
2. To center selected paragraphs, click the Center button on the Formatting toolbar.
3. To center a graphic in a Word document, right-click anywhere on the graphic and select Center from the shortcut menu.
4. To save a Word document as a Web page, click the Save As Web button on the Standard toolbar.

ACTIVITY

Write a letter to your lecturer to ask her/his permission to use computer lab

Multiple Choice

Instructions: Select the best answer.

1. The _____ bar contains buttons that allow you to speak commands.
   a. Status
   b. Talk
   c. Language
   d. Speak

2. A(n) _____ contains buttons and boxes that allow you to perform frequent tasks quickly.
   a. indicator
   b. toolbar
   c. Scroll bar
   d. task pane

3. _____ are used to display different portions of your document in the document window.
   a. Status indicators
   b. Toolbars
   c. Scroll bars
   d. Rulers

4. The Language bar can be in any state except the following.
   a. Opened
   b. Closed
   c. Hidden
   d. Restored

5. If a word you type is not in Word's dictionary, a _____ wavy underline displays below the word, and a red _____ displays on the Spelling and Grammar Checking Status icon.
   a. green, check mark
   b. green, X
   c. red, check mark
   d. red, X

6. The file type _____ indicates that the file is a Word document.
   a. .word
   b. .doc
   c. .file
   d. .wd

7. The _____ command can be used to duplicate an action that you wish to perform again.
   a. Repeat
   b. Redo
   c. Undo
   d. Copy

8. Selected graphics display _____ handles at the corner and middle locations.
   a. selection
   b. sizing
   c. picture
   d. resizing

9. _____ the OVR status indicator to toggle between overtype and insert mode.
   a. Click
   b. Right-click
   c. Double-click
   d. Drag

10. To close a document and start over, _____.
   a. click Close on the File menu
   b. click the Close button at the right edge of the menu bar
   c. click the Close button on the Standard toolbar
   d. both a and b

SUMMARY

This chapter teach how to use Microsoft Word to create documents

KEY TERM

Format	**Bold**
Italic	**Print**
Table	**Alignment**
Paragraph	**Picture**
Bullet	**Numbering**

REFERENCES

Microsft 365 Training, Support Microsoft, Oct 20th, 2021, https://support.microsoft.com/en-us/training

TOPIC 10

Microsoft PowerPoint

LEARNING OUTCOMES

By the end of topic, you should be able to:

Create a Powerpoint presentation that consists ot slide transition, animations, picture, video, and sound

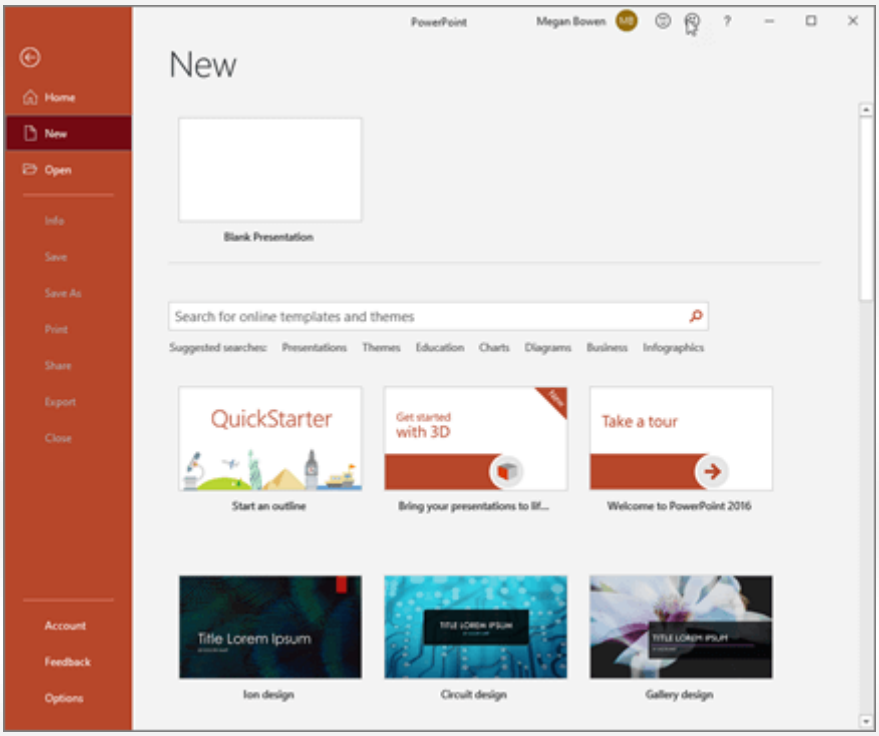
10.1 Introduction

With PowerPoint on your PC, Mac, or mobile device:

- Create presentations from scratch or a template.
- Add text, images, art, and videos.
- Select a professional design with PowerPoint Designer.
- Add transitions, animations, and motion.
- Save to OneDrive, to get to your presentations from your computer, tablet, or phone.
- Share and work with others, wherever they are.

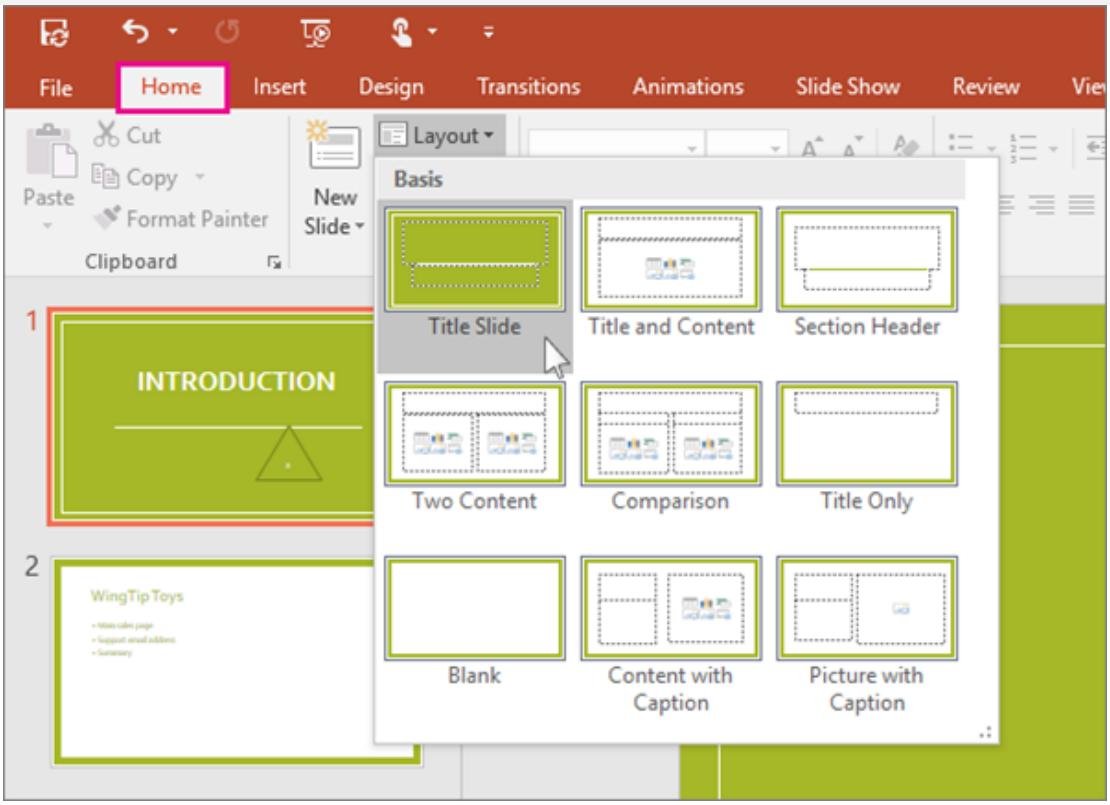
Create a presentation

1. Open PowerPoint.
2. Select an option:
   - Select **Blank Presentation** to create a presentation from scratch.
   - Select one of the templates.
   - Select **Take a Tour**, and then select **Create**, to see tips for using PowerPoint.



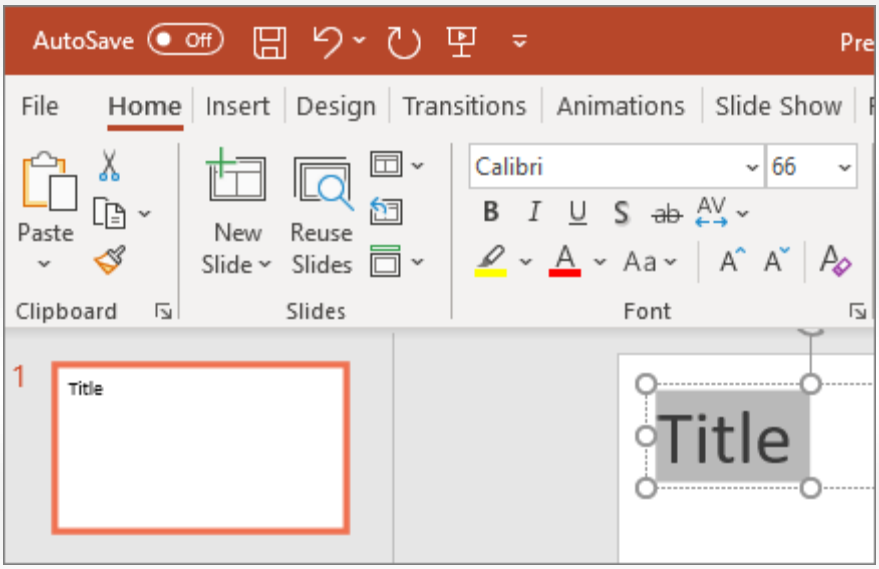
Add a slide

1. Select the slide you want your new slide to follow.
2. Select **Home** > **New Slide**.
3. Select **Layout** and the you type want from the drop-down.



Add and format text

1. Place the cursor where you want, and type.
2. Select the text, and then select an option on the **Home** tab: **Font**, **Font size**, **Bold**, **Italic**, **Underline**, ...
3. To create bulleted or numbered lists, select the text, and then select **Bullets** or **Numbering**.



Add a picture, shape, and more

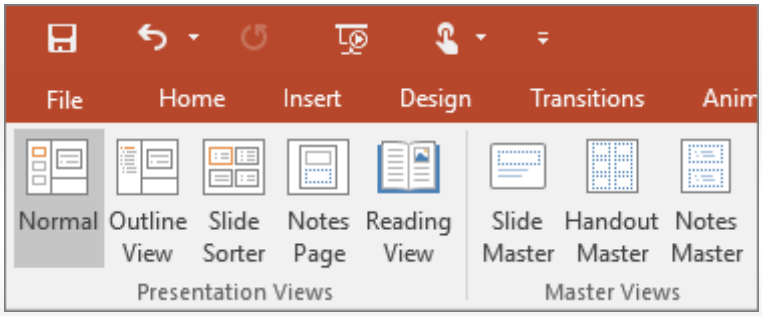
1. Select **Insert**.
2. To add a picture:
    - Select **Pictures**.
    - Browse for the picture you want and select **Insert**.
3. To add illustrations:
    - Select **Shapes**, **Icons**, **3D Models**, **SmartArt**, or **Chart**.
    - Select the one you want.

10.2 View

Choose the right view for the task in PowerPoint

You can view your PowerPoint file in a variety of ways, depending on the task at hand. Some views are helpful when you're creating your presentation, and some are most helpful for delivering your presentation.

You can find the different PowerPoint view options on the **View** tab, as shown below.



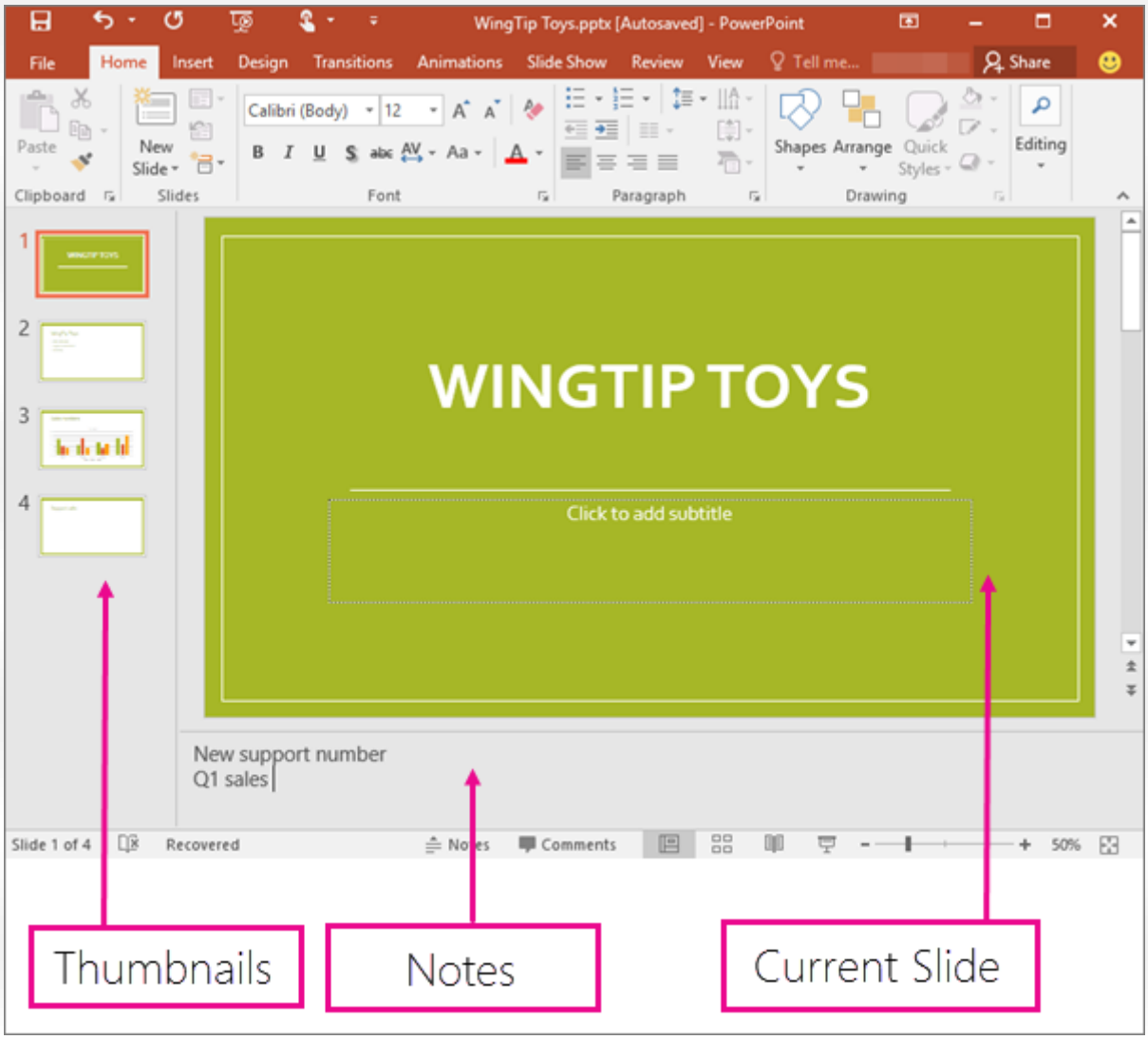
You can also find the most frequently used views on the task bar at the bottom right of the slide window, as shown below.

Views for creating your presentation

Normal view

You can get to **Normal** view from the task bar  at the bottom of the slide window, or from the **View** tab on the ribbon.

Normal view is the editing mode where you'll work most frequently to create your slides. Below, **Normal** view displays slide thumbnails on the left, a large window showing the current slide, and a section below the current slide where you can type your speaker notes for that slide.

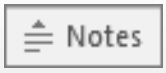


Slide Sorter view

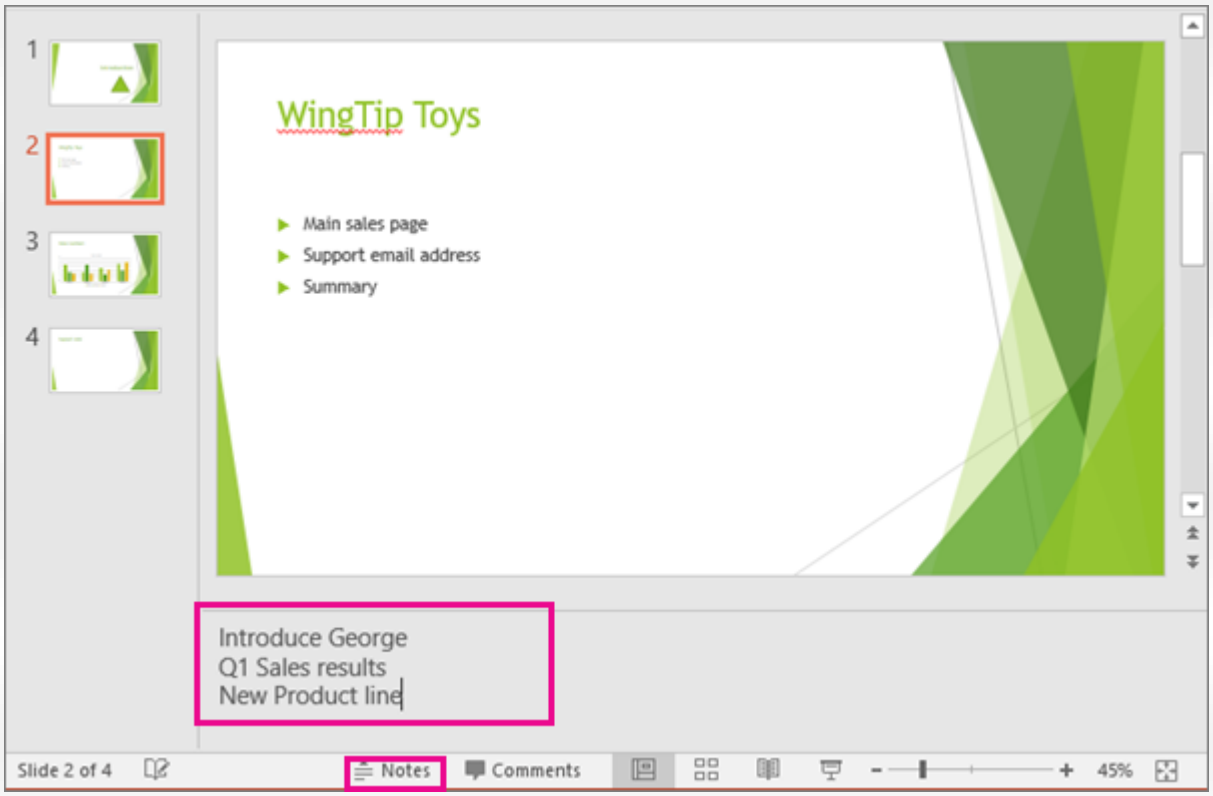
You can get to **Slide Sorter** view from the task bar  at the bottom of the slide window, or from the **View** tab on the ribbon.

Slide Sorter view (below) displays all the slides in your presentation in horizontally sequenced, thumbnails. Slide show view is helpful if you need to reorganize your slides—you can just click and drag your slides to a new location, or add sections to organize your slides into meaningful groups.

Notes Page view

You can show or hide your speakers notes with the **Notes** button  at the bottom of the slide window, or you can get to **Notes Page** view from the **View** tab on the ribbon.

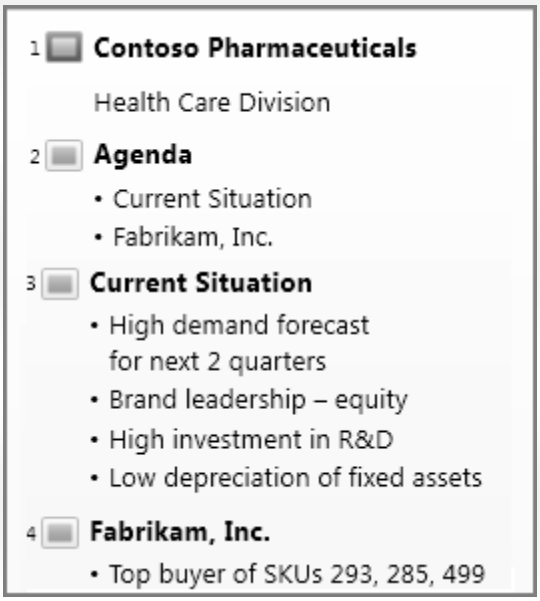
The **Notes** pane is located beneath the slide window. You can print your notes or include the notes in a presentation that you send to the audience, or just use them as cues for yourself while you're presenting.



Outline view

You can get to **Outline** view from the **View** tab on the ribbon.

Use **Outline** view to create an outline or story board for your presentation. It displays only the *text* on your slides, not pictures or other graphical items.



Master views

To get to a master view, on the **View** tab, in the **Master Views** group, choose the master view that you want.

Master views include, **Slide**, **Handout**, and **Notes**. The key benefit to working in a master view is that you can make universal style changes to every slide, notes page, or handout associated with your presentation.

Views for delivering and viewing a presentation

Slide Show view

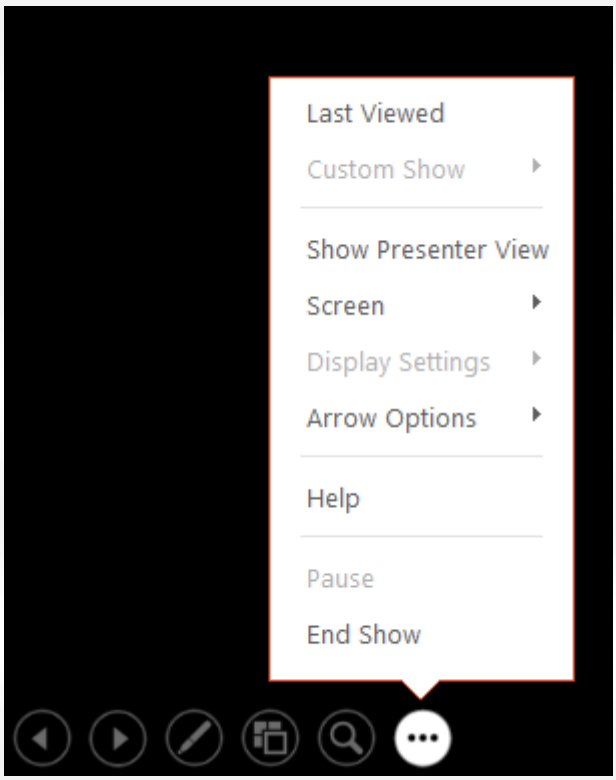
You can get to **SlideShow** view from the task bar  at the bottom of the slide window.

Use Slide Show view to deliver your presentation to your audience. Slide Show view occupies the full computer screen, exactly the way your presentation will look on a big screen when your audience sees it.

Presenter view

To get to **Presenter** view, in **Slide Show** view, in the lower left corner of the screen, click  , and then click **Show Presenter View** (as shown below).

Use **Presenter** view to view your notes while delivering your presentation. In **Presenter** view, your audience cannot see your notes.



Reading view

You can get to **Reading** view from the task bar  at the bottom of the slide window.

Most people reviewing a PowerPoint presentation without a presenter will want to use Reading view. It displays the presentation in a full screen like

Slide Show view, and it includes a few simple controls to make it easy to flip through the slides.

10.3 Transition

Slide transitions are the animation-like effects that happen when you move from one slide to the next during a presentation. Add slide transitions to bring your PowerPoint presentation to life.

1. Select the slide you want to add a transition to.
2. Select the **Transitions** tab and choose a transition.
3. Select a transition to see a preview.
4. Select **Effect Options** to choose the direction and nature of the transition.

   Note: Not every transition has **Effect Options**.

5. Select **Preview** to see what the transition looks like.

To remove a transition, select **Transitions** > **None**.

Add, change, or remove transitions between slides

A slide transition is the visual effect that occurs when you move from one slide to the next during a presentation. You can control the speed, add sound, and customize the look of transition effects.

Add slide transitions to bring your presentation to life

1. Select the slide you want to add a transition to.
2. Select the **Transitions** tab and choose a transition. Select a transition to see a preview.
3. Select **Effect Options** to choose the direction and nature of the transition.
4. Select **Preview** to see what the transition looks like.

To remove a transition, select **Transitions** > **None**.

Set the timing and speed of a transition

You can modify the duration of a transition, modify the transition effect, and even specify a sound to play during a transition. Also, you can specify the time to spend on a slide before advancing to the next.

Set the speed of a transition

Use **Duration** to set transition speed. A shorter duration means that a slide advances faster, and a larger number makes the slide advance more slowly.

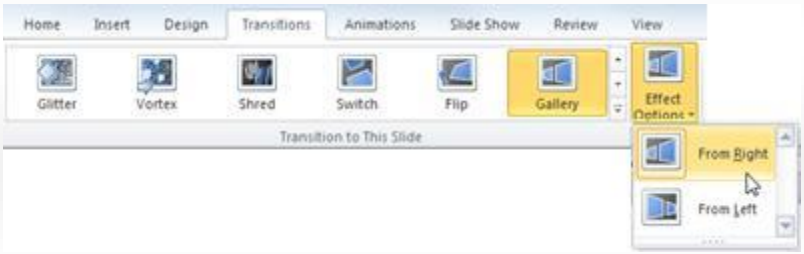
1. Select the slide that has the transition that you want to modify.
2. On the **Transitions** tab, in the **Timing** group, in the **Duration** box, type the number of seconds that you want.

Tip: If you want all the slide show's transitions to use the same speed, click **Apply to All**.

Modify the effect options for a transition

Many, but not all, of the transitions in PowerPoint can be customized.

1. Select the slide that has the transition you want to modify.
2. On the **Transitions** tab, in the **Transition to This Slide** group, click **Effect Options** and select the option that you want.



In this example, a **Gallery** transition is applied to the slide and the **From Right** option is selected.

A **Gallery** transition, with the **From Right** option selected, during a presentation.

Specify a time to advance to the next slide

Advance Slide sets the transition timing by specifying how long a slide stays in view before the transition to the next slide begins. If no timing is selected, slides advance when you click the mouse.

1. Select the slide that you want to set the timing for.
2. On the **Transitions** tab, in the **Timing** group, under **Advance Slide**, do one of the following:

- To make the slide advance to the next slide when you click the mouse, select the **On Mouse Click** check box.
- To make the slide advance automatically, select the **After** check box, and then enter the number of minutes or seconds that you want. The timer starts when the final animation or other effect on the slide finishes.
- To enable both the mouse and automatic advance, select both the **On Mouse Click** check box and the **After** check box. Then, at **After**, enter the number of minutes or seconds that you want. The slide will advance automatically, but you can advance it more quickly by clicking the mouse.

Tip: If you want all the slides to advance using the same speed, click **Apply to All**.

Set a sound to play during a transition

1. Select the slide that has the transition that you want to modify.
2. On the **Transitions** tab, in the **Timing** group, in the **Sound** list, select the sound that you want.

Note: If you want to use your own sound, in the **Sound** list, select **Other Sound**. Then, in the **Add Audio** dialog box, select the sound that you want, and then click **OK**

10.4 Animations

Animation can help make a PowerPoint presentation more dynamic, and help make information more memorable. The most common types of animation effects include entrances and exits. You can also add sound to increase the intensity of your animation effects.

Presentation experts recommend using animations and sound effects sparingly. Animation can be useful in making a presentation more dynamic, and help to emphasize points, but too much animation can be distracting. Do not let animation and sound take the focus away from what you are saying.

Add animations and effects

1. Select the object or text you want to animate.
2. Select **Animations** and choose an animation.
3. Select **Effect Options** and choose an effect.

Manage animations and effects

There are different ways to start animations in your presentation:

- **On Click** - Start an animation when you click a slide.
- **With Previous** - Play an animation at the same time as the previous animation in your sequence.
- **After Previous** - Start an animation immediately after the previous one happens.
- **Duration** - Lengthen or shorten an effect.
- **Delay** - Add time before an effect runs.

Add more effects to an animation

1. Select an object or text with an animation.
2. Select **Add Animation** and choose one.

Change the order of animations

1. Select an animation marker.
2. Choose the option you want:
    - **Move Earlier** - Make an animation appear earlier in the sequence.
    - **Move Later** - Make an animation occur later in the sequence.

Add animation to grouped objects

You can add an animation to grouped objects, text, and more.

1. Press Ctrl and select the objects you want.
2. Select **Format** > **Group** > **Group** to group the objects together.
3. Select **Animations** and choose an animation.

Animate text or objects

You can animate the text, pictures, shapes, tables, SmartArt graphics, and other objects in your PowerPoint presentation.

Effects can make an object appear, disappear, or move. They can change an object's size or color.

Add animations to text, pictures, shapes, and more in your presentation

1. Select the object or text you want to animate.
2. Select **Animations** and choose an animation.
3. Select **Effect Options** and choose an effect.

Manage animations and effects

There are different ways to start animations in your presentation:

- **On Click**: Start an animation when you click a slide.
- **With Previous**: Play an animation at the same time as the previous animation in your sequence.

- **After Previous**: Start an animation immediately after the previous one happens.
- **Duration**: Lengthen or shorten an effect.
- **Delay**: Add time before an effect runs.

Add more effects to an animation

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Change the order of animations

1. Select an animation marker.
2. Choose the option you want:
   - **Move Earlier**: Make an animation appear earlier in the sequence.
   - **Move Later**: Make an animation occur later in the sequence.

Add animation to grouped objects

You can add an animation to grouped objects, text, and more.

1. Press Ctrl and select the objects you want.
2. Select **Format** > **Group** > **Group** to group the objects together.
3. Select **Animations** and choose an animation.

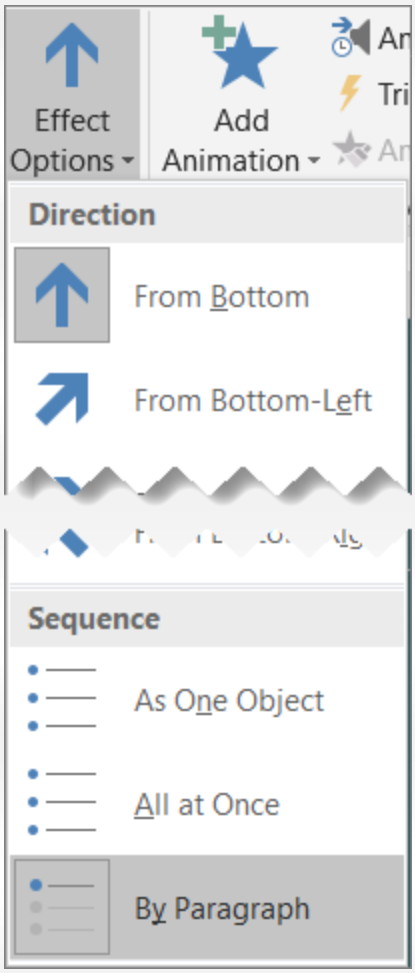
Animate or make words appear one line at a time

Make text appear one line at a time

1. On the slide, select the box that contains your text.
2. Select the **Animations** tab, and then pick an animation, such as **Appear**, **Fade In**, or **Fly In**.

   For some animations, such as **Fly In**, select **Effects Options**, as you'll need to pick a direction for the bullets to fly in from, such as bottom, top, left, or right.

3. Select **Effect Options**, and then select **By Paragraph** to make the paragraphs of text appear one at a time. (The other option, **All at Once**, makes all the lines of text appear at the same time.)



PowerPoint immediately previews the animation for you.

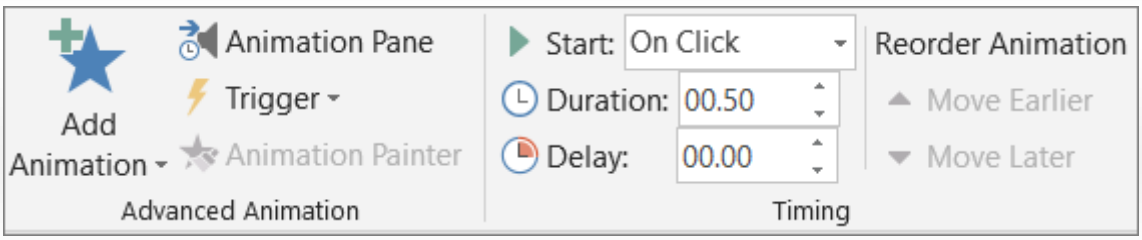
By default, when you present in Slide Show, each paragraph appears in response to a click. That way, you control when each paragraph appears. You can modify this setting by using the **Start**, **Duration**, and **Delay** controls on the far-right end of the **Animation** tab of the ribbon.

Make text appear one letter at a time

You can also create a "typing" visual effect by making characters in a paragraph appear one at a time.

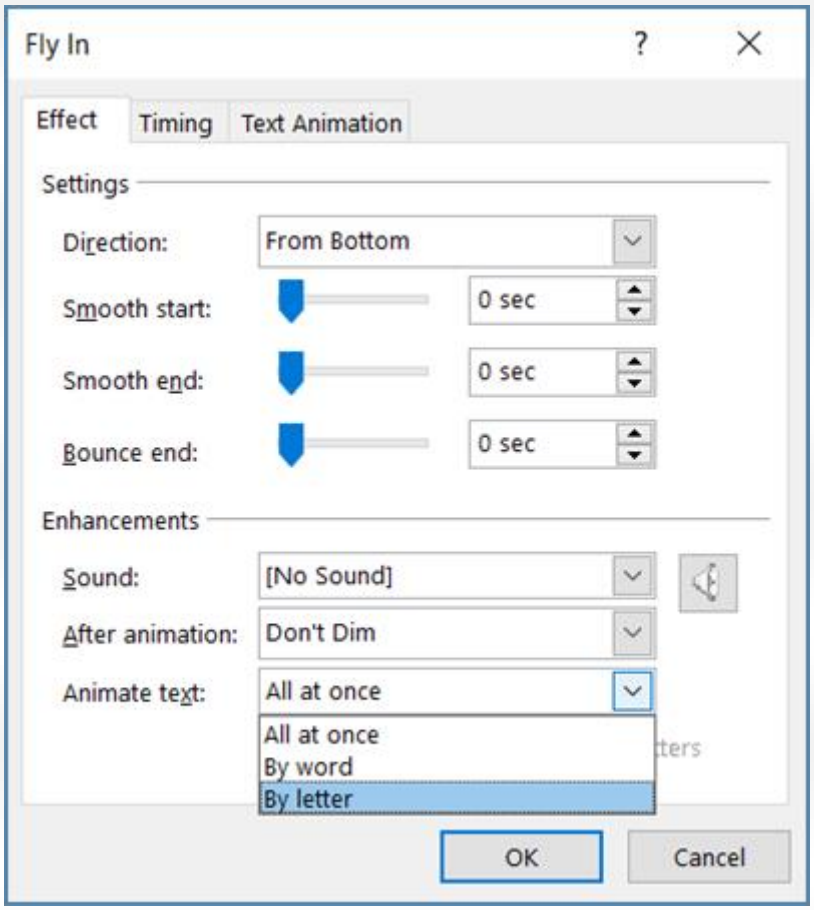
1. On the slide, select the box that contains your text.
2. Select the **Animations** tab, and then select the **Add Animation** drop-down menu to select an animation, such as **Appear**, **Fade**, or **Fly In**.

3. Select the **Animations** tab, and then select **Animation pane**.



   The Animation Pane opens on the right side of the PowerPoint window.

4. In the Animation Pane, select the arrow next to your animation, and select **Effect Options**.
5. In the dialog box, on the **Effect** tab under **Enhancements**, select the arrow next to **Animate text**, and select **By letter**. You can change the delay time in the **% delay between letters** box.



PowerPoint immediately previews the animation for you so that you can see the timing as the characters appear individually. You can repeat the preview by selecting the animation in the Animation Pane and selecting **Play Selected**.

10.5 Inserting Audio and Video

Using the **Recording** tab introduced in PowerPoint 2016, you can add a screenshot, screen recording, audio (such as background music), or video to a slide.

Tip: Don't see the **Recording** tab? Right-click any tab in PowerPoint and select **Customize the Ribbon**. On the right side of the dialog box you'll see a list of tabs. Make sure **Recording** is checked.

Insert a screenshot

Open the slide where you want the screenshot to be inserted.

Click **Recording** tab > **Screenshot** button > (the gallery of windows opens)

Either select one of the windows shown (for a full-window clipping of that app) or select **Screen Clipping** to define the area on your screen that you want to capture.

Insert a screen recording

- You can record your computer screen and related audio, and then embed it into your PowerPoint slide—or you can save it as a separate file.

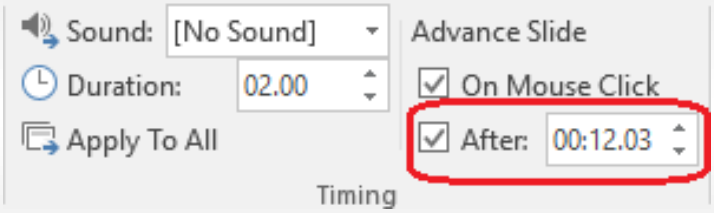
Insert a video file

1. Open the slide where you want to add the video.
2. Click **Recording** tab > **Video** > and then browse to the location on your computer or network where the video file is stored. Select the file and click **Insert**.

   The video will "auto-play" That means that when viewers look at the presentation in Slide Show, and they arrive at the slide where the video is placed, the video immediately begins to play. The viewer doesn't need to click Play to start it. When the video finishes playing, the slide show automatically advances to the next slide.

   Important: If you insert a video this way, then subsequently trim the video, the trimming doesn't alter the auto-advance timing for the video.

You must manually set the slide to advance at the appropriate time. (Select the video, click the **Transitions** tab of the ribbon, and at the far right end of the ribbon, adjust the **Advance Slide** > **After** setting to the amount of time that equals the length of the trimmed video.)



Embed a web video

- Click **Insert** tab > **Video** > **Online Video** and then select or specify the video you want to embed.

Insert an audio file

1. Open the slide where you want to add the audio file.
2. Click **Recording** tab > **Audio** > **Audio on My PC** > and then browse to the location on your computer or network where the audio file is stored. Select the file and click **Insert**.

   The recording will "auto-play" That means that when viewers look at the presentation in Slide Show, and they arrive at the slide where the audio recording is placed, it immediately begins to play. The viewer doesn't need to click Play to start it. When the audio finishes playing, the slide show automatically advances to the next slide.

Record sound and insert it on a slide

1. Open the slide where you want to add the audio.
2. Click **Recording** tab > **Audio** > **Record Sound**

3. In the **Record Sound** dialog box, click the **Record** button, and begin speaking or playing your own audio. Click the square stop button when you are done. Assign a name to the recording if you like. Then click **OK**, and the recording is placed on the current slide, represented by the standard audio icon.

The recording will "auto-play" That means that when viewers look at the presentation in Slide Show, and they arrive at the slide where the audio recording is placed, it immediately begins to play. The viewer doesn't need to click Play to start it. When the audio finishes playing, the slide show automatically advances to the next slide.

10.1 Slide Show

Start a slide show

1. To start your slide show, on the **Slide Show** tab, select **Play From Beginning**.

(If you've turned off the Simplified Ribbon, you don't have a **Slide Show** tab; instead use the **View** tab to start Slide Show.)

2. To manage your slide show, go to the controls in the bottom-left corner  and do any of the following:

Select	To
	Go to the previous slide
	Go to the next slide
	View all slides To skip to a particular slide, simply click it in this Grid view.
	Turn subtitles on or off
	End the slide show

3. To skip to any slide in the presentation, right-click the screen and select **Go to Slide**. Then, enter the slide number you want in the **Slide** box, and select **OK**.

Checkpoint 10

Instructions: Find the true statement below. Then, rewrite the remaining false statements so they are true.

1. Powerpoint has 3 different type of view, that is reading, outline and normal view
2. You can insert an online video into your presentation
3. You cannot record your presentation.

ACTIVITY

Create a presentation about yourself.

SUMMARY

- Powerpoint is a software that can helps you to create an interesting presentation using its element

KEY TERM

Presentation	**Slide**
Transition	**Animations**

REFERENCES

Microsft 365 Training, Support Microsoft, Oct 20th, 2021, https://support.microsoft.com/en-us/training

TOPIC 11

Microsoft Excel

LEARNING OUTCOMES

By the end of topic, you should be able to:

1. Create data analysis using Excel
2. Create a graph using Excel

11.1 Introduction

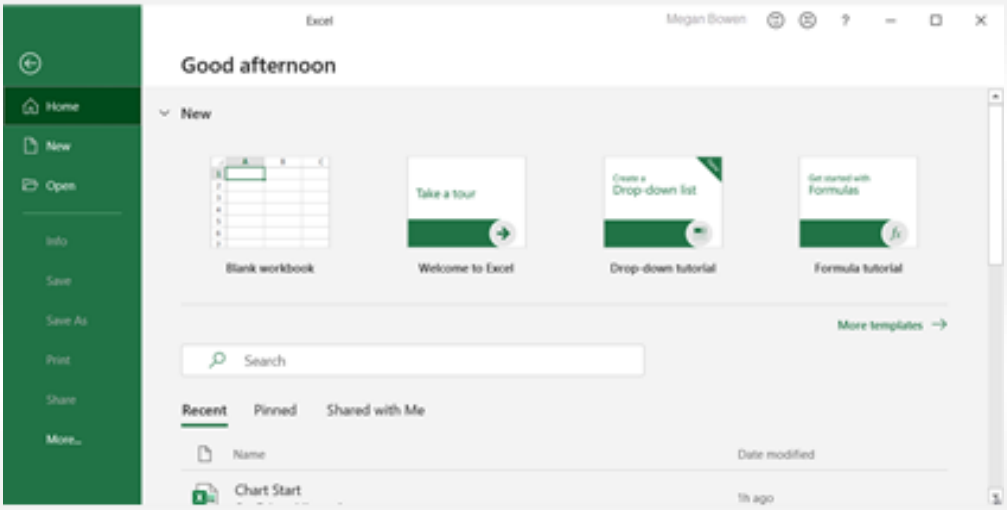
Create a workbook in Excel

Excel makes it easy to crunch numbers. With Excel, you can streamline data entry with AutoFill. Then, get chart recommendations based on your data, and create them with one click. Or easily spot trends and patterns with data bars, color coding, and icons.

Create a workbook

1. Open Excel.
2. Select **Blank workbook**.

   Or press **Ctrl+N**.



Enter data

To manually enter data:

1. Select an empty cell, such as A1, and then type text or a number.
2. Press **Enter** or **Tab** to move to the next cell.

To fill data in a series:

1. Enter the beginning of the series in two cells: such as Jan and Feb; or 2014 and 2015.
2. Select the two cells containing the series, and then drag the fill handle  across or down the cells.

11.2 Working with Sheet

Basic tasks in Excel

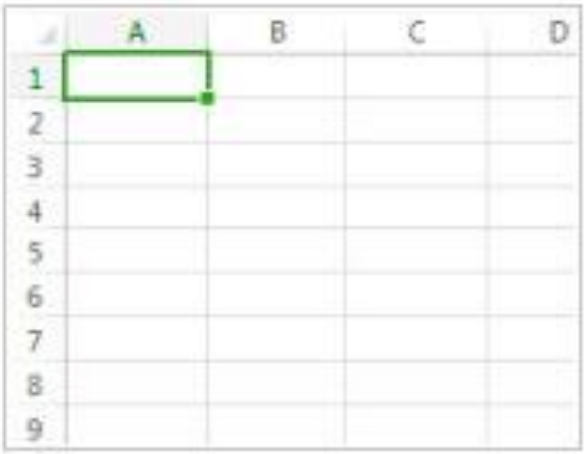
Excel is an incredibly powerful tool for getting meaning out of vast amounts of data. But it also works well for simple calculations and tracking almost

any kind of information. The key for unlocking all that potential is the grid of cells. Cells can contain numbers, text, or formulas. You put data in your cells and group them in rows and columns. That allows you to add up your data, sort and filter it, put it in tables, and build great-looking charts. Let's go through the basic steps to get you started.

Create a new workbook

Excel documents are called workbooks. Each workbook has sheets, typically called spreadsheets. You can add as many sheets as you want to a workbook, or you can create new workbooks to keep your data separate.

1. Click **File**, and then click **New**.
2. Under **New**, click the **Blank workbook**.



Blank workbook

Enter your data

1. Click an empty cell.

   For example, cell A1 on a new sheet. Cells are referenced by their location in the row and column on the sheet, so cell A1 is in the first row of column A.

2. Type text or a number in the cell.

3. Press Enter or Tab to move to the next cell.

Apply cell borders

1. Select the cell or range of cells that you want to add a border to.

2. On the **Home** tab, in the Font group, click the arrow next to Borders, and then click the border style that you want.

Apply cell shading

1. Select the cell or range of cells that you want to apply cell shading to.

2. On the **Home** tab, in the **Font** group, choose the arrow next to **Fill Color**  , and then under **Theme Colors** or **Standard Colors**, select the color that you want.

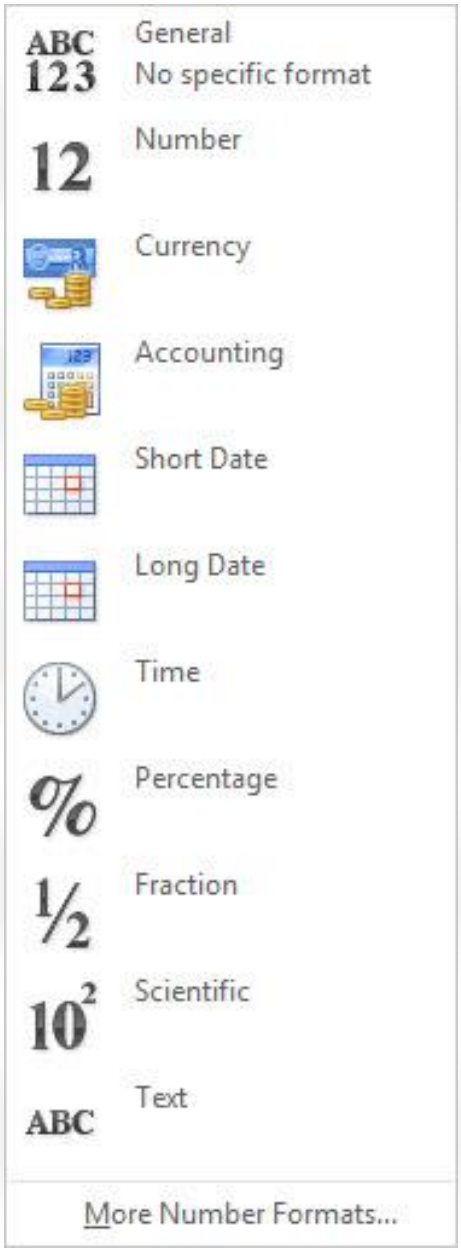
Apply a number format

To distinguish between different types of numbers, add a format, like currency, percentages, or dates.

1. Select the cells that have numbers you want to format.

2. Click the **Home** tab, and then click the arrow in the **General** box.

3. Pick a number format.



If you don't see the number format you're looking for, click **More Number Formats**.

11.3 Formula

Overview of formulas in Excel

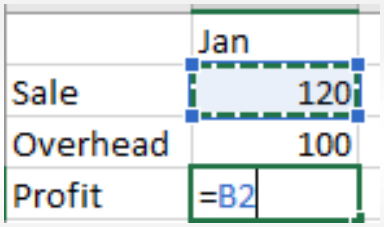
Get started on how to create formulas and use built-in functions to perform calculations and solve problems.

Create a formula that refers to values in other cells

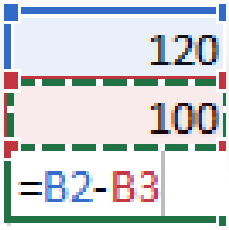
1. Select a cell.
2. Type the equal sign =.

   Note: Formulas in Excel always begin with the equal sign.

3. Select a cell or type its address in the selected cell.



4. Enter an operator. For example, – for subtraction.
5. Select the next cell, or type its address in the selected cell.



6. Press Enter. The result of the calculation appears in the cell with the formula.

Using calculation operators in Excel formulas

Operators specify the type of calculation that you want to perform on the elements of a formula. Excel follows general mathematical rules for calculations, which is **Parentheses**, **Exponents**, **Multiplication and Division**, and **Addition and Subtraction**, or the acronym **PEMDAS** (Please Excuse My Dear Aunt Sally). Using parentheses allows you to change that calculation order.

- **Arithmetic operators**

  To perform basic mathematical operations, such as addition, subtraction, multiplication, or division; combine numbers; and produce numeric results, use the following arithmetic operators.

Arithmetic operator	Meaning	Example
+ (plus sign)	Addition	=3+3
– (minus sign)	Subtraction Negation	=3–3 =-3
*** (asterisk)**	Multiplication	=3*3
/ (forward slash)	Division	=3/3
% (percent sign)	Percent	30%
^ (caret)	Exponentiation	=3^3

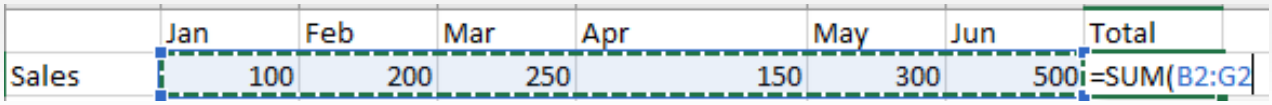
See a formula

1. When a formula is entered into a cell, it also appears in the **Formula bar.**

2. To see a formula, select a cell, and it will appear in the formula bar.

Enter a formula that contains a built-in function

1. Select an empty cell.
2. Type an equal sign = and then type a function. For example, =SUM for getting the total sales.
3. Type an opening parenthesis (.
4. Select the range of cells, and then type a closing parenthesis).



5. Press Enter to get the result.

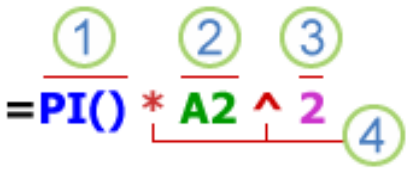
Formulas in-depth

You can browse through the individual sections below to learn more about specific formula elements.

The parts of an Excel formula

A formula can also contain any or all of the following: **functions**, **references**, **operators**, and **constants**.

Parts of a formula



1. **Functions**: The PI() function returns the value of pi: 3.142...
2. **References**: A2 returns the value in cell A2.
3. **Constants**: Numbers or text values entered directly into a formula, such as 2.
4. **Operators**: The ^ (caret) operator raises a number to a power, and the * (asterisk) operator multiplies numbers.

Using constants in Excel formulas

A constant is a value that is not calculated; it always stays the same. For example, the date 10/9/2008, the number 210, and the text "Quarterly Earnings" are all constants. An expression or a value resulting from an expression is not a constant. If you use constants in a formula instead of references to cells (for example, =30+70+110), the result changes only if you modify the formula. In general, it's best to place constants in individual cells where they can be easily changed if needed, then reference those cells in formulas.

Using references in Excel formulas

A reference identifies a cell or a range of cells on a worksheet, and tells Excel where to look for the values or data you want to use in a formula. You can use references to use data contained in different parts of a worksheet in one formula or use the value from one cell in several formulas. You can also refer to cells on other sheets in the same workbook, and to other workbooks. References to cells in other workbooks are called links or external references.

The A1 reference styles

By default, Excel uses the A1 reference style, which refers to columns with letters (A through XFD, for a total of 16,384 columns) and refers to rows with numbers (1 through 1,048,576). These letters and numbers are called row and column headings. To refer to a cell, enter the column letter followed by the row number. For example, B2 refers to the cell at the intersection of column B and row 2.

To refer to	Use
The cell in column A and row 10	A10
The range of cells in column A and rows 10 through 20	A10:A20
The range of cells in row 15 and columns B through E	B15:E15
All cells in row 5	5:5
All cells in rows 5 through 10	5:10
All cells in column H	H:H
All cells in columns H through J	H:J
The range of cells in columns A through E and rows 10 through 20	A10:E20

The difference between absolute, relative and mixed references

Relative references

A relative cell reference in a formula, such as A1, is based on the relative position of the cell that contains the formula and the cell the reference refers to. If the position of the cell that contains the formula changes, the reference is changed. If you copy or fill the formula across rows or down columns, the reference automatically adjusts. By default, new formulas use relative references. For example, if you copy or fill a relative reference in cell B2 to cell B3, it automatically adjusts from =A1 to =A2.

Copied formula with relative reference

	A	B
1		
2		=A1
3		=A2

Absolute references

An absolute cell reference in a formula, such as $A$1, always refer to a cell in a specific location. If the position of the cell that contains the formula changes, the absolute reference remains the same. If you copy or fill the formula across rows or down columns, the absolute reference does not adjust. By default, new formulas use relative references, so you may need to switch them to absolute references. For example, if you copy or fill an absolute reference in cell B2 to cell B3, it stays the same in both cells: =$A$1.

Copied formula with absolute reference

	A	B
1		
2		=$A$1
3		=$A$1

Mixed references

A mixed reference has either an absolute column and relative row, or absolute row and relative column. An absolute column reference takes the form $A1, $B1, and so on. An absolute row reference takes the form A$1, B$1, and so on. If the position of the cell that contains the formula changes, the relative reference is changed, and the absolute reference does not change. If you copy or fill the formula across rows or down columns, the relative reference automatically adjusts, and the absolute reference does not adjust. For example, if you copy or fill a mixed reference from cell A2 to B3, it adjusts from =A$1 to =B$1.

Copied formula with mixed reference

	A	B	C
1			
2		=A$1	
3			=B$1

11.4 Functions

SUM function

The **SUM** function adds values. You can add individual values, cell references or ranges or a mix of all three.

For example:

- **=SUM(A2:A10)** Adds the values in cells A2:10.
- **=SUM(A2:A10, C2:C10)** Adds the values in cells A2:10, as well as cells C2:C10.

Syntax:

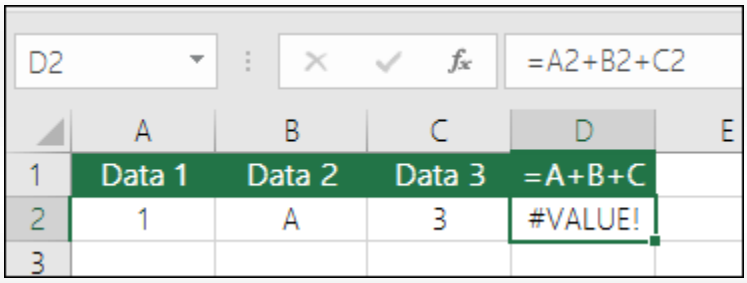
SUM(number1,[number2],...)

Argument name	Description
number1 **Required**	The first number you want to add. The number can be like 4, a cell reference like B6, or a cell range like B2:B8.
number2-255 **Optional**	This is the second number you want to add. You can specify up to 255 numbers in this way.

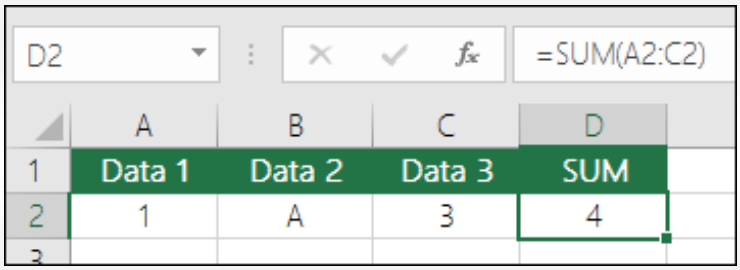
#VALUE! errors from referencing text instead of numbers

If you use a formula like:

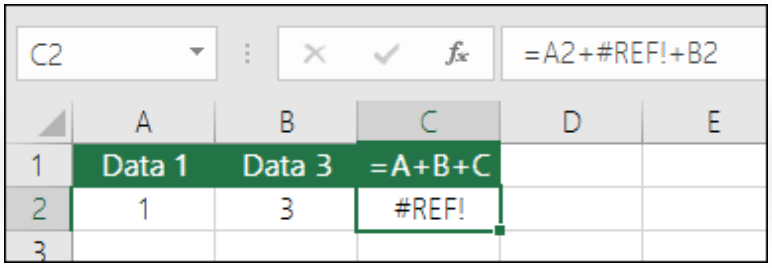
- **=A1+B1+C1** or **=A1+A2+A3**



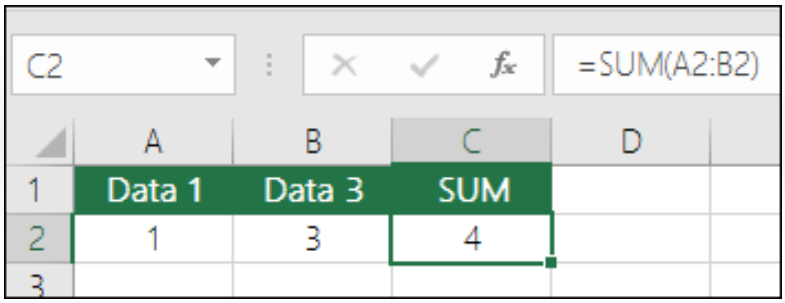
Your formula can break if there are any non-numeric (text) values in the referenced cells, which will return a #VALUE! error. SUM will ignore text values and give you the sum of just the numeric values.



#REF! error from deleting rows or columns



If you delete a row or column, the formula will not update to exclude the deleted row and it will return a #REF! error, where a SUM function will automatically update.



AVERAGE function

Returns the average (arithmetic mean) of the arguments. For example, if the range A1:A20 contains numbers, the formula **=AVERAGE(A1:A20)** returns the average of those numbers.

Syntax

AVERAGE(number1, [number2], ...)

The AVERAGE function syntax has the following arguments:

- **Number1** Required. The first number, cell reference, or range for which you want the average.
- **Number2, ...** Optional. Additional numbers, cell references or ranges for which you want the average, up to a maximum of 255.

Remarks

- Arguments can either be numbers or names, ranges, or cell references that contain numbers.
- Logical values and text representations of numbers that you type directly into the list of arguments are not counted.
- If a range or cell reference argument contains text, logical values, or empty cells, those values are ignored; however, cells with the value zero are included.
- Arguments that are error values or text that cannot be translated into numbers cause errors.
- If you want to include logical values and text representations of numbers in a reference as part of the calculation, use the **AVERAGEA** function.
- If you want to calculate the average of only the values that meet certain criteria, use the **AVERAGEIF** function or the **AVERAGEIFS** function.

Note: The **AVERAGE** function measures central tendency, which is the location of the center of a group of numbers in a statistical distribution. The three most common measures of central tendency are:

- **Average**, which is the arithmetic mean, and is calculated by adding a group of numbers and then dividing by the count of those numbers. For example, the average of 2, 3, 3, 5, 7, and 10 is 30 divided by 6, which is 5.
- **Median**, which is the middle number of a group of numbers; that is, half the numbers have values that are greater than the median, and half the

numbers have values that are less than the median. For example, the median of 2, 3, 3, 5, 7, and 10 is 4.

- **Mode**, which is the most frequently occurring number in a group of numbers. For example, the mode of 2, 3, 3, 5, 7, and 10 is 3.

For a symmetrical distribution of a group of numbers, these three measures of central tendency are all the same. For a skewed distribution of a group of numbers, they can be different.

Tip: When you average cells, keep in mind the difference between empty cells and those containing the value zero, especially if you have cleared the **Show a zero in cells that have a zero value** check box in the **Excel Options** dialog box in the Excel desktop application. When this option is selected, empty cells are not counted, but zero values are.

To locate the **Show a zero in cells that have a zero value** check box:

- On the **File** tab, click **Options**, and then, in the **Advanced** category, look under **Display options for this worksheet**.

MAX function

Returns the largest value in a set of values.

Syntax

MAX(number1, [number2], ...)

The MAX function syntax has the following arguments:

- **Number1, number2, ...** Number1 is required, subsequent numbers are optional. 1 to 255 numbers for which you want to find the maximum value.

MIN function

Returns the smallest number in a set of values.

Syntax

MIN(number1, [number2], ...)

The MIN function syntax has the following arguments:

- **Number1, number2, ...** Number1 is optional, subsequent numbers are optional. 1 to 255 numbers for which you want to find the minimum value.

11.5 Chart

Create a chart from start to finish

Charts help you visualize your data in a way that creates maximum impact on your audience. Learn to create a chart and add a trendline.

Create a chart

1. Select data for the chart.
2. Select **Insert** > **Recommended Charts**.
3. Select a chart on the **Recommended Charts** tab, to preview the chart.

   Note: You can select the data you want in the chart and press ALT + F1 to create a chart immediately, but it might not be the best chart for the

data. If you don’t see a chart you like, select the **All Charts** tab to see all chart types.

4. Select a chart.
5. Select **OK**.

Add a trendline

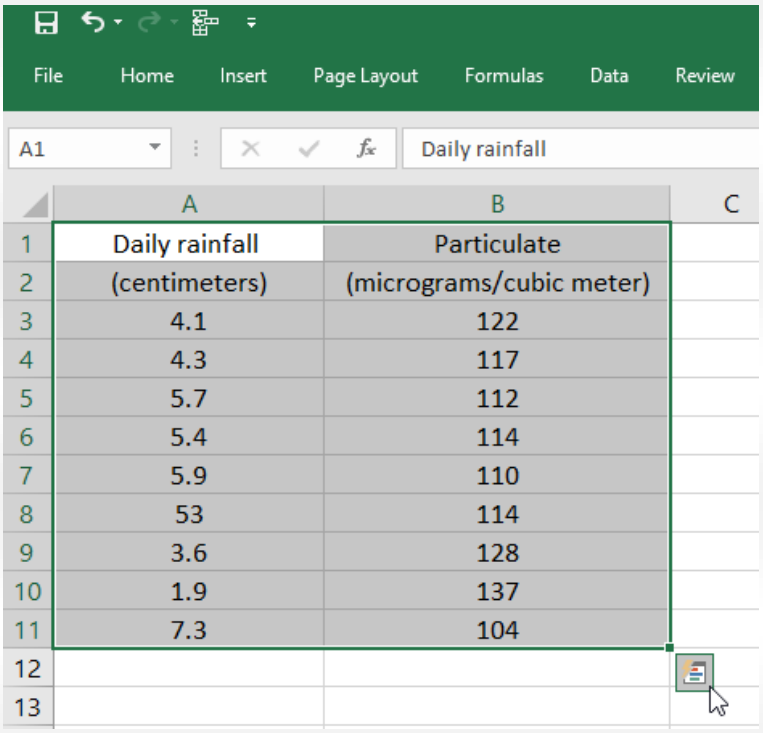
1. Select a chart.
2. Select **Design** > **Add Chart Element**.
3. Select **Trendline** and then select the type of trendline you want, such as **Linear, Exponential, Linear Forecast**, or **Moving Average**.

Choose your chart using Quick Analysis

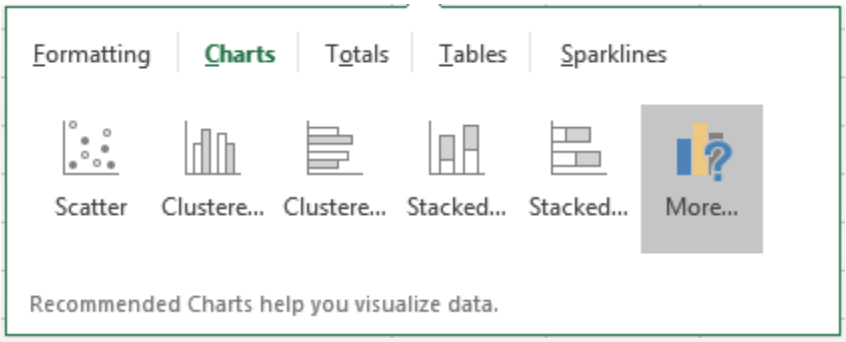
Quick Analysis takes a range of data and helps you pick the perfect chart with just a few commands.

1. Select a range of cells.
2. Select the **Quick Analysis** button that appears at the bottom right corner of the selected data.

   Or, press Ctrl + Q.



3. Select **Charts**.



4. Hover over the chart types to preview a chart, and then select the chart you want.

Chart Types

There are several options for chart types that you can choose to represent your data. Among the easy to use charts are;

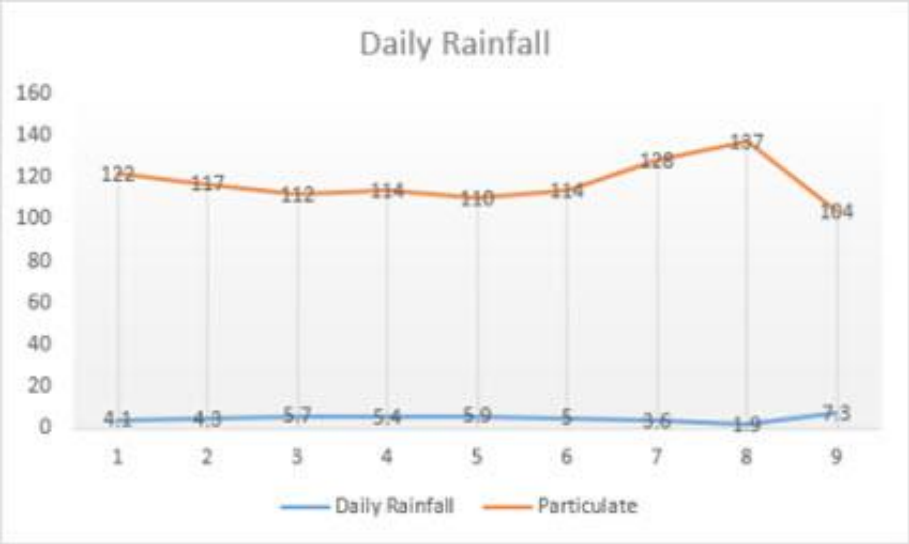
Column chart

Data that's arranged in columns or rows on a worksheet can be plotted in a column chart. A column chart typically displays categories along the horizontal (category) axis and values along the vertical (value) axis, as shown in this chart:

Use this chart when you have multiple data series and you want to emphasize the total.

Line chart

Data that's arranged in columns or rows on a worksheet can be plotted in a line chart. In a line chart, category data is distributed evenly along the horizontal axis, and all value data is distributed evenly along the vertical axis. Line charts can show continuous data over time on an evenly scaled axis, so they're ideal for showing trends in data at equal intervals, like months, quarters, or fiscal years.



Notes:

- Line charts work best when you have multiple data series in your chart—if you have only one data series, consider using a scatter chart instead.
- Stacked line charts sum the data, which might not be the result you want. It might not be easy to see that the lines are stacked, so consider using a different line chart type or a stacked area chart instead.

Pie charts

Data that's arranged in one column or row on a worksheet can be plotted in a pie chart. Pie charts show the size of items in one data series, proportional to the sum of the items. The data points in a pie chart are shown as a percentage of the whole pie.

Consider using a pie chart when:

- You have only one data series.
- None of the values in your data are negative.
- Almost none of the values in your data are zero values.
- You have no more than seven categories, all of which represent parts of the whole pie.

Doughnut charts

Data that's arranged in columns or rows only on a worksheet can be plotted in a doughnut chart. Like a pie chart, a doughnut chart shows the relationship of parts to a whole, but it can contain more than one data series.

Note: Doughnut charts aren't easy to read. You may want to use a stacked column charts or Stacked bar chart instead.

Bar chart

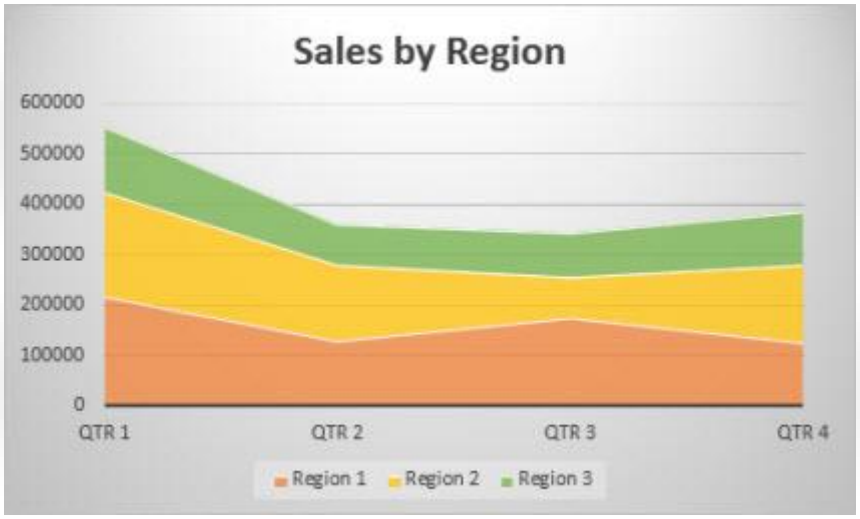
Data that's arranged in columns or rows on a worksheet can be plotted in a bar chart. Bar charts illustrate comparisons among individual items. In a bar chart, the categories are typically organized along the vertical axis, and the values along the horizontal axis.

Consider using a bar chart when:

- The axis labels are long.
- The values that are shown are durations.

Area chart

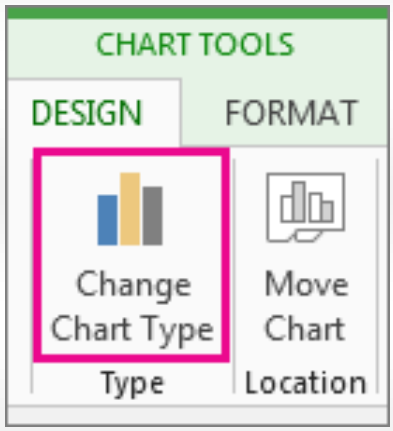
Data that's arranged in columns or rows on a worksheet can be plotted in an area chart. Area charts can be used to plot change over time and draw attention to the total value across a trend. By showing the sum of the plotted values, an area chart also shows the relationship of parts to a whole.



Change a chart type

If you have already have a chart, but you just want to change its type:

1. Select the chart, click the **Design** tab, and click **Change Chart Type.**



2. Choose a new chart type in the **Change Chart Type box**.

Checkpoint 11

Instructions: Find the true statement below. Then, rewrite the remaining false statements so they are true.

1. Excel will recalculate a formula if any changes are made to the data
2. You can create many types of charts using excel
3. You must insert; to enable you to calculate in excel

ACTIVITY

Create a graph based on this data

Location	Date	Rainfall (inch)	Temperature(C)
Melaka	10/20/2021	0.2	25
Kuala Lumpur	10/20/2021	2.3	26
Selangor	10/20/2021	1.3	27

SUMMARY

Excel is a software to make data analysis and a graph

KEY TERM

Formula **Function**

Graph **Sort**

REFERENCES

Microsft 365 Training, Support Microsoft, Oct 20th, 2021, *https://support.microsoft.com/en-us/training*

Available chart types in Office (microsoft.com), Mac 7th, 2022 https://support.microsoft.com/en-us/office/available-chart-types-in-office-a6187218-807e-4103-9e0a-27cdb19afb90

TOPIC 12

Microsoft Access

LEARNING OUTCOMES

By the end of topic, you should be able to:

- Create table, form, report and queries using Access

12.1 Introduction

What is a database?

A database is a tool for collecting and organizing information. Databases can store information about people, products, orders, or anything else. Many databases start as a list in a word-processing program or spreadsheet. As the list grows bigger, redundancies and inconsistencies begin to appear in the data. The data becomes hard to understand in list form, and there are limited ways of searching or pulling subsets of data out for review. Once these problems start to appear, it's a good idea to transfer the data to a database created by a database management system (DBMS), such as MS Access.

A computerized database is a container of objects. One database can contain more than one table. For example, an inventory tracking system that uses three tables is not three databases, but one database that contains three tables. Unless it has been specifically designed to use data or code from another source, an MS Access database stores its tables in a single file, along with other objects, such as forms, reports, macros, and

modules. Databases created in the MS Access 2007 format (which is also used by MS Access, 2016, MS Access 2013 and MS Access 2010) have the file extension .accdb, and databases created in earlier MS Access formats have the file extension .mdb. You can use MS Access 2016, MS Access 2013, MS Access 2010, or MS Access 2007 to create files in earlier file formats (for example, MS Access 2000 and MS Access 2002-2003).

Using MS Access, you can:

- Add new data to a database, such as a new item in an inventory
- Edit existing data in the database, such as changing the current location of an item
- Delete information, perhaps if an item is sold or discarded
- Organize and view the data in different ways
- Share the data with others via reports, e-mail messages, an intranet , or the Internet

12.2 Objects in MS Access

Tables

A database table is similar in appearance to a spreadsheet, in that data is stored in rows and columns. As a result, it is usually quite easy to import a

spreadsheet into a database table. The main difference between storing your data in a spreadsheet and storing it in a database is in how the data is organized.

To get the most flexibility out of a database, the data needs to be organized into tables so that redundancies don't occur. For example, if you're storing information about employees, each employee should only need to be entered once in a table that is set up just to hold employee data. Data about products will be stored in its own table, and data about branch offices will be stored in another table. This process is called *normalization*.

Each row in a table is referred to as a record. Records are where the individual pieces of information are stored. Each record consists of one or more fields. Fields correspond to the columns in the table. For example, you might have a table named "Employees" where each record (row) contains information about a different employee, and each field (column) contains a different type of information, such as first name, last name, address, and so on. Fields must be designated as a certain data type, whether it's text, date or time, number, or some other type.

Another way to describe records and fields is to visualize a library's old-style card catalog. Each card in the cabinet corresponds to a *record* in the database. Each piece of information on an individual card (author, title, and so on) corresponds to a *field* in the database.

Forms

Forms allow you to create a user interface in which you can enter and edit your data. Forms often contain command buttons and other controls that perform various tasks. You can create a database without using forms by simply editing your data in the table datasheets. However, most database users prefer to use forms for viewing, entering, and editing data in the tables.

You can program command buttons to determine which data appears on the form, open other forms or reports, or perform a variety of other tasks. For example, you might have a form named "Customer Form" in which you work with customer data. The customer form might have a button which opens an order form where you can enter a new order for that customer.

Forms also allow you to control how other users interact with the data in the database. For example, you can create a form that shows only certain fields and allows only certain operations to be performed. This helps protect data and to ensure that the data is entered properly.

Reports

Reports are what you use to format, summarize and present data. A report usually answers a specific question, such as "How much money did we receive from each customer this year?" or "What cities are our customers located in?" Each report can be formatted to present the information in the most readable way possible.

A report can be run at any time, and will always reflect the current data in the database. Reports are generally formatted to be printed out, but they can also be viewed on the screen, exported to another program, or sent as an attachment to an e-mail message.

Queries

Queries can perform many different functions in a database. Their most common function is to retrieve specific data from the tables. The data you

want to see is usually spread across several tables, and queries allow you to view it in a single datasheet. Also, since you usually don't want to see all the records at once, queries let you add criteria to "filter" the data down to just the records you want.

Certain queries are "updateable," meaning you can edit the data in the underlying tables via the query datasheet. If you are working in an updateable query, remember that your changes are actually being made in the tables, not just in the query datasheet.

Queries come in two basic varieties: select queries and action queries. A select query simply retrieves the data and makes it available for use. You can view the results of the query on the screen, print it out, or copy it to the clipboard. Or, you can use the output of the query as the record source for a form or report.

An action query, as the name implies, performs a task with the data. Action queries can be used to create new tables, add data to existing tables, update data, or delete data.

12.3 Tables

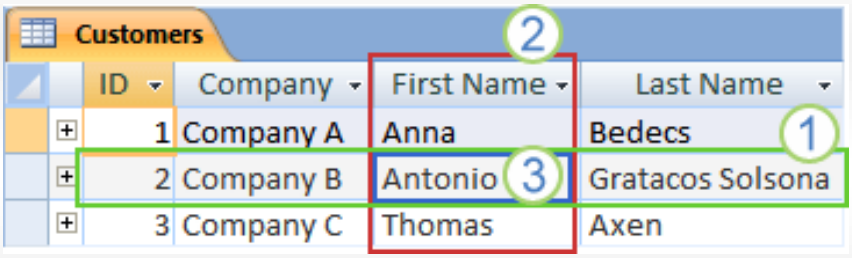
Introduction to tables

Tables are essential objects in a database because they hold all the information or data. For example, a database for a business can have a Contacts table that stores the names of their suppliers, e-mail addresses, and telephone numbers. Because other database objects depend so heavily on tables, you should always start your design of a database by creating all

its tables and then creating any other objects. Before you create tables, consider your requirements, and determine all the tables that you might need.

Table Overview

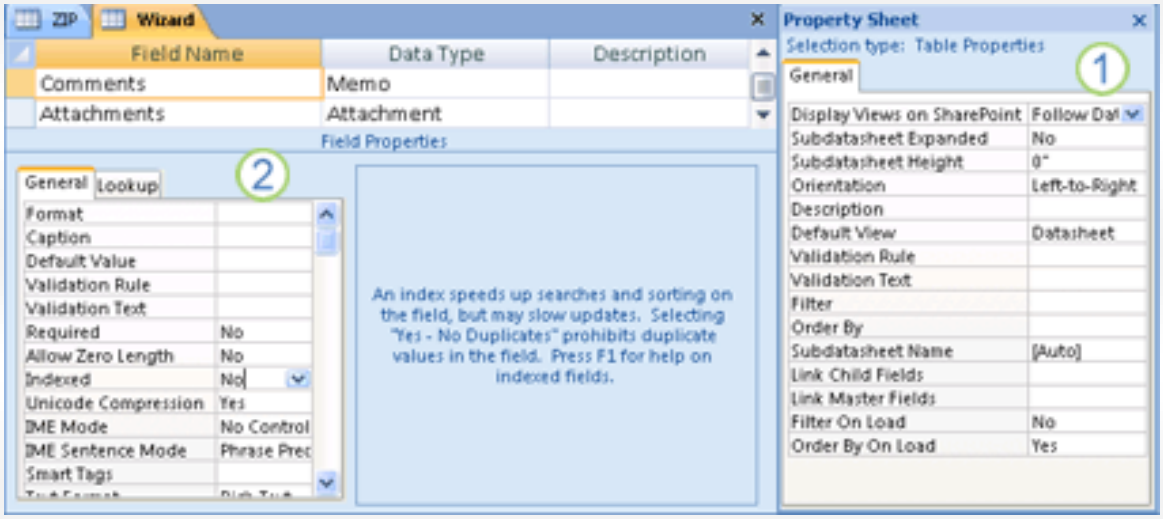
A relational database like MS Access usually has several related tables. In a well-designed database, each table stores data about a particular subject, such as employees or products. A table has records (rows) and fields (columns). Fields have different types of data, such as text, numbers, dates, and hyperlinks.



1. A **record**: Contains specific data, like information about a particular employee or a product.
2. A **field**: Contains data about one aspect of the table subject, such as first name or e-mail address.
3. A field value: Each record has a field value. For example, Contoso, Ltd. or someone@example.com.

Table and field properties

Tables and fields also have properties that you can set to control their characteristics or behavior.



In an MS Access database, table properties are attributes of a table that affect the appearance or behavior of the table. Table properties are set in the table's property sheet, in Design view. For example, you can set a table's **Default View** property to specify how the table is displayed by default.

A field property applies to a particular field in a table and defines one of the field's characteristics or an aspect of the field's behavior. You can set some field properties in Datasheet view. You can also set any field property in Design view by using the **Field Properties** pane.

Data types

Every field has a data type. A field's data type indicates the kind of data that the field stores, such as large amounts of text or attached files.

A data type is a field property, but it differs from other field properties as follows:

- You set a field's data type in the table design grid, not in the **Field Properties** pane.
- A field's data type determines what other properties the field has.
- You must set a field's data type when you create the field.

  You can create a new field in MS Access by entering data in a new column in Datasheet view. When you create a field by entering data in Datasheet view, MS Access automatically assigns a data type for the field, based on the value that you enter. If no other data type is implied by your input, MS Access sets the data type to Text. If needed, you can change the data type by using the Ribbon.

Examples of automatic data type detection

The following table shows how automatic data type detection works in Datasheet view.

If you enter:	MS Access creates a field with a data type of:
John	Text
http://www.contoso.com You can use any valid Internet protocol prefix. For example, http://, https://, and mailto: are valid prefixes.	Hyperlink

1	Number, Long Integer
50,000	Number, Long Integer
50,000.99	Number, Double
50000.389	Number, Double
12/67 The date and time formats recognized are those of your user locale.	Date/Time
December 31, 2016	Date/Time
10:50:23	Date/Time
10:50 am	Date/Time
17:50	Date/Time
$12.50 The currency symbol recognized is that of your user locale.	Currency

Table relationships

Although each table stores data about a different subject, tables in an MS Access database usually store data about subjects that are related to each other. For example, a database might contain:

- A customers table that lists your company's customers and their addresses.
- A products table that lists the products that you sell, including prices and pictures for each item.
- An orders table that tracks customer orders.

Because you store data about different subjects in separate tables, you need some way to tie the data together so that you can easily combine related data from those separate tables. To connect the data stored in

different tables, you create relationships. A relationship is a logical connection between two tables that specifies fields that the tables have in common.

Keys

Fields that are part of a table relationship are called keys. A key usually consists of one field but may consist of more than one field. There are two kinds of keys:

Primary key

A table can have only one primary key. A primary key consists of one or more fields that uniquely identify each record that you store in the table. Often, there is a unique identification number, such as an ID number, a serial number, or a code, that serves as a primary key. For example, you might have a Customers table where each customer has a unique customer ID number. The customer ID field is the primary key of the Customers table. When a primary key contains more than one field, it is usually composed of pre-existing fields that, taken together, provide unique values. For example, you might use a combination of last name, first name, and birth date as the primary key for a table about people.

Foreign key

A table can also have one or more foreign keys. A foreign key contains values that correspond to values in the primary key of another table. For example, you might have an Orders table in which each order has a customer ID number that corresponds to a record in a Customers table. The customer ID field is a foreign key of the Orders table.

The correspondence of values between key fields forms the basis of a table relationship. You use a table relationship to combine data from related tables. For example, suppose that you have a Customers table and an Orders table. In your Customers table, each record is identified by the primary key field, ID.

To associate each order with a customer, you add a foreign key field to the Orders table that corresponds to the ID field of the Customers table, and then create a relationship between the two keys. When you add a record to the Orders table, you use a value for customer ID that comes from the Customers table. Whenever you want to view any information about an order's customer, you use the relationship to identify which data from the Customers table corresponds to which records in the Orders table.

1. A primary key, identified by the key icon next to the field name.

2. A foreign key — note the absence of the key icon.

Do not add a field if you expect that each unique entity represented in the table might require more than value for the field. Continuing the preceding example, if you want to start tracking orders placed by your customers, you do not add a field to the table, because each customer will have more

Plan your tables with relationships in mind. You can use the Lookup Wizard to create a foreign key field if the table that contains the corresponding primary key already exists. The Lookup Wizard creates the relationship for you.

Create a table and add fields

When you create an MS Access database, you store your data in tables—subject-based lists that contain rows and columns. For instance, you can create a Contacts table to store a list of names, addresses, and telephone

numbers, or a Products table to store information about products. This article explains how to create a table, add fields to a table, set a table's primary key, and how to set field and table properties.

Before you create tables and add fields, make sure you understand the background concepts.

Creating a table

A simple database, such as a contact list, might use only a single table. Many databases, however, use several tables. When you create a new database, you create a new file on your computer that acts as a container for all of the objects in your database, including your tables.

You can create a table by creating a new database, by inserting a table into an existing database, or by importing or linking to a table from another data source — such as a Microsoft Excel workbook, a Microsoft Word document, a text file, or another database. When you create a new, blank database, a new, empty table is automatically inserted for you. You can then enter data in the table to start defining your fields.

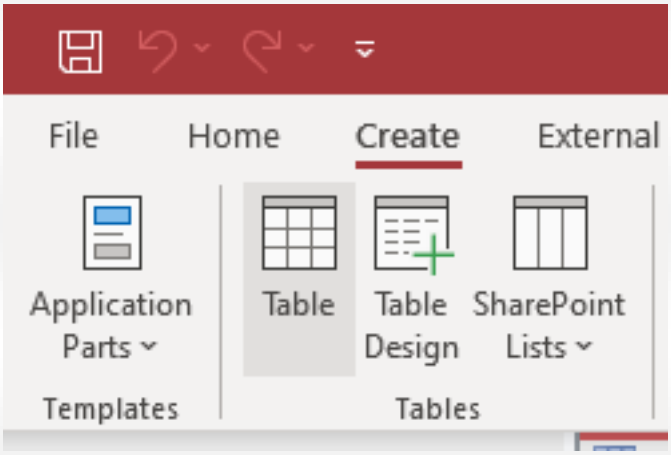
Create a new table in a new database

1. Click **File** > **New**, and then select **Blank database**.
2. In the **File Name** box, type a file name for the new database.
3. To browse to a different location and save the database, click the folder icon.
4. Click **Create**.

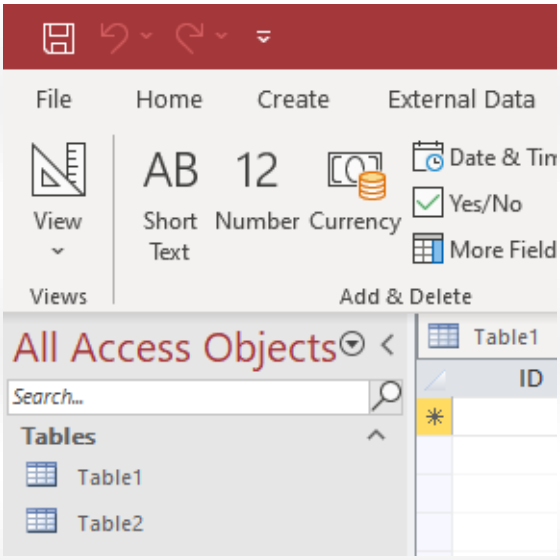
The new database opens, and a new table named Table1 is created and opens in Datasheet view.

Create a new table in an existing database

1. Click **File** > **Open**, and click the database if it is listed under **Recent**. If not, select one of the browse options to locate the database.
2. In the **Open** dialog box, select the database that you want to open, and then click **Open**.
3. On the **Create** tab, in the **Tables** group, click **Table**.



A new table is inserted in the database and the table opens in Datasheet view.



Importing or linking to create a table

You can create a table by importing or linking to data that is stored elsewhere. You can import or link to data in an Excel worksheet, a SharePoint list, an XML file, another MS Access database, a Microsoft Outlook folder, and more.

When you import data, you create a copy of the data in a new table in the current database. Subsequent changes to the source data will have no effect on the imported data, and changes to the imported data do not affect the source data. After you connect to a data source and import its data, you can then use the imported data without connecting to the source. You can change the design of an imported table.

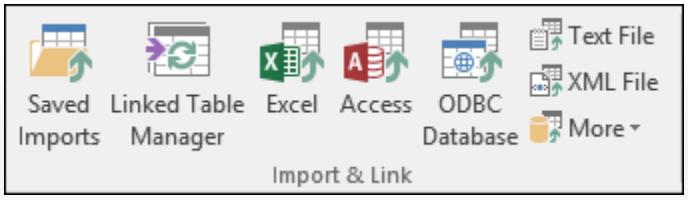
When you link to data, you create a linked table in the current database that represents a live link to the existing information that is stored elsewhere. When you change data in a linked table, you are changing it in the source. Whenever data changes in the source, that change is shown in

the linked table. You must be able to connect to the data source whenever you use a linked table. You cannot change the design of a linked table.

Note: You cannot edit data in an Excel worksheet by using a linked table. As a workaround, import the source data into an MS Access database, and then link to the database from Excel.

Create a new table by importing or linking to external data

1. Click **File** > **Open**.
2. In the **Open** dialog box, select and open the database in which you wish to create a new table.
3. On the **External Data** tab, in the **Import & Link** group, click one of the available data sources.



4. Follow the instructions in the dialog boxes that appear at each step.

   MS Access creates the new table and displays it in the Navigation Pane.

Save a table

After you create or modify a table, you should save its design. When you save a table for the first time, give it a name that describes the data that it contains. You can use up to 64 alphanumeric characters, including spaces. For example, you might name a table Customers, Parts Inventory, or Products.

MS Access gives you lots of flexibility when it comes to naming your tables; however, there are some restrictions to be aware of. A table name can be up to 64 characters long, can include any combination of letters, numbers, spaces, and special characters except a period (.), exclamation point (!), square brackets ([]), leading space, leading equal sign (=), or nonprintable character such as a carriage return. The name also cannot contain any of the following characters: / \ : ; * ? " ' < > | # <TAB> { } % ~ &.

Tip: You should decide on a naming convention for the objects in your database, and use it consistently.

1. Select **File** > **Save**, or press CTRL+S.
2. If you are saving the table for the first time, type a name for the table, and then click **OK**.

Setting a primary key

Unless you have a specific reason not to, you should specify a primary key for a table. MS Access automatically creates an index for the primary key, which can help improve database performance. MS Access also makes sure that every record has a value in the primary key field, and that the value is always unique. Unique values are crucial, because otherwise there is no way to reliably distinguish a particular row from other rows.

When you create a new table in Datasheet view, MS Access automatically creates a primary key for you and assigns it a field name of ID and the AutoNumber data type.

In Design view, you can change or remove the primary key, or set the primary key for a table that doesn't already have one.

Determine which fields to use as a primary key

Sometimes, you might already have data that you want to use as a primary key. For example, you may have existing ID numbers for your employees. If you create a table to track employee information, you might decide to use the existing employee ID as the primary key for the table. Or, perhaps employee ID is only unique in combination with department ID, requiring that you use both fields together as the primary key. A good candidate for the primary key has the following characteristics:

- Each record has a unique value for the field or combination of fields.
- The field or combination of fields is never empty or null — there is always a value.
- The values do not change.

If no suitable data exists to use as a primary key, you can create a new field to use as a primary key. When you create a new field to use as a primary key, set the field's data type to AutoNumber to help make sure that it meets the three characteristics in the preceding list.

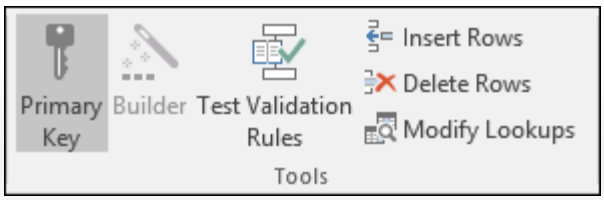
Set or change the primary key

1. Select the table whose primary key you want to set or change.
2. On the **Home** tab, in the **Views** group, click **View**, and then click **Design View**.
3. In the table design grid, select the field or fields that you want to use as the primary key.

   To select one field, click the row selector for the field that you want.

   To select more than one field, hold down CTRL, and then click the row selector for each field.

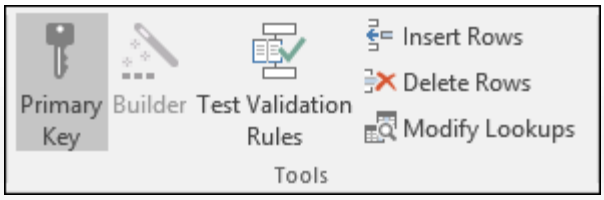
4. On the **Design** tab, in the **Tools** group, click **Primary Key**.



A key indicator appears to the left of the field or fields that you specify as the primary key.

Remove the primary key

1. Select the table whose primary key you want to remove.
2. On the **Home** tab, in the **Views** group, click **View**, and then click **Design View**.
3. Click the row selector for the current primary key. If the primary key consists of multiple fields, hold down CTRL, and then click the row selector for each field.
4. On the **Design** tab, in the **Tools** group, click **Primary Key**.



The key indicator is removed from the field or fields that you previously specified as the primary key.

When you save a new table without setting a primary key, MS Access prompts you to create a new field for the primary key. If you click **Yes**, MS Access creates an ID field that uses the AutoNumber data type to provide a unique value for each record. If your table already includes an

AutoNumber field, MS Access uses it as the primary key. If you click **No**, MS Access does not add a field, and no primary key is set.

Adding fields

To store a new piece of data about something for which you already have an MS Access table, consider adding a field to the table. For example, suppose you have a table that stores the last name, first name, email address, telephone number, and mailing address of each of your customers. If you want to start tracking each customer's preferred means of communication, you add a field to store that data.

You store each piece of data that you want to track in a field. For example, in a contacts table you create fields for Last Name, First Name, Telephone Number, and Address. In a products table you create fields for Product Name, Product ID, and Price.

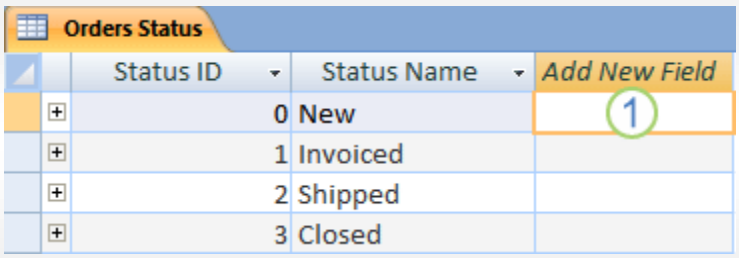
Every field has certain essential characteristics, such as a name that uniquely identifies the field within a table, a data type that defines the nature of the data, the operations that can be performed on the data, and how much storage space to set aside for each value.

Before you create fields, try to separate data into its smallest useful parts. It is much easier to combine data later than it is to pull it apart. For example, instead of a Full Name field, consider creating separate fields for Last Name and First Name. Then, you can easily search or sort by First Name, Last Name, or both. If you plan to report, sort, search, or calculate on an item of data, put that item in a field by itself.

After you create a field, you can also set field properties to control its appearance and behavior. For example, the **Format** property defines how the data appears in a datasheet or form that contains that field.

Add a field by entering data

When you create a new table or open an existing table in Datasheet view, you can add a field to the table by entering data in the **Add New Field** column of the datasheet **(1)**. MS Access automatically assigns a data type for the field, based on the value that you enter. If no other data type is implied by your input, MS Access sets the data type to Text but you can change the data type.



To enter data in the **Add New Field** column:

1. Create or open a table in Datasheet view by right-clicking the table that you want in the Navigation Pane and then clicking **Datasheet view** from the shortcut menu.
2. In the **Add New Field** column, enter the name of the field that you want to create.

   Use a descriptive name so that the field will be easier to identify.

3. Enter data in the new field.

Add a field by using a field template

Sometimes it is easier to choose from a predefined list of fields that fit your needs than to manually create a field. You can use the **More Fields** list to choose from a list of field templates. A field template is a predefined set of characteristics and properties that describes a field. The field template

definition includes a field name, a data type, a setting for the field's **Format** property, and other field properties.

1. On the **Home** tab, in the **Views** group, click **View**, and then click **Datasheet View**.
2. On the **Fields** tab, in the **Add & Delete** group, click **More Fields**.

3. Select a field in the **More Fields** list to insert the new column. MS Access places the field to the right of the column where your cursor is currently located. If you choose one of the field options under the Quick Start heading, such as Address, MS Access creates multiple fields in your table to contain the various parts of an address.

Setting field properties

After you create a field, you can set field properties to control its appearance and behavior.

For example, by setting field properties, you can:

- Control the appearance of data in a field
- Help prevent incorrect data entry in a field
- Specify default values for a field
- Help speed up searching and sorting on a field

You can set some of the available field properties while you work in Datasheet view. To have MS Access to and set the complete list of field properties; however, you must use Design view.

The properties that you can set, depend on the field's data type.

Set field properties in Datasheet view

You can rename a field, change its data type, change its **Format** property, and change some of a field's other properties while you work in Datasheet view.

1. In the Navigation Pane, right-click the table that you want to open.
2. On the shortcut menu, click **Datasheet view**.

Rename a field

When you add a field by entering data in Datasheet view, MS Access automatically assigns a generic name to the field. MS Access assigns the name Field1 to the first new field, Field2 to the second new field, and so on. By default, a field's name is used as its label wherever the field is displayed, such as a column heading on a datasheet. Renaming fields so that they have more descriptive names helps make them easier to use when you view or edit records.

1. Right-click the heading of the field that you want to rename (for example, Field1).
2. On the shortcut menu, click **Rename Field**.
3. Enter the new name in the field heading.

   Field names can consist of up to 64 characters (letters or numbers), including spaces.

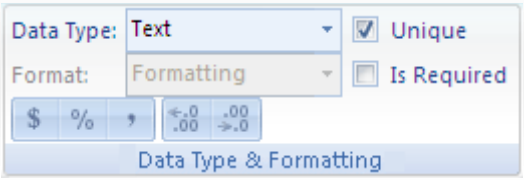
Change a field's data type

When you create a field by entering data in Datasheet view, MS Access examines that data to determine the appropriate data type for the field. For example, if you enter **1/1/2017**, MS Access recognizes that data as a date and sets the data type for the field to Date/Time. If MS Access can't definitively determine the data type, the data type is set to Text by default (Short Text if you're using MS Access 2016).

The data type of the field determines which other field properties you can set. For example, you can set only the **Append Only** property for a field that has the Hyperlink data type or the Memo data type (Long Text if you're using MS Access 2016).

There may be cases where you want to manually change a field's data type. For example, suppose you have room numbers that resemble dates, such as 10/2017. If you enter **10/2017** into a new field in Datasheet view, the automatic data type detection feature selects the Date/Time data type for the field. Because room numbers are labels, and not dates, they should use the Text data type. Use the following procedure to change a field's data type.

1. On the Ribbon, click the **Fields** tab.
2. In the **Data Type** list, in the **Formatting** group, select the data type that you want.



Data types for MS Access desktop databases

When creating tables in MS Access, you need to select a data type for each column of data. The Short Text data type is a popular choice since it lets you enter almost any character (letter, symbol, or number). However, careful selection of data types can help you take advantage of more MS Access features (such as data validation and functions) and improves the accuracy of the information you're storing. The table below gives an overview of the data types available in MS Access desktop databases (.accdb and .mdb).

The following table lists the data types available in desktop databases in MS Access 2013 and later versions.

Data Type	Usage	Size
Short Text (formerly known as "Text")	Alphanumeric data (names, titles, etc.)	Up to 255 characters.
Long Text (formerly known as "Memo"	Large amounts of alphanumeric data: sentences and paragraphs.	Up to about 1 gigabyte (GB), but controls to display a long text are limited to the first 64,000 characters.
Number	Numeric data.	1, 2, 4, 8, or 16 bytes.
Large Number	Numeric data.	8 bytes.
Date/Time	Dates and times.	8 bytes.
Date/Time Extended	Dates and times.	Encoded string of 42 bytes
Currency	Monetary data, stored with 4 decimal places of precision.	8 bytes.

AutoNumber	Unique value generated by MS Access for each new record.	4 bytes (16 bytes for ReplicationID).
Yes/No	Boolean (true/false) data; MS Access stores the numeric value zero (0) for false, and -1 for true.	1 byte.
OLE Object	Pictures, graphs, or other ActiveX objects from another Windows-based application.	Up to about 2 GB.
Hyperlink	A link address to a document or file on the Internet, on an intranet, on a local area network (LAN), or on your local computer	Up to 8,192 (each part of a Hyperlink data type can contain up to 2048 characters).
Attachment	You can attach files such as pictures, documents, spreadsheets, or charts; each Attachment field can contain an unlimited number of attachments per record, up to the storage limit of the size of a database file. Note, the Attachment data type isn't available in MDB file formats.	Up to about 2 GB.
Calculated	You can create an expression that uses data from one or more fields. You can designate different result	Dependent on the data type of the Result Type property. Short Text data type result can have up to

	data types from the expression. Note, the Calculated data type isn't available in MDB file formats.	243 characters. Long Text, Number, Yes/No, and Date/Time should match their respective data types.
Lookup Wizard	The Lookup Wizard entry in the Data Type column in Design view is not actually a data type. When you choose this entry, a wizard starts to help you define either a simple or complex lookup field. A simple lookup field uses the contents of another table or a value list to validate the contents of a single value per row. A complex lookup field allows you to store multiple values of the same data type in each row.	Dependent on the data type of the lookup field.

Tips on data types

- ✓ The maximum size of an MS Access database file is 2 gigabytes.
- ✓ To optimize performance, you should use the most appropriate **Field Size** when you create a Text or Number field. For example, if you expect to store postal codes of a predictable length, specify that length as the field size. You can specify the field size by setting a value in the **Field Size** property box.

- ✓ For phone numbers, part numbers, and other numbers that you don't intend to use for mathematical calculations, you should select the Text data type instead of the Number data type. A numeric value that is stored as text can be sorted and filtered more logically.

Change a field's format

In addition to determining the data type of a new field, MS Access may also set the **Format** property for the field, depending on what you enter. For example, if you enter 10:50 a.m., MS Access sets the data type to Date/Time and the **Format** property to Medium Time. To manually change a field's **Format** property, do the following:

1. On the Ribbon, click the **Fields** tab.
2. In the **Format** list, in the **Formatting** group, enter the format you want.

   Note: The **Format** list may be unavailable for some fields (for example, Text), depending on the data type of the field.

Set other field properties

1. In Datasheet view, click the field for which you want to set the property.
2. On the **Fields** tab, in the **Properties**, **Formatting**, or **Field Validation** groups, select the properties that you want.

Set field properties in Design view

You can set any field property while you work with a table in Design view. In Design view, you set a field's data type in the table design grid, and you set other properties in the **Field Properties** pane.

1. In the Navigation Pane, right-click the table.
2. On the shortcut menu, click **Design view**.

Set other field properties

Note: Not all formats are available for all data types. Set the data type first, and then, if needed, set the format.

1. In the table design grid, select the field for which you want to set properties. MS Access displays the properties for this field in the **Field Properties** pane.

   The data type of the field determines the properties that you can set.

2. In the **Field Properties** pane, enter the settings that you want for each property, or press F6 and then use the arrow keys to select a property.
3. To provide more space for entering or editing a property setting in the property box, press SHIFT+F2 to display the **Zoom** box.

   Tip: If you are entering an input mask or validation expression and would like help in building it, click  next to the property box to display the appropriate builder.

4. To save your changes, press CTRL+S.

Move a field

To move a field, drag it to the position that you want. To select multiple contiguous fields to move, click the first field, hold down the SHIFT key, and then click the last field. You can then drag the selected group of fields to a new position.

Dragging a field changes its position on the Datasheet but does not change the order of the fields in the table design. If you programmatically access the fields, the original order applies. For example, if you drag a field to a new position on the Datasheet, and then create a form from the table by using the Form button, the field will be in its original position.

12.4 Forms

A form in MS Access is a database object that you can use to create a user interface for a database application. A "bound" form is one that is directly connected to a data source such as a table or query, and can be used to enter, edit, or display data from that data source. Alternatively, you can create an "unbound" form that does not link directly to a data source, but which still contains command buttons, labels, or other controls that you need to operate your application.

This article focuses primarily on bound forms. You can use bound forms to control access to data, such as which fields or rows of data are displayed. For example, certain users might need to see only several fields in a table with many fields. Providing those users with a form that contains only those fields makes it easier for them to use the database. You can also add

command buttons and other features to a form to automate frequently performed actions.

Think of bound forms as windows through which people see and reach your database. An effective form speeds the use of your database because people don't have to search for what they need. A visually attractive form makes working with the database more pleasant and more efficient, and it can also help prevent incorrect data from being entered.

Note: This article assumes you have already created a table (or a query based on one or more tables), and that you want to build a form to view or manipulate the data.

Create a form by using the Form tool

You can use the Form tool to create a form with a single mouse-click. When you use this tool, all the fields from the underlying data source are placed on the form. You can start using the new form immediately, or you can modify it in Layout view or Design view to better suit your needs.

Use the Form tool to create a new form

1. In the Navigation Pane, click the table or query that contains the data you want to see on your form.
2. On the **Create** tab, in the **Forms** group, click **Form**.

MS Access creates the form and displays it in Layout view. In Layout view, you can make design changes to the form while it is displaying data. For example, you can adjust the size of the text boxes to fit the data, if necessary.

If MS Access finds a single table that has a one-to-many relationship with the table or query that you used to create the form, MS Access adds a datasheet to the form that is based on the related table or query. For example, if you create a simple form that is based on the Employees table, and there is a one-to-many relationship that is defined between the Employees table and Orders table, the datasheet displays all the records in the Orders table that relate to the current Employee record. You can delete the datasheet from the form if you decide you do not need it. If there is more than one table with a one-to-many relationship to the table that you used to create the form, MS Access does not add any datasheets to the form.

Create a split form by using the Split Form tool

A split form gives you two views of the data at the same time — a Form view and a Datasheet view.

A split form differs from a form/subform combination in that the two views are connected to the same data source and are synchronized with one another at all times. Selecting a field in one part of the form selects the same field in the other part of the form. You can add, edit, or delete data from either part (as long as the record source is updatable, and you have not configured the form to prevent these actions).

Working with split forms gives you the benefits of both kinds of forms in a single form. For example, you can use the datasheet portion of the form to quickly locate a record, and then use the form portion to view or edit the record.

To create a split form by using the Split Form tool:

1. In the Navigation Pane, click the table or query that contains the data that you want on your form. Or open the table or query in Datasheet view.
2. On the **Create** tab, in the **Forms** group, click **More Forms**, and then click **Split Form**.

MS Access creates the form and displays it in Layout view. In Layout view, you can make design changes to the form while it is displaying data. For example, you can adjust the size of the text boxes to fit the data, if necessary.

Create a form that displays multiple records by using the Multiple Items tool

When you create a form by using the Form tool, the form that MS Access creates displays a single record at a time. If you want a form that displays multiple records but is more customizable than a datasheet, you can use the Multiple Items tool.

1. In the Navigation Pane, click the table or query that contains the data you want to see on your form.
2. On the **Create** tab, in the **Forms** group, click **More Forms**, and then click **Multiple Items**.

MS Access creates the form and displays it in Layout view. In Layout view, you can make design changes to the form while it is displaying data.

When you use the Multiple Items tool, the form that MS Access creates resembles a datasheet. The data is arranged in rows and columns, and you see more than one record at a time. However, a Multiple Items form gives you more customization options than a datasheet, such as the ability to add graphical elements, buttons, and other controls.

Create a form by using the Form Wizard

To be more selective about what fields appear on your form, you can use the Form Wizard instead of the various form-building tools previously mentioned. You can also define how the data is grouped and sorted, and you can use fields from more than one table or query, as long as you specified the relationships between the tables and queries beforehand.

1. On the **Create** tab, in the **Forms** group, click **Form Wizard**.
2. Follow the directions on the pages of the Form Wizard.

   Note: If you want to include fields from multiple tables and queries on your form, do not click **Next** or **Finish** after you select the fields from the first table or query on the first page of the Form Wizard. Instead, repeat the steps to select a table or query, and click any additional fields that you want to include on the form. Then click **Next** or **Finish** to continue.

3. On the last page of the wizard, click **Finish**.

Create a form by using the Blank Form tool

If the wizard or the form-building tools don't meet your needs, you can use the Blank Form tool to build a form. This can be a very quick way to build a form, especially if you plan to put only a few fields on your form.

1. On the **Create** tab, in the **Forms** group, click **Blank Form**.

   MS Access opens a blank form in Layout view, and displays the **Field List** pane.

2. In the **Field List** pane, click the plus sign (**+**) next to the table or tables that contain the fields that you want to see on the form.

3. To add a field to the form, double-click it or drag it onto the form.
   - After the first field has been added, you can add several fields at once by holding down the CTRL key, clicking several fields, and then dragging them onto the form at the same time.
   - The order of the tables in the **Field List** pane can change, depending on which part of the form is currently selected. If the field you want to add is not visible, try selecting a different part of the form and then try adding the field again.
4. Use the tools in the **Header/Footer** group on the **Design** tab to add a logo, title, or the date and time to the form.
5. Use the tools in the **Controls** group of the **Design** tab to add a wider variety of controls to the form.

   For a slightly larger selection of controls, switch to Design view by right-clicking the form and then clicking **Design View**.

Understand Layout view and Design view

Layout view Layout view is the most intuitive view to use for form modification, and it can be used for almost all the changes that you would want to make to a form in MS Access.

In Layout view, the form is actually running. Therefore, you can see your data much as it will appear when you are using the form. However, you can also change the form design in this view. Because you can see the data while you are modifying the form, this is a very useful view for setting the size of controls or performing almost any other task that affects the appearance and usability of the form.

If you encounter a task that cannot be performed in Layout view, you can switch to Design view. In certain situations, MS Access displays a message

that states that you must switch to Design view before you can make a particular change.

Design view Design view gives you a more detailed view of the structure of your form. You can see the Header, Detail, and Footer sections for the form. The form is not actually running when it is shown in Design view. Therefore, you cannot see the underlying data while you are making design changes. However, there are certain tasks that you can perform more easily in Design view than in Layout view. You can:

- Add a wider variety of controls to your form, such as bound object frames, page breaks, and charts.
- Edit text box control sources in the text boxes themselves, without using the property sheet.
- Resize form sections, such as the Form Header or the Detail section.
- Change certain form properties that cannot be changed in Layout view.

Fine-tune your form in Layout view

After you create a form, you can easily fine-tune its design by working in Layout view. Using the actual form data as your guide, you can rearrange the controls and adjust their sizes. You can place new controls on the form and set the properties for the form and its controls.

To switch to Layout view, right-click the form name in the Navigation Pane and then click **Layout View**.

MS Access shows the form in Layout view.

You can use the property sheet to change the properties for the form and its controls and sections. To display the property sheet, press F4.

You can use the **Field List** pane to add fields from the underlying table or query to your form design. To display the **Field List** pane:

- On the **Design** tab, in the **Tools** group, click **Add Existing Fields** or use the keyboard shortcut by pressing ALT+F8.

You can then drag fields directly from the **Field List** pane onto your form.

- To add a single field, double-click it or drag it from the **Field List** pane to the section on the form where you want it displayed.
- To add several fields at once, hold down CTRL and click the fields that you want to add. Then drag the selected fields onto the form.

Fine-tune your form in Design view

You can also fine-tune your form's design by working in Design view. You can add new controls and fields to the form by adding them to the design grid. The property sheet gives you MS Access to many properties that you can set to customize your form.

To switch to Design view, right-click the form name in the Navigation Pane and then click **Design View**.

MS Access shows the form in Design view.

You can use the property sheet to change the properties for the form and its controls and sections. To display the property sheet, press F4.

You can use the **Field List** pane to add fields from the underlying table or query to your form design. To display the **Field List** pane:

- On the **Design** tab, in the **Tools** group, click **Add Existing Fields** or use the keyboard shortcut by pressing ALT+F8..

You can then drag fields directly from the **Field List** pane onto your form.

- To add a single field, double-click it or drag it from the **Field List** pane to the section on the form where you want it displayed.
- To add several fields at once, hold down CTRL and click the fields that you want to add. Then drag the selected fields onto the form.

Create a form in MS Access

Forms in MS Access are like display cases in stores that make it easier to view or get the items that you want. Since forms are objects through which you or other users can add, edit, or display the data stored in your MS Access desktop database, the design of your form is an important aspect. If your MS Access desktop database is going to be used by multiple users, well-designed forms are essential for efficiency and data entry accuracy.

There are several ways of creating a form in an MS Access desktop database and this article points you to some of the common ways.

Create a form from an existing table or query in MS Access

To create a form from a table or query in your database, in the Navigation Pane, click the table or query that contains the data for your form, and on the **Create** tab, click **Form.**

MS Access creates a form and displays it in Layout view. You can make design changes like adjusting the size of the text boxes to fit the data, if necessary

Create a blank form in MS Access

1. To create a form with no controls or preformatted elements: On the **Create** tab, click **Blank Form**. MS Access opens a blank form in Layout view and displays the **Field List** pane.
2. In the **Field List** pane, click the plus sign (**+**) next to the table or tables that contain the fields that you want to see on the form.
3. To add a field to the form, double-click it or drag it onto the form. To add several fields at once, hold down CTRL and click several fields, and then drag them onto the form at the same time.

   Note: The order of the tables in the **Field List** pane can change, depending on which part of the form is currently selected. If you are not able to add a field to the form, try selecting a different part of the form and then try adding the field again.

4. Use the tools in the **Controls** group on the **Form Layout Tools** tab to add a logo, title, page numbers, or the date and time to the form.
5. If you want to add a wider variety of controls to the form, click **Design** and use the tools in the **Controls** group.

Create a split form in MS Access

A split form gives you two views of the data at the same time — a Form view and a Datasheet view. Working with split forms gives you the benefits of both types of forms in a single form. For example, you can use the datasheet portion of the form to quickly locate a record, and then use the form portion to view or edit the record. The two views are connected to the same data source and are synchronized with each other at all times.

To create a new split form by using the Split Form tool, in the Navigation Pane, click the table or query that contains the data, and then on the **Create** tab, click **More Forms**, and then click **Split Form**.

MS Access creates the form and you can make design changes to the form. For example, you can adjust the size of the text boxes to fit the data, if necessary.

Create a form that displays multiple records in MS Access

A multiple item form, also known as a continuous form, and is useful if you want a form that displays multiple records but is more customizable than a datasheet, you can use the Multiple Items tool.

1. In the Navigation Pane, click the table or query that contains the data you want to see on your form.
2. On the **Create** tab and click **More Forms** > **Multiple Items**.

MS Access creates the form and displays it in Layout view. In Layout view, you can make design changes to the form while it is displaying data. For example, you can adjust the size of the text boxes to fit the data.

Create a Navigation form in MS Access

A navigation form is simply a form that contains a Navigation Control. Navigation forms are a great addition to any database but creating a navigation form is particularly important if you plan to publish a database to the Web, because the MS Access Navigation Pane does not display in a browser.

1. Open the database to which you want to add a navigation form.
2. On the **Create** tab, in the **Forms** group, click **Navigation**, and then select the style of navigation form that you want.

MS Access creates the form, adds the Navigation Control to it, and displays the form in Layout view.

12.5 Queries

Introduction to queries

Using a query makes it easier to view, add, delete, or change data in your MS Access database. Some other reasons for using queries:

- Find specific quickly data by filtering on specific criteria (conditions)
- Calculate or summarize data
- Automate data management tasks, such as reviewing the most current data on a recurring basis.

Note: If you want to try out the queries in the examples, use an MS Access desktop database.

Queries help you find and work with your data

In a well-designed database, the data that you want to present through a form or report is usually located in multiple tables. A query can pull the information from various tables and assemble it for display in the form or report. A query can either be a request for data results from your database or for action on the data, or for both. A query can give you an answer to a simple question, perform calculations, combine data from different tables, add, change, or delete data from a database. Since queries are so versatile, there are many types of queries and you would create a type of query based on the task.

Major query types	Use
Select	To retrieve data from a table or make calculations.
Action	Add, change, or delete data. Each task has a specific type of action query. Action queries are not available in MS Access web apps.

Create a select query

If you want to review data from only certain fields in a table, or review data from multiple tables simultaneously or maybe just see the data based on certain criteria, a select query type would be your choice.

Review data from select fields

For example, if your database has a table with a lot of information about products and you want to review a list of products and their prices, here's how you'd create a select query to return just the product names and the respective price:

1. Open the database and on the **Create** tab, click **Query Design**.
2. On the **Tables** tab, double-click the **Products** table.
3. In the Products table, let's say that you have Product Name and List Price fields. Double-click the **Product Name** and **List Price** to add these fields to the query design grid.
4. On the **Design** tab, click **Run**. The query runs, and displays a list of products and their prices.

Review data from multiple related tables simultaneously

For example, if you have a database for a store that sells food items and you want to review orders for customers who live in a particular city. Say that the data about orders and data about customers are stored in two tables named Customers and Orders respectively. If each table has a Customer ID field, which forms the basis of a one-to-many relationship between the two tables. You can create a query that returns orders for customers in a particular city, for example, Las Vegas, by using the following procedure:

1. Open the database. On the **Create** tab, in the **Query** group, click **Query Design**.
2. On the **Tables** tab, double-click **Customers** and **Orders**.

   Note the line (called a join) that connects the ID field in the Customers table and the Customer ID field in the Orders table. This line shows the relationship between the two tables.

3. In the Customers table, double-click **Company** and **City** to add these fields to the query design grid.
4. In the query design grid, in the **City** column, clear the check box in the **Show** row.
5. In the **Criteria** row of the **City** column, type **Las Vegas**.

Clearing the **Show** check box prevents the query from displaying the city in its results, and typing **Las Vegas** in the **Criteria** row specifies that you want to see only records where the value of the City field is Las Vegas. In this case, the query returns only the customers that are located in Las Vegas. You don't need to display a field to use it with a criterion.

6. In the Orders table, double-click **Order ID** and **Order Date** to add these fields to the next two columns of the query design grid.
7. On the **Design** tab, in the **Results** group, click **Run**. The query runs, and then displays a list of orders for customers in Las Vegas.
8. Press CTRL+S to save the query.

Create a parameter query

If you frequently want to run variations of a particular query, consider using a parameter query. When you run a parameter query, the query prompts you for field values, and then uses the values that you supply to create criteria for your query.

Note: You cannot create a parameter query in an MS Access web app.

Continuing from the previous example where you learnt to create a select query that returns orders for customers located in Las Vegas, you can modify the select query to prompt you to specify the city each time that you run the query. To follow along, open the database that you created in the previous example:

1. In the Navigation Pane, right-click the query named **Orders by City** (that you created in the previous section), and then click **Design View** on the shortcut menu.

2. In the query design grid, in the **Criteria** row of the City column, delete **Las Vegas**, and then type **[For what city?]**.

   The string **[For what city?]** is your parameter prompt. The square brackets indicate that you want the query to ask for input, and the text (in this case, **For what city?**) is the question that the parameter prompt displays.

   Note: Neither a period (**.**) nor an exclamation point (**!**) can be used as text in a parameter prompt.

3. Select the check box in the **Show** row of the City column, so that the query results will display the city.
4. On the **Design** tab, in the **Results** group, click **Run**. The query prompts you to enter a value for City.
5. Type **New York**, and then press ENTER to see orders for customers in New York.

   What if you don't know what values you can specify? You can use wildcard characters as part of the prompt:

6. On the **Home** tab, in the **Views** group, click **View**, and then click **Design View**.
7. In the query design grid, in the **Criteria** row of the **City** column, type **Like [For what city?]&"*"**.

   In this parameter prompt, the **Like** keyword, the ampersand (**&**), and the asterisk (*****) enclosed in quotation marks allow the user to type a combination of characters, including wildcard characters, to return a variety of results. For example, if the user types *****, the query returns all cities; if the user types **L**, the query returns all cities that start with the letter "L;" and if the user types ***s***, the query returns all cities that contain the letter "s."

8. On the **Design** tab, in the **Results** group, click **Run**, and at the query prompt, type **New**, and press ENTER.

   The query runs, and then displays orders for customers in New York.

Specify parameter data types

You can also specify what type of data a parameter should accept. You can set the data type for any parameter, but it is especially important to set the data type for numeric, currency, or date/time data. When you specify the data type that a parameter should accept, users see a more helpful error message if they enter the wrong type of data, such as entering text when currency is expected.

If a parameter is set to accept text data, any input is interpreted as text, and no error message is displayed.

To specify the data type for parameters in a query, use the following procedure:

1. With the query open in Design view, on the **Design** tab, in the **Show/Hide** group, click **Parameters**.
2. In the **Query Parameters** dialog box, in the **Parameter** column, type the prompt for each parameter for which you want to specify the data type. Make sure that each parameter matches the prompt that you use in the **Criteria** row of the query design grid.
3. In the **Data Type** column, select the data type for each parameter.

Create a totals query

The Total row in a datasheet is very useful, but for more complex questions, you use a totals query. A totals query is a select query that allows you to

group and summarize data, like when you want to see total sales per product. In a totals query, you can use the Sum function (an aggregate function), to see total sales per product.

Note: You cannot use aggregate functions in an MS Access web app.

Use the following procedure to modify the Product Subtotals query that you created in the previous example so that it summarizes product subtotals by product.

1. On the **Home** tab, click **View** > **Design View**.

   The Product Subtotals query opens in Design view.

2. On the **Design** tab, in the **Show/Hide** group, click **Totals**.

   The **Totals** row is displayed in the query design grid.

Note: Although they have similar names, the **Totals** row in the design grid and the **Total** row in a datasheet are not the same:

- You can group by field values by using the **Totals** row in the design grid.
- You can add a datasheet **Total** row to the results of a totals query.
- When you use the **Totals** row in the design grid, you must choose an aggregate function for each field. If you do not want to perform a calculation on a field, you can group by the field.

- In the second column of the design grid, in the **Total** row, select **Sum** from the drop-down list.
- On the **Design** tab, in the **Results** group, click **Run**. The query runs, and then displays a list of products with subtotals.
- Press CTRL+S to save the query. Leave the query open.

Make calculations based on your data

You usually would not use tables to store calculated values, like subtotals, even if they are based on data in the same database, because calculated values can become outdated if the values that they are based on changes. For example, you would not store someone's age in a table, because every year you would have to update the value; instead, you store the person's date of birth, and then use a query to calculate the person's age.

For example, if you have a database for some products you'd like to sell. This database has a table called Orders Details that has information about the products in fields such as, price of each product and the quantities. You can calculate the subtotal by using a query that multiplies the quantity of each product by the unit price for that product, multiplies the quantity of each product by the unit price and discount for that product, and then subtracts the total discount from the total unit price. If you created the sample database in the previous example, open it and follow along:

1. On the **Create** tab, click **Query Design**.
2. On the **Tables** tab, double-click **Order Details**.
3. In the Order Details table, double-click **Product ID** to add this field to the first column of the query design grid.
4. In the second column of the grid, right-click the **Field** row, and then click **Zoom** on the shortcut menu.
5. In the **Zoom** box, type or paste the following: **Subtotal: ([Quantity]*[Unit Price])-([Quantity]*[Unit Price]*[Discount])**
6. Click **OK**.
7. On the **Design** tab, click **Run**. The query runs, and then displays a list of products and subtotals, per order.
8. Press CTRL+S to save the query, and then name the query **Product Subtotals**.

Display summarized or aggregate data

When you use tables to record transactions or store regularly occurring numeric data, it is useful to be able to review that data in aggregate, such as sums or averages. In MS Access, you can add a Totals row to a datasheet. Total row is a row at the bottom of the datasheet that can display a running total or other aggregate value.

1. Run the Product Subtotals query you created earlier, and leave the results open in Datasheet view.
2. On the **Home** tab, click **Totals**. A new row appears at the bottom of the datasheet, with the word **Total** in the first column.
3. Click the cell in the last row of the datasheet named **Total**.
4. Click the arrow to view the available aggregate functions. Because the column contains text data, there are only two choices: **None** and **Count**.
5. Select **Count**. The content of the cell changes from **Total** to a count of the column values.
6. Click the adjoining cell (the second column). Note that an arrow appears in the cell.
7. Click the arrow, and then click **Sum**. The field displays a sum of the column values.
8. Leave the query open in Datasheet view.

Create a crosstab query

Now suppose that you want to review product subtotals, but you also want to aggregate by month, so that each row shows subtotals for a product, and each column shows product subtotals for a month. To show subtotals for a product and to show product subtotals for a month, use a crosstab query.

Note: A crosstab query cannot be displayed in an MS Access web app.

You can modify the Product Subtotals query again so that the query returns rows of product subtotals and columns of monthly subtotals.

1. On the **Home** tab, in the **Views** group, click **View**, and then click **Design View**.
2. In the **Query Setup** group, click **Add Tables** (or **Show Table** in MS Access 2013).
3. Double-click **Orders**, and then click **Close**.
4. On the **Design** tab, in the **Query Type** group, click **Crosstab**. In the design grid, the **Show** row is hidden, and the **Crosstab** row is displayed.
5. In the third column of the design grid, right-click the **Field** row, and then click **Zoom** on the shortcut menu. The **Zoom** box opens.
6. In the **Zoom** box, type or paste the following: **Month: "Month " & DatePart("m", [Order Date])**
7. Click **OK**.
8. In the **Crosstab** row, select the following values from the drop-down list: **Row Heading** for the first column, **Value** for the second column, and **Column Heading** for the third column.
9. On the **Design** tab, in the **Results** group, click **Run**. The query runs, and then displays product subtotals, aggregated by month.
10. Press CTRL+S to save the query.

Create a make table query

You can use a make-table query to create a new table from data that is stored in other tables.

Note: A make-table query is not available in MS Access web apps.

For example, suppose that you want to send data for Chicago orders to a Chicago business partner who uses Access to prepare reports. Instead of sending all your order data, you want to restrict the data that you send to data specific to Chicago orders.

You can build a select query that contains Chicago order data, and then use the select query to create the new table by using the following procedure:

1. Open the example database from the previous example.

   To run a make-table query, you may need to enable the database content.

   Note: If you see a message beneath the Ribbon about enabling the database, click **Enable content.** If your database is already in a trusted location, you will not see the Message Bar.

2. On the **Create** tab, in the **Query** group, click **Query Design**.
3. Double-click **Order Details** and **Orders**.
4. In the **Orders** table, double-click **Customer ID** and **Ship City** to add these fields to the design grid.
5. In the **Order Details** table, double-click **Order ID**, **Product ID**, **Quantity**, **Unit Price**, and **Discount** to add these fields to the design grid.
6. In the **Ship City** column of the design grid, clear the box in the **Show** row. In the **Criteria** row, type **'Chicago'** (include the single quotation marks). Verify the query results before you use them to create the table.
7. On the **Design** tab, in the **Results** group, click **Run**.
8. Press Ctrl + S to save the query.
9. In the **Query Name** box, type **Chicago Orders Query**, and then click **OK**.

10. On the **Home** tab, in the **Views** group, click **View**, and then click **Design View**.
11. On the **Design** tab, in the **Query Type** group, click **Make Table**.
12. In the **Make Table** dialog box, in the **Table Name** box, type **Chicago Orders**, and then click **OK**.
13. On the **Design** tab, in the **Results** group, click **Run**.
14. In the confirmation dialog box, click **Yes**, and see the new table displayed in the Navigation Pane.

    Note: If there is already a table with the same name that you specified, MS Access deletes that table before running the query.

Create an append query

You can use an append query to retrieve data from one or more tables and add that data to another table.

Note: Append query is not available in MS Access web apps.

For example, suppose that you created a table to share with a Chicago business associate, but you realize that the associate also works with clients in the Milwaukee area. You want to add rows that contain Milwaukee area data to the table before you share the table with your associate. You can add Milwaukee area data to the Chicago Orders table by using the following procedure:

1. Open the query named "Chicago Orders Query" you created earlier in Design view.
2. On the **Design** tab, in the **Query Type** group, click **Append**. The **Append** dialog box opens.
3. In the **Append** dialog box, click the arrow in the **Table Name** box, select **Chicago Orders** from the drop-down list, and then click **OK**.

4. In the design grid, in the **Criteria** row of the Ship City column, delete 'Chicago', and then type **'Milwaukee'**.
5. In the **Append To** row, select the appropriate field for each column.

   In this example, the **Append To** row values should match the **Field** row values, but that is not required for append queries to work.

6. On the **Design** tab, in the **Results** group, click **Run**.

Note: While running a query that returns a large amount of data you might get an error message indicating that you will not be able to undo the query. Try increasing the limit on the memory segment to 3MB to allow the query to go through.

Create an update query

You can use an update query to change the data in your tables, and you can use an update query to enter criteria to specify which rows should be updated. An update query provides you an opportunity to review the updated data before you perform the update.

Important: An action query cannot be undone. You should consider making a backup of any tables that you will update by using an update query. An update query is not available in MS Access web apps.

In the previous example, you appended rows to the Chicago Orders table. In the Chicago Orders table, the Product ID field shows the numeric Product ID. To make the data more useful in reports, you can replace the product IDs with product names, use the following procedure:

1. Open the Chicago Orders table in Design view.
2. In the Product ID row, change the Data Type from **Number** to **Text**.
3. Save and close the Chicago Orders table.

4. On the **Create** tab, in the **Query** group, click **Query Design**.
5. Double-click **Chicago Orders** and **Products**.
6. On the **Design** tab, in the **Query Type** group, click **Update**.
7. In the design grid, the **Sort** and **Show** rows disappear, and the **Update To** row appears.
8. In the **Chicago Orders** table, double-click **Product ID** to add this field to the design grid.
9. In the design grid, in the **Update To** row of the **Product ID** column, type or paste the following: **[Products].[Product Name]**

   Tip: You can use an update query to delete field values by using an empty string (**""**) or NULL in the **Update To** row.

10. In the **Criteria** row, type or paste the following: **[Product ID] Like ([Products].[ID])**
11. You can review which values will be changed by an update query by viewing the query in Datasheet view.
12. On the **Design** tab, click **View** > **Datasheet View**. The query returns a list of Product IDs that will be updated.
13. On the **Design** tab, click **Run**.

When you open the Chicago Orders table, you will see that the numeric values in the Product ID field have been replaced by the product names from the Products table.

Create a delete query

You can use a delete query to delete data from your tables, and you can use a delete query to enter criteria to specify which rows should be deleted. A delete query provides you an opportunity to review the rows that will be deleted before you perform the deletion.

Note: A delete query option is not available in MS Access web apps.

For example, say that while you were preparing to send the Chicago Orders table from the previous example to your Chicago business associate, you notice that some of the rows contain several empty fields. You decided to remove these rows before you send the table. You could just open the table and delete the rows manually, but if you have many rows to delete and you have clear criteria for which rows should be deleted, you might find it helpful to use a delete query.

You can use a query to delete rows in the Chicago Orders table that do not have a value for Order ID by using the following procedure:

1. On the **Create** tab, click **Query Design**.
2. Double-click **Chicago Orders**.
3. On the **Design** tab, in the **Query Type** group, click **Delete**. In the design grid, the **Sort** and **Show** rows disappear, and the **Delete** row appears.
4. In the **Chicago Orders** table, double-click **Order ID** to add it to the grid.
5. In the design grid, in the **Criteria** row of the Order ID column, type **Is Null**.
6. On the **Design** tab, in the **Results** group, click **Run**.

Create a simple select query

When you want to select specific data from one or more sources, you can use a select query. A select query helps you retrieve only the data that you want, and also helps you combine data from several data sources. You can use tables and other select queries as data sources for a select query. This topic provides an overview of select queries, and gives steps for creating a select query, by using the Query Wizard or in Design view.

Overview

When you want to use data, you rarely want to use all of the data from one table. For example, when you want to use data from a Contacts table, you usually want to look at one specific record, or maybe just the telephone number. Sometimes you want to combine data from more than one table, such as combining Customer information with Order information. To select the data that you want to use, you use a select query.

A select query is a database object that shows information in Datasheet view. A query does not store data, it displays data that is stored in tables. A query can show data from one or more tables, from other queries, or from a combination of the two.

Benefits of using a query

A query lets you:

- View data only from the fields you are interested in viewing. When you open a table, you see all the fields. A query is a handy way to save a selection of fields.

  Note: A query only points to data, it does not store data. When you save a query, you are not saving a copy of the data.

- Combine data from several data sources. A table usually only displays data that it stores. A query lets you pick and choose fields from various sources and specify how the information should be combined.
- Use expressions as fields. For example, you could use the Date function as a field, or you could use the Format function with a field to control the way the data from the field is formatted in the query results.

- View records that meet criteria that you specify. When you open a table, you see all the records. A query is a handy way to save a selection of records.

Basic steps to create a select query

You can create a select query by using the Query Wizard or by working in Design view. Some design elements are not available when you use the wizard, but you can add these elements later by using Design view. Although the two methods are somewhat different from each other, the basic steps are essentially the same:

1. Choose the tables or queries that you want to use as sources of data.
2. Specify the fields that you want to include from the data sources.
3. Optionally, specify criteria to limit the records that the query returns.

After you have created a select query, you run it to see the results. To run a select query, you open it in Datasheet view. If you save the query, you can reuse it whenever you need, for example, as a data source for a form, report, or another query.

Use the Query Wizard to create a select query

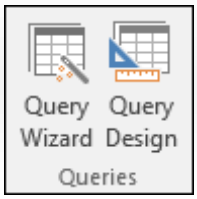
You can use the Query Wizard to automatically create a select query. When you use the wizard, you have less control over the details of the query design, but the query is usually created faster than if you did not use the wizard. Moreover, the wizard can catch some simple design mistakes and prompt you to perform a different action.

Before you begin

If you use fields from data sources that are not related to each other, the Query Wizard asks you if you want to create relationships. The wizard opens the **Relationships window** for you, but you must restart the wizard if you edit any relationships. Therefore, before you run the wizard, consider creating any relationships that your query needs.

Use the Query Wizard

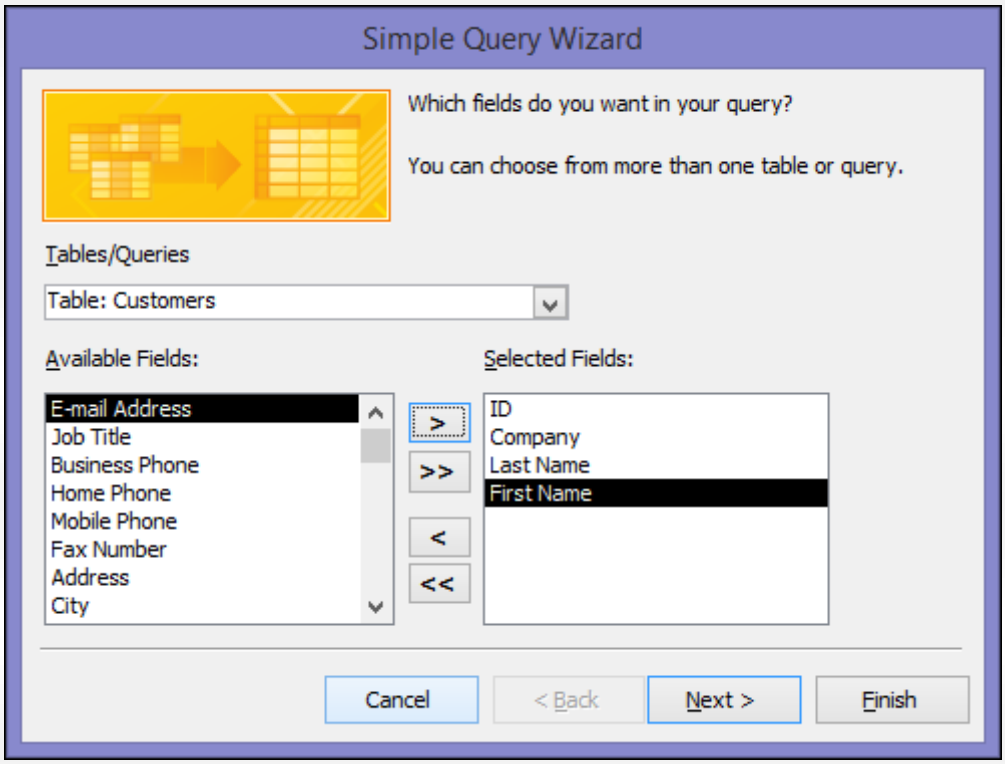
1. On the **Create** tab, in the **Queries** group, click **Query Wizard**.



2. In the **New Query** dialog box, click **Simple Query Wizard**, and then click **OK**.
3. Next, you add fields. You can add up to 255 fields from as many as 32 tables or queries.

   For each field, perform these two steps:

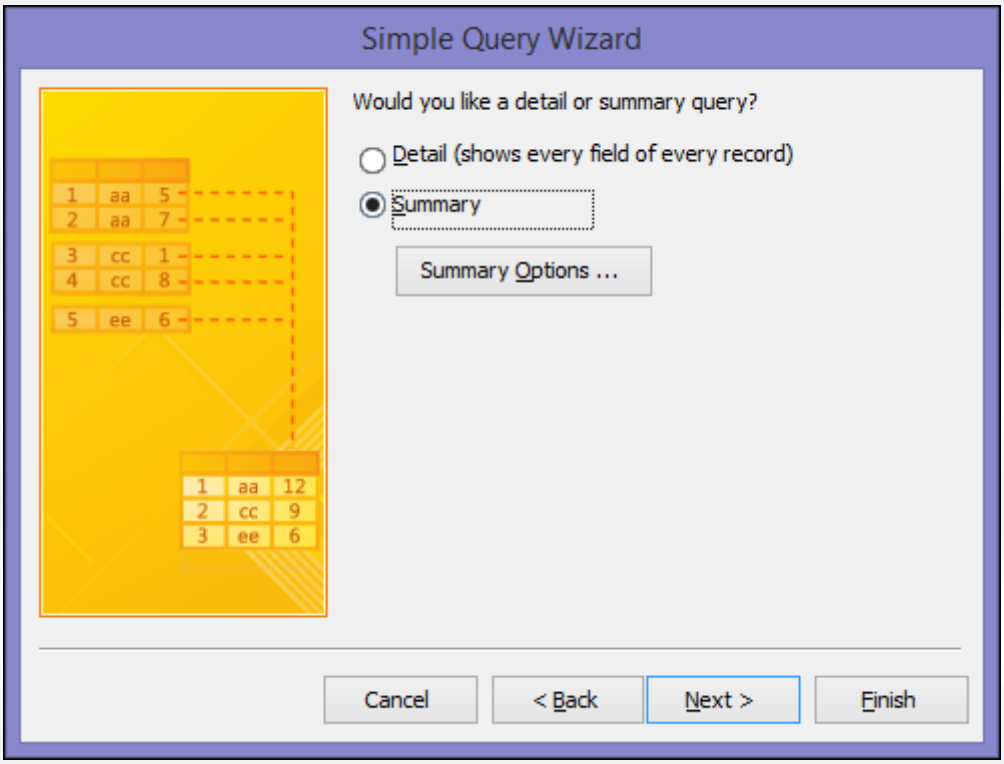
   a. Under **Tables/Queries**, click the table or query that contains the field.
   b. Under **Available Fields**, double-click the field to add it to the **Selected Fields** list. If you want to add all fields to your query, click the button with the double right arrows (>>).
   c. When you have added all the fields that you want, click **Next**.



4. If you did not add any number fields (fields that contain numeric data), skip ahead to step 9. If you added any number fields, the wizard asks whether you want the query to return details or summary data.

   Do one of the following:

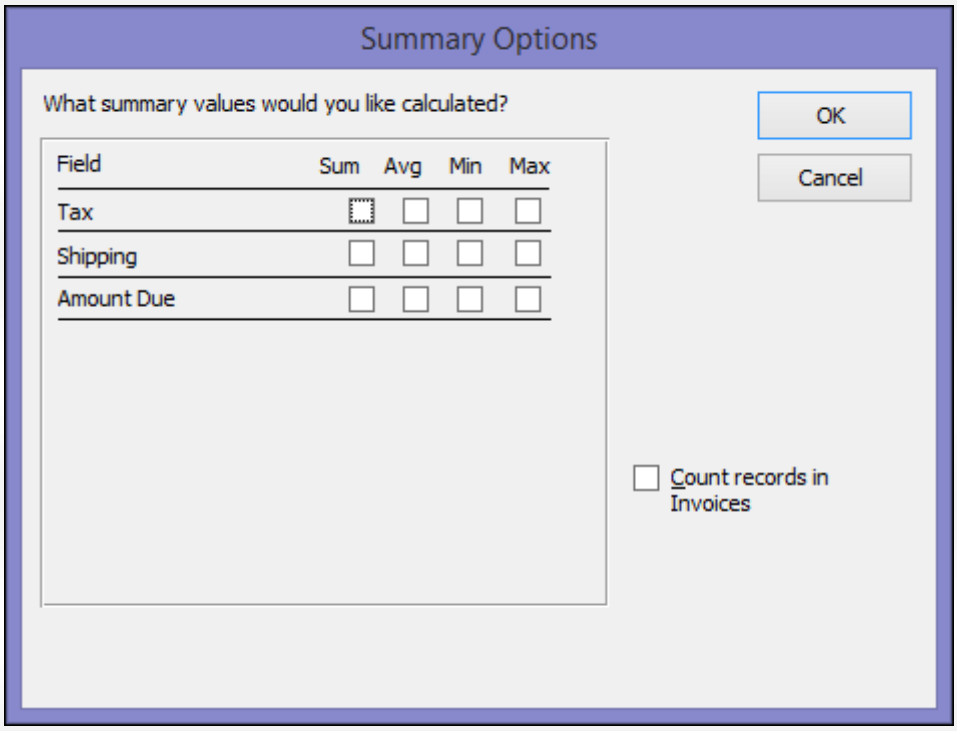
   a. If you want to see individual records, click **Detail**, and then click **Next**. Skip ahead to step 9.
   b. If you want to see summarized numeric data, such as averages, click **Summary**, and then click **Summary Options**.



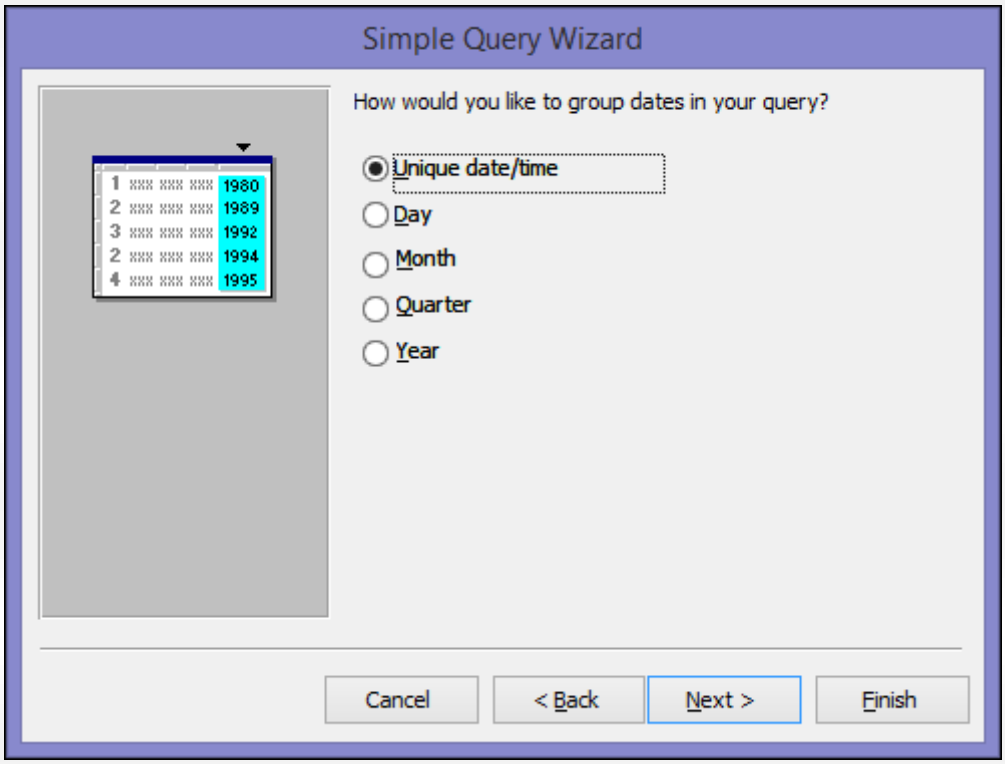
5. In the **Summary Options** dialog box, specify which fields you want to summarize, and how you want to summarize the data. Only number fields are listed.

   For each number field, choose one of the following functions:

   a. **Sum** The query returns the sum of all the values of the field.
   b. **Avg** The query returns the average of the values of the field.
   c. **Min** The query returns the smallest value of the field.
   d. **Max** The query returns the largest value of the field.



6. If you want the query results to include a count of the records in a data source, select the appropriate **Count records in data source name** check box.
7. Click **OK** to close the **Summary Options** dialog box.
8. If you did not add a date/time field to the query, skip ahead to step 9. If you added a date-time field to the query, the Query Wizard asks you how you would like to group the date values. For example, suppose you added a number field ("Price") and a date/time field ("Transaction_Time") to your query, and then specified in the **Summary Options** dialog box that you want to see the average value of the number field "Price". Because you included a date/time field, you could calculate summary values for each unique date/time value, for each day, for each month, for each quarter, or for each year.



Select the time period that you want to use to group the date/time values, and then click **Next**.

Note: In Design view, you can use an expression to group by any time period you want, but the wizard only offers these choices.

9. On the last page of the wizard, give the query a title, specify whether you want to open or modify the query, and then click **Finish**.

   If you choose to open the query, the query displays the selected data in Datasheet view. If you choose to modify the query, the query opens in Design view.

Create a query by working in Design view

You can use Design view to manually create a select query. When you use Design view, you have more control over the details of the query design,

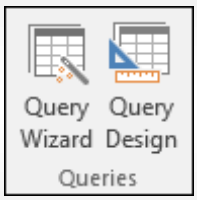
but it is easier to make design mistakes, and it can take longer than using the wizard.

Create a query

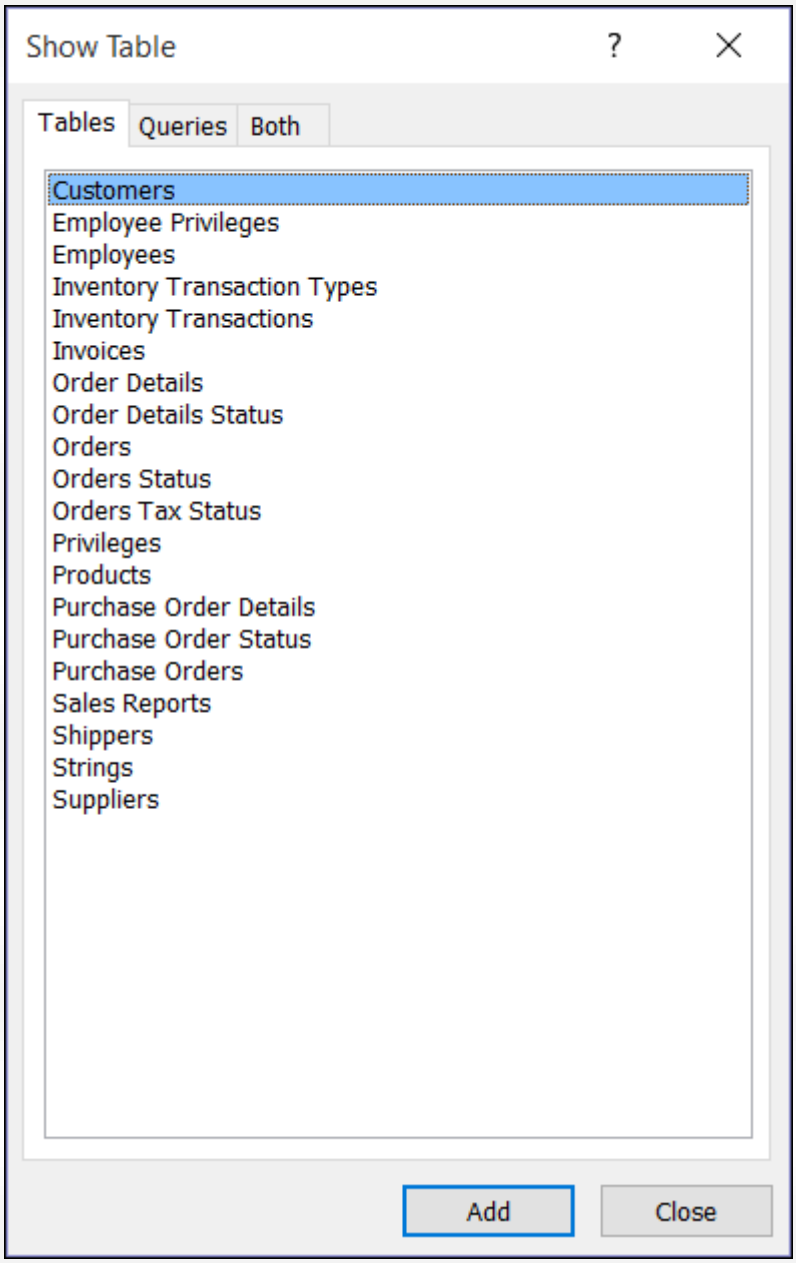
Step 1: Add data sources

When you use Design view, to add data sources, you add the data sources and fields in separate steps. However, you can always add more data sources later if you want.

1. On the **Create** tab, in the **Other** group, click **Query Design**.



2. Double-click each data source that you want to use or select each data source and then click **Add**.



Automatic joins

When you add the data sources, if the sources already have relationships defined between them, those relationships are automatically added to the query as joins. Joins specify how data from related sources should be combined. MS Access also automatically creates a join between two tables if they have fields have compatible data types and one field is a primary key.

You might want to adjust the joins that MS Access creates. MS Access determines what type of join to create based on the relationship the join represents.

Use the same data source several times

In some cases, you want to join two copies of the same table or query, called a self-join, that combines records from the same table when there are matching values in the joined fields. For example, say you have an Employees table in which the ReportsTo field for each employee's record displays his or her manager's ID instead of name. You could use a self-join to display the manager's name in each employee's record instead.

When you add a data source a second time, MS Access appends _1 to the name of the second instance. For example, if you added the Employees table twice, the second instance would be named Employees_1.

Step 2: Join related data sources

If the data sources that you add to a query already have relationships, MS Access automatically creates an inner join for each relationship. If referential integrity is enforced, MS Access also displays a "1" above the join line to show which table is on the "one" side of a one-to-many relationship and an infinity symbol (∞) to show which table is on the "many" side.

If you add queries to your query, and have not created relationships between those queries, MS Access does not automatically create joins between those queries, or between queries and tables that are not related. If MS Access does not create joins when you add data sources, you should

usually add them yourself. Data sources that are not joined to any other data source can cause problems with the query results.

You might also want to change the type of a join from an inner join to an outer join, so that your query includes more records.

Add a join

- To add a join, drag a field from one data source to a corresponding field on another data source.

  MS Access displays a line between the two fields to show that a join has been created.

Change a join

1. Double-click the join you want to change.

   The **Join Properties** dialog box appears.

2. In the **Join Properties** dialog box, review the three options.
3. Click the option that you want to use, and then click **OK**.

After the joins are ready, you add output fields — fields that have data that you want in the query results.

Step 3: Add output fields

You can easily add a field from any of the data sources that you added in step 1.

- To add a field, drag the field from a data source in the upper pane of the query design window down to the **Field** row of the design grid, in the bottom pane of the query design window.

  When you add a field this way, MS Access automatically fills in the **Table** row of the design grid to reflect the data source of the field.

  Tip: If you want to quickly add all fields down to the Field row of the query design grid, double-click the table or query name from the upper pane to highlight all the fields in that source and then drag them all down to the design grid at the same time.

Use an expression as an output field

If you want to perform calculations or use a function to produce query output, you can use an expression as an output field. An expression can use data from any of the query data sources, as well as functions, such as Format or InStr, and can also contains constants and arithmetic operators.

1. In an empty column of the query design grid, right-click the **Field** row, and then click **Zoom** on the shortcut menu.
2. In the **Zoom** box, type or paste your expression. Preface your expression with the name you would like to use for the expression output, followed by a colon. For example, if you wanted the expression to be labelled "Last updated", you would start your expression with **Last updated:**.

   Note: You can do a wide variety of things by using expressions. A thorough explanation of expressions is beyond the scope of this article.

Step 4: Specify criteria

This step is optional.

You use criteria to limit the records that your query returns, on the basis of whether field values meet the criteria that you specify.

Specify criteria for an output field

1. In the query design grid, in the **Criteria** row of the field that has values that you want to limit, type an expression that field values must satisfy to be included in your results. For example, if you wanted to limit a query so that only records where the value of the field City is Las Vegas, type **Las Vegas** in the **Criteria** row under that field.

2. Specify any alternate criteria in the **Or** row, below the **Criteria** row.

   If you specify alternate criteria, a field value can meet any of the listed criteria and be included in the query result.

Multiple field criteria

You can use criteria with multiple fields. When you do, all the criteria in a given **Criteria** or **Or** row must be true for the record to be included.

Specify criteria by using a field that you don't want to output

You can add a field to your query design and not include the field's data in the query output. You do this if you want to use the field's values to limit the query results, but don't want to see the field values.

1. Add the field to the design grid.
2. Clear the check box in the **Show** row for the field.
3. Specify criteria as you would for an output field.

Step 5: View the results

To see the query results, on the Design tab, click **Run**. MS Access displays the results of your query in Datasheet view.

To make further changes to the query, click **Home** > **View** > **Design View** to switch back to Design view.

Change your fields, expressions, or criteria and rerun the query until it returns the data that you want.

Run a query

A query is a set of instructions that you can use for working with data. You run a query to perform these instructions. In addition to returning results — which can be sorted, grouped, or filtered — a query can also create, copy, delete, or change data.

This article explains how to run queries and provides only brief overviews of the various types of queries. The article also discusses error messages you might encounter when you run different types of queries and provides steps you can take to work around or correct those errors.

This article does not provide step-by-step instructions for creating queries.

Important: You cannot run action queries if a database is operating in Disabled mode —a reduced functionality mode that MS Access uses to help protect your data in certain circumstances. You may see a dialog box warning, or you may see a warning in the Message Bar.

Run a select or a crosstab query

You use select queries and crosstab queries to retrieve and present data, and to supply forms and reports with data. When you run a select or a crosstab query, MS Access displays the results in Datasheet view.

Run the query

1. Locate the query in the Navigation Pane.
2. Do one of the following:
    - Double-click the query you want to run.
    - Click the query you want to run, and then press ENTER.

If the query you want to run is currently open in Design view, you can also run it by clicking **Run** in the **Results** group on the **Design** tab on the Ribbon, part of the Microsoft Office Fluent user interface.

Run an action query

There are four types of action queries: append queries, delete queries, update queries, and make-table queries. Except for make-table queries (which create new tables), action queries make changes to the data in tables they are based on. These changes cannot be easily undone, for example, by pressing CTRL+Z. If you make changes using an action query that you later decide you didn't want to make, usually you will have to restore the data from a backup copy. For this reason, you should always make sure you have a fresh backup of the underlying data before running an action query.

You can mitigate the risk of running an action query by first previewing the data that will be acted upon. There are two ways to do this:

- View the action query in Datasheet view before you run it. To do this, open the query in Design view, click **View** on the MS Access status bar, and then click **Datasheet View** on the shortcut menu. To switch back to Design view, click **View** again, and then click **Design View** on the shortcut menu.
- Change the query to a select query, and then run it.

  Note: Make sure to note what type of action query (append, update, make-table, or delete) you are starting with, so you can change the query back to that type after you preview the data with this method.

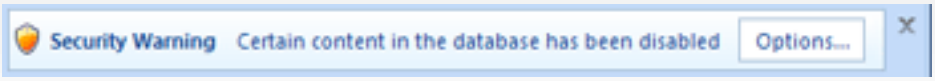
  Run an action query as a select query

a. Open the action query in Design view.
b. On the **Design** tab, in the **Query Type** group, click **Select**.
c. On the **Design** tab, in the **Results** group, click **Run**.

Run the query

When you are ready to run an action query, double-click it in the Navigation Pane, or click it and then press ENTER.

Important: By default, MS Access disables all action queries in a database unless you indicate that you trust the database. You can indicate that you trust a database by using the Message Bar, just below the Ribbon.



Trust a database

1. On the Message Bar, click **Options**.

   The **Microsoft Office Security Options** dialog box appears.

2. Select **Enable this content** and then click **OK**.

Troubleshoot an error message

The following table shows some common error messages you may encounter. These errors can appear either as a message in a cell (instead of an expected value), or as an error message. The sections that follow the list include procedures you can use to resolve these errors.

Error message	Problem	Solution
Type mismatch in expression	The query may be joining fields that have different data types.	Check the query design and ensure that the joined fields have the same data type.
Record is Deleted	This can occur if either the object or the database is damaged.	Compact and repair the database.
Circular reference caused by alias	The alias assigned to a field is the same as a component of the expression for that field. An alias is a name that is given to any expression in the **Field** row of the query design grid that is not an actual field. MS Access assigns the alias for you if you do not do so yourself; for example, **EXPR1**. An alias is immediately followed by a colon (**:**) and then by the expression. When you run the query, the alias becomes the	Change the alias.

	column name in the datasheet.	
#Error	This error can occur when the value of a calculated field is greater than the value allowed by the field's **FieldSize** property setting. This also occurs when the denominator of a calculated field is or evaluates to zero (0).	Ensure that the calculated field's denominator does not evaluate to zero (0). If appropriate, change the **FieldSize** property.
#Deleted	The record being referred to has been deleted.	If the record was deleted accidentally, it must be restored from a backup. If the deletion was intentional, you can dismiss this error message by pressing SHIFT+F9 to refresh the query.

Examples of query criteria

Query criteria help you zero in on specific items in an MS Access database. If an item matches all the criteria you enter, it appears in the query results.

To add criteria to an MS Access query, open the query in Design view and identify the fields (columns) you want to specify criteria for. If the field is not in the design grid, double-click the field to add it to the design grid and then enter the criterion in the **Criteria** row for that field.

A query criterion is an expression that MS Access compares to query field values to determine whether to include the record that contains each value. For example, **= "Chicago"** is an expression that MS Access can compare to values in a text field in a query. If the value for that field in a given record is **"Chicago"**, MS Access includes the record in the query results.

Here are some examples of commonly used criteria you can use as a starting point to create your criteria. The examples are grouped by data types.

Introduction to query criteria

A criterion is like a formula — it is a string that may consist of field references, operators, and constants. Query criteria are also referred to as expressions in MS Access.

The following tables shows some sample criteria and explains how they work.

Criteria	Description
>25 and <50	This criterion applies to a Number field, such as Price or UnitsInStock. It includes only those records where the Price or UnitsInStock field contains **a value greater than 25 and less than 50**.
DateDiff ("yyyy", [BirthDate], Date()) > 30	This criterion applies to a Date/Time field, such as BirthDate. Only records where **the number of years between a person's birthdate and today's date is greater than 30** are included in the query result.
Is Null	This criterion can be applied to any type of field to show records where **the field value is null**.

As you can see, criteria can look very different from each other, depending on the data type of the field to which they apply and your specific requirements. Some criteria are simple, and use basic operators and constants. Others are complex, and use functions, special operators, and include field references.

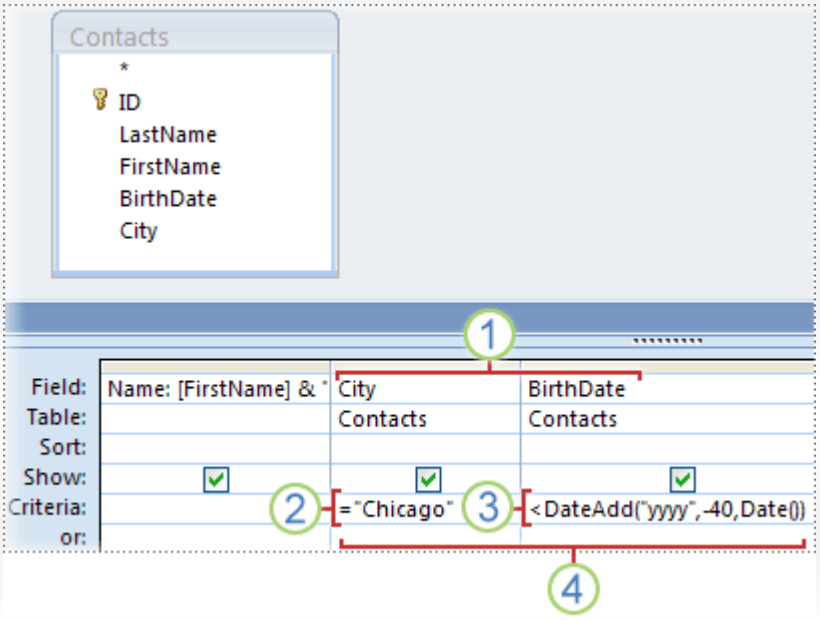
This topic lists several commonly used criteria by data type. If the examples given in this topic do not address your specific needs, you might need to write your own criteria. To do that, you must first familiarize yourself with the full list of functions, operators, special characters, and the syntax for expressions referring to fields and literals.

Here, you will see where and how you add the criteria. To add a criteria to a query, you must open the query in Design view. You then identify the fields for which you want to specify criteria. If the field is not already in the design grid, you add it by either dragging it from the query design window to the field grid, or by double-clicking the field (Double-clicking the field

automatically adds it to the next empty column in the field grid.). Finally, you type the criteria in the **Criteria** row

Criteria that you specify for different fields in the **Criteria** row are combined by using the AND operator. In other words, the criteria specified in the City and BirthDate fields are interpreted like this:

City = "Chicago" AND BirthDate < DateAdd (" yyyy ", -40, Date())



1. The City and BirthDate fields include criteria.

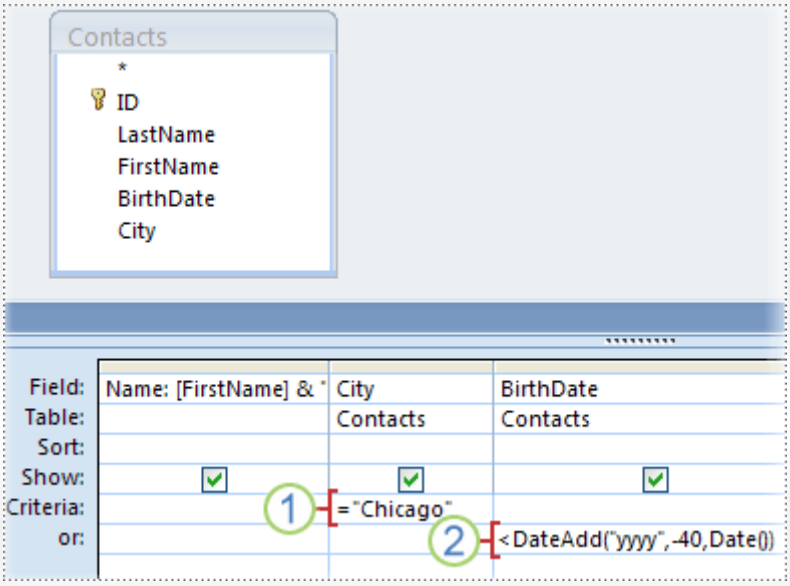
2. Only records where the value of the City field is Chicago will satisfy this criterion.

3. Only records of those who are at least 40 years old will satisfy this criterion.

4. Only records that meet both criteria will be included in the result.

What if you want only one of these conditions to be met? In other words, if you have alternate criteria, how do you enter them?

If you have alternate criteria, or two sets of independent criteria where it is sufficient to satisfy one set, you use both the **Criteria** and the **or** rows in the design grid.



1. The City criterion is specified in the Criteria row.

2. The BirthDate criterion is specified in the or row.

Criteria specified in the **Criteria** and **or** rows are combined using the OR operator, as shown below:

City = "Chicago" OR BirthDate < DateAdd (" yyyy ", -40, Date())

If you need to specify more alternatives, use the rows below the **or** row.

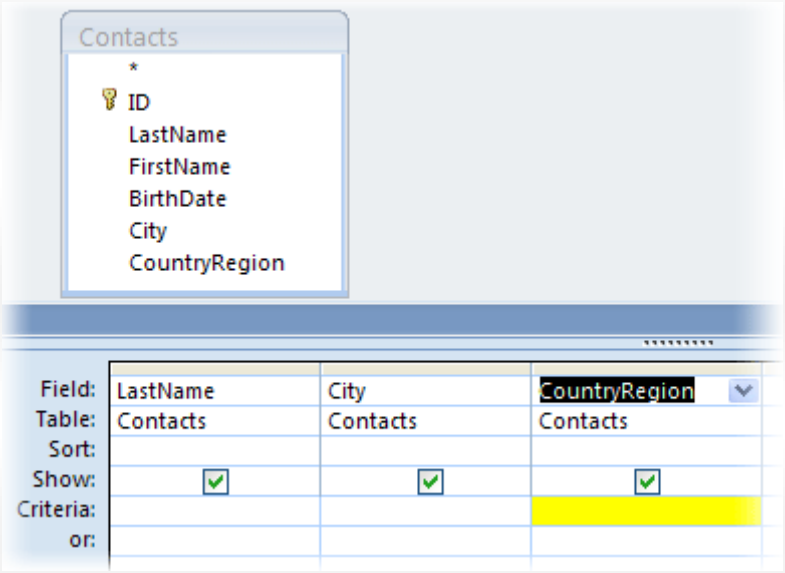
Before you continue with the examples, note the following:

- If the criteria is temporary or changes often, you can filter the query result instead of frequently modifying the query criteria. A filter is a temporary criterion that changes the query result without altering the design of the query.

- If the criteria fields don't change, but the values you are interested in do change frequently, you can create a parameter query. A parameter query prompts the user for field values, and then uses those values to create the query criteria. **Criteria for Text, Memo, and Hyperlink fields**

Note: Beginning in MS Access 2013, Text fields are now named **Short Text** and Memo fields are now named **Long Text.**

The following examples are for the CountryRegion field in a query that is based on a table that stores contacts information. The criterion is specified in the **Criteria** row of the field in the design grid.



A criterion that you specify for a Hyperlink field is, by default, applied to the display text portion of the field value. To specify criteria for the destination Uniform Resource Locator (URL) portion of the value, use the **HyperlinkPart** expression. The syntax for this expression is as follows: **HyperlinkPart([Table1].[Field1],1) = "http://www.microsoft.com/"**, where Table1 is the name of the table containing the hyperlink field, Field1 is the hyperlink field, and http://www.microsoft.com is the URL you want to match.

To include records that...	Use this criterion	Query result
Exactly match a value, such as China	"China"	Returns records where the CountryRegion field is set to China.
Do not match a value, such as Mexico	Not "Mexico"	Returns records where the CountryRegion field is set to a country/region other than Mexico.
Begin with the specified string, such as U	Like U*	Returns records for all countries/regions whose names start with "U", such as UK, USA, and so on. **Note:** When used in an expression, the asterisk (*) represents any string of characters — it is also called a wildcard character. For a list of such characters, see the article MS Access wildcard character reference.
Do not begin with the specified string, such as U	Not Like U*	Returns records for all countries/regions whose names start with a character other than "U".
Contain the specified string, such as Korea	Like "*Korea*"	Returns records for all countries/regions that contain the string "Korea".
Do not contain the specified string, such as Korea	Not Like "*Korea*"	Returns records for all countries/regions that do not contain the string "Korea".

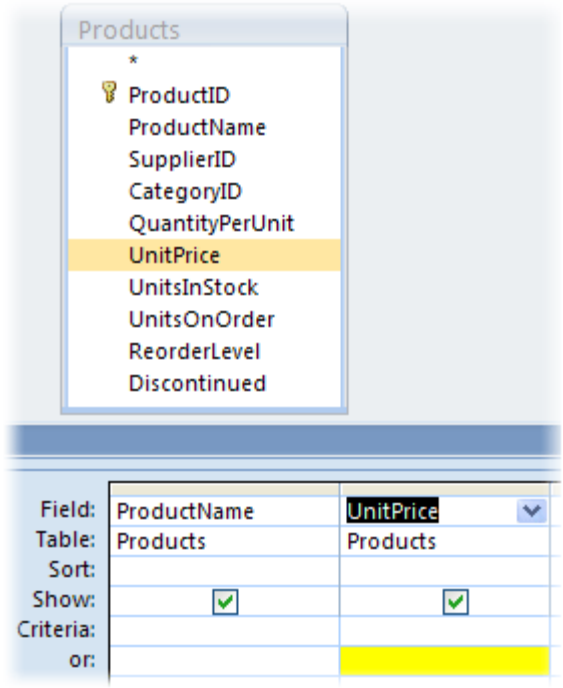
End with the specified string, such as "ina"	Like "*ina"	Returns records for all countries/regions whose names end in "ina", such as China and Argentina.
Do not end with the specified string, such as "ina"	Not Like "*ina"	Returns records for all countries/regions that do not end in "ina", such as China and Argentina.
Contain null (or missing) values	Is Null	Returns records where there is no value in the field.
Do not contain null values	Is Not Null	Returns records where the value is not missing in the field.
Contain zero-length strings	"" (a pair of quotes)	Returns records where the field is set to a blank (but not null) value. For example, records of sales made to another department might contain a blank value in the CountryRegion field.
Do not contain zero-length strings	Not ""	Returns records where the CountryRegion field has a nonblank value.
Contains null values or zero-length strings	"" Or Is Null	Returns records where there is either no value in the field, or the field is set to a blank value.
Is not empty or blank	Is Not Null And Not ""	Returns records where the CountryRegion field has a nonblank, non-null value.
Follow a value, such as Mexico, when	>= "Mexico"	Returns records of all countries/regions, beginning with

sorted in alphabetical order		Mexico and continuing through the end of the alphabet.
Fall within a specific range, such as A through D	Like "[A-D]*"	Returns records for countries/regions whose names start with the letters "A" through "D".
Match one of two values, such as USA or UK	"USA" Or "UK"	Returns records for USA and UK.
Contain one of the values in a list of values	In("France", "China", "Germany", "Japan")	Returns records for all countries/regions specified in the list.
Contain certain characters at a specific position in the field value	Right([CountryRegion], 1) = "y"	Returns records for all countries/regions where the last letter is "y".
Satisfy length requirements	Len([CountryRegion]) > 10	Returns records for countries/regions whose name is more than 10 characters long.
Match a specific pattern	Like "Chi??"	Returns records for countries/regions, such as China and Chile, whose names are five characters long and the first three characters are "Chi". **Note:** The characters **?** and **_**, when used in an expression, represent a single character — these are also called wildcard characters. The

	character _ cannot be used in the same expression with the **?** character, nor can it be used in an expression with the ***** wildcard character. You may use the wildcard character _ in an expression that also contains the **%** wildcard character.

Criteria for Number, Currency, and AutoNumber fields

The following examples are for the UnitPrice field in a query that is based on a table that stores products information. The criterion is specified in the **Criteria** row of the field in the query design grid.

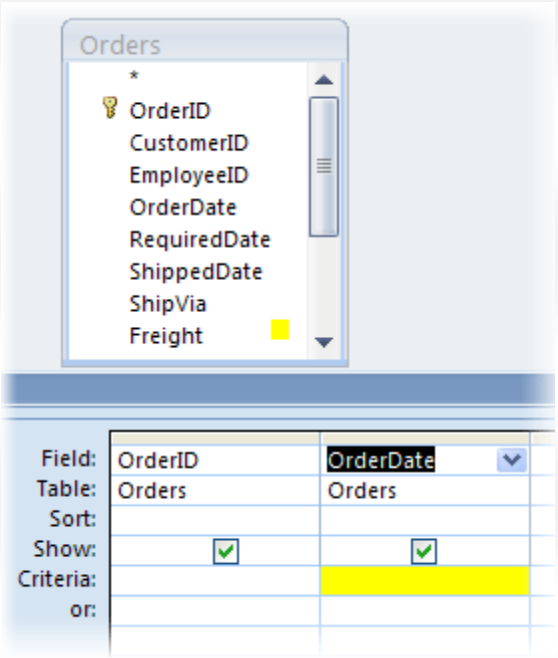


To include records that...	Use this crit erion	Query Result
Exactly match a value, such as 100	100	Returns records where the unit price of the product is $100.
Do not match a value, such as 1000	Not 1000	Returns records where the unit price of the product is not $1000.
Contain a value smaller than a value, such as 100	< 100 <= 100	Returns records where the unit price is less than $100 (<100). The second expression (<=100) displays records where the unit price is less than or equal to $100.
Contain a value larger than a value, such as 99.99	>99.99 >=99.99	Returns records where the unit price is greater than $99.99 (>99.99). The second expression displays records where the unit price is greater than or equal to $99.99.
Contain one of the two values, such as 20 or 25	20 or 25	Returns records where the unit price is either $20 or $25.
Contain a value that falls with a range of values	>49.99 and <99.99 -or- Between 50 and 100	Returns records where the unit price is between (but not including) $49.99 and $99.99.
Contain a value that falls outside a range	<50 or >100	Returns records where the unit price is not between $50 and $100.

Contain one of many specific values	In(20, 25, 30)	Returns records where the unit price is either $20, $25, or $30.
Contain a value that ends with the specified digits	Like "*4.99"	Returns records where the unit price ends with "4.99", such as $4.99, $14.99, $24.99, and so on. **Note:** The characters ***** and **%**, when used in an expression, represent any number of characters — these are also called wildcard characters. The character **%** cannot be used in the same expression with the ***** character, nor can it be used in an expression with the **?** wildcard character. You may use the wildcard character **%** in an expression that also contains the **_** wildcard character.
Contain null null (or missing) values	Is Null	Returns records where no value is entered in the UnitPrice field.
Contain non-null values	Is Not Null	Returns records where the value is not missing in the UnitPrice field.

Criteria for Date/Time fields

The following examples are for the OrderDate field in a query based on a table that stores Orders information. The criterion is specified in the **Criteria** row of the field in the query design grid.



To include records that ...	Use this criterion	Query result
Exactly match a value, such as 2/2/2006	#2/2/2006#	Returns records of transactions that took place on Feb 2, 2006. Remember to surround date values with the # character so that MS Access can distinguish between date values and text strings.
Do not match a value, such as 2/2/2006	Not #2/2/2006#	Returns records of transactions that took place on a day other than Feb 2, 2006.
Contain values that fall before a certain date, such as 2/2/2006	< #2/2/2006#	Returns records of transactions that took place before Feb 2, 2006.

		To view transactions that took place on or before this date, use the **<=** operator instead of the **<** operator.
Contain values that fall after a certain date, such as 2/2/2006	> #2/2/2006#	Returns records of transactions that took place after Feb 2, 2006. To view transactions that took place on or after this date, use the **>=** operator instead of the **>** operator.
Contain values that fall within a date range	>#2/2/2006# and <#2/4/2006#	Returns records where the transactions took place between Feb 2, 2006 and Feb 4, 2006. You can also use the **Between** operator to filter for a range of values, including the end points. For example, Between #2/2/2006# and #2/4/2006# is the same as >=#2/2/2006# and <=#2/4/2006# .
Contain values that fall outside a range	<#2/2/2006# or >#2/4/2006#	Returns records where the transactions took place before Feb 2, 2006 or after Feb 4, 2006.

Contain one of two values, such as 2/2/2006 or 2/3/2006	#2/2/2006# or #2/3/2006#	Returns records of transactions that took place on either Feb 2, 2006 or Feb 3, 2006.
Contain one of many values	In (#2/1/2006#, #3/1/2006#, #4/1/2006#)	Returns records where the transactions took place on Feb 1, 2006, March 1, 2006, or April 1, 2006.
Contain a date that falls in a specific month (irrespective of year), such as December	DatePart("m", [SalesDate]) = 12	Returns records where the transactions took place in December of any year.
Contain a date that falls in a specific quarter (irrespective of year), such as the first quarter	DatePart("q", [SalesDate]) = 1	Returns records where the transactions took place in the first quarter of any year.
Contain today's date	Date()	Returns records of transactions that took place on the current day. If today's date is 2/2/2006, you see records where the OrderDate field is set to Feb 2, 2006.
Contain yesterday's date	Date()-1	Returns records of transactions that took place the day before the current

		day. If today's date is 2/2/2006, you see records for Feb 1, 2006.
Contain tomorrow's date	Date() + 1	Returns records of transactions that took place the day after the current day. If today's date is 2/2/2006, you see records for Feb 3, 2006.
Contain dates that fall during the current week	DatePart("ww", [SalesDate]) = DatePart("ww", Date()) and Year([SalesDate]) = Year(Date())	Returns records of transactions that took place during the current week. A week starts on Sunday and ends on Saturday.
Contain dates that fell during the previous week	Year([SalesDate]) * 53 + DatePart("ww", [SalesDate]) = Year(Date())* 53 + DatePart("ww", Date()) - 1	Returns records of transactions that took place during the last week. A week starts on Sunday and ends on Saturday.
Contain dates that fall during the following week	Year([SalesDate]) * 53+DatePart("ww ", [SalesDate]) = Year(Date())* 53+DatePart("ww ", Date()) + 1	Returns records of transactions that will take place next week. A week starts on Sunday and ends on Saturday.

Contain a date that fell during the last 7 days	Between Date() and Date()-6	Returns records of transactions that took place during the last 7 days. If today's date is 2/2/2006, you see records for the period Jan 24, 2006 through Feb 2, 2006.
Contain a date that belongs to the current month	Year([SalesDate]) = Year(Now()) And Month([SalesDate]) = Month(Now())	Returns records for the current month. If today's date is 2/2/2006, you see records for Feb 2006.
Contain a date that belongs to the previous month	Year([SalesDate]) * 12 + DatePart("m", [SalesDate]) = Year(Date())* 12 + DatePart("m", Date()) - 1	Returns records for the previous month. If today's date is 2/2/2006, you see records for Jan 2006.
Contain a date that belongs to the next month	Year([SalesDate]) * 12 + DatePart("m", [SalesDate]) = Year(Date())* 12 + DatePart("m", Date()) + 1	Returns records for the next month. If today's date is 2/2/2006, you see records for Mar 2006.
Contain a date that fell during the last 30 or 31 days	Between Date( ) And DateAdd("M", -1, Date( ))	A month's worth of sales records. If today's date is 2/2/2006, you see records

		for the period Jan 2, 2006. to Feb 2, 2006
Contain a date that belongs to the current quarter	Year([SalesDate]) = Year(Now()) And DatePart("q", Date()) = DatePart("q", Now())	Returns records for the current quarter. If today's date is 2/2/2006, you see records for the first quarter of 2006.
Contain a date that belongs to the previous quarter	Year([SalesDate]) *4+DatePart("q", [SalesDate]) = Year(Date())*4+ DatePart("q",Date ())- 1	Returns records for the previous quarter. If today's date is 2/2/2006, you see records for the last quarter of 2005.
Contain a date that belongs to the next quarter	Year([SalesDate]) *4+DatePart("q", [SalesDate]) = Year(Date())*4+ DatePart("q",Date ())+1	Returns records for the next quarter. If today's date is 2/2/2006, you see records for the second quarter of 2006.
Contain a date that falls during the current year	Year([SalesDate]) = Year(Date())	Returns records for the current year. If today's date is 2/2/2006, you see records for the year 2006.
Contain a date that belongs to the previous year	Year([SalesDate]) = Year(Date()) - 1	Returns records of transactions that took place during the previous year. If today's date is 2/2/2006, you see records for the year 2005.

Contain a date that belongs to next year	Year([SalesDate]) = Year(Date()) + 1	Returns records of transactions with next year's date. If today's date is 2/2/2006, you see records for the year 2007.
Contain a date that falls between Jan 1 and today (year to date records)	Year([SalesDate]) = Year(Date()) and Month([SalesDate]) <= Month(Date()) and Day([SalesDate]) <= Day (Date())	Returns records of transactions with dates that fall between Jan 1 of the current year and today. If today's date is 2/2/2006, you see records for the period Jan 1, 2006 to to 2/2/2006.
Contain a date that occurred in the past	< Date()	Returns records of transactions that took place before today.
Contain a date that occurrs in the future	> Date()	Returns records of transactions that will take place after today.
Filter for null (or missing) values	Is Null	Returns records where the date of transaction is missing.
Filter for non-null values	Is Not Null	Returns records where the date of transaction is known.

Criteria for Yes/No fields

As an example, your Customers table has a Yes/No field named Active, used to indicate whether a customer's account is currently active. The following table shows how values entered in the Criteria row for a Yes/No field are evaluated.

Field value	Result
Yes, True, 1, or -1	Tested for a Yes value. A value of 1 or -1 is converted to "True" in the Criteria row after you enter it.
No, False, or 0	Tested for a No value. A value of 0 is converted to "False" in the Criteria row after you enter it.
No value (null)	Not tested
Any number other than 1, -1, or 0	No results if it's the only criteria value in the field
Any character string other than Yes, No, True, or False	Query fails to run due to Data type mismatch error

Multivalued fields Data in a multivalued field are stored as rows in a hidden table that MS Access creates and populates to represent the field. In query Design view, this is represented in the **Field List** by using an expandable field. To use criteria for a multivalued field, you supply criteria for a single row of the hidden table. To do this:

1. Create a query containing the multivalued field, and open it in Design view.
2. Expand the multivalued field by clicking the plus symbol (**+**) next to it — if the field is already expanded, this is a minus symbol (**-**). Just below

the name of the field, you will see a field representing a single value of the multivalued field. This field will have the same name as the multivalued field, with the string **.Value** appended.

3. Drag the multivalued field and its single value field to separate columns in the design grid. If you want to see only the complete multivalue field in your results, clear the **Show** check box for the single value field.
4. Type your criteria in the **Criteria** row for the single value field, using criteria that is appropriate for whatever type of data the values represent.
5. Each value in the multivalued field will be individually evaluated using the criteria you supply. For example, you may have a multivalued field that stores a list of numbers. If you supply the criteria **>5 AND <3**, any record where there is at least one value greater than 5 **and** one value less than 3 will match.

12.6 Report

Introduction to reports in MS Access

Reports offer a way to view, format, and summarize the information in your Microsoft Access database. For example, you can create a simple report of phone numbers for all your contacts, or a summary report on the total sales across different regions and time periods.

From this article, you'll get an overview of reports in MS Access. You'll also learn the basics of creating a report, and using options like sorting,

grouping, and summarizing the data, and how to preview and print the report.

Note: The information in this article is intended for use only with MS Access desktop databases. MS Access web apps don't support reports.

What can you do with a report?

A report is a database object that comes in handy when you want to present the information in your database for any of the following uses:

- Display or distribute a summary of data.
- Archive snapshots of the data.
- Provide details about individual records.
- Create labels.

Parts of a report

While it is possible to create "unbound" reports that do not display data, but for the purposes of this article, we'll assume that a report is bound to a data source such as a table or query. The design of a report is divided into sections that you can view in the Design view. Understanding how each section works can helps you create better reports. For example, the section in which you choose to place a calculated control determines how MS Access calculates the results.

The following list is a summary of the section types and their uses:

Section	How the section is displayed when printed	Where the section can be used
Report Header	At the beginning of the report.	Use the report header for information that might normally appear on a cover page, such as a logo, a title, or a date. When you place a calculated control that uses the Sum aggregate function in the report header, the sum calculated is for the entire report. The report header is printed before the page header.
Page Header	At the top of every page.	Use a page header to repeat the report title on every page.
Group Header	At the beginning of each new group of records.	Use the group header to print the group name. For example, in a report that is grouped by product, use the group header to print the product name. When you place a calculated control that uses the Sum aggregate function in the group header, the sum is for the current group. You can have multiple group header sections on a report, depending on how many grouping levels you have added. For more information about creating group headers and footers, see the section Add grouping, sorting, or totals.

Detail	Appears once for every row in the record source.	This is where you place the controls that make up the main body of the report.
Group Footer	At the end of each group of records.	Use a group footer to print summary information for a group. You can have multiple group footer sections on a report, depending on how many grouping levels you have added.
Page Footer	At the end of every page.	Use a page footer to print page numbers or per-page information.
Report Footer	At the end of the report. **Note:** In Design view, the report footer appears below the page footer. However, in all other views (Layout view, for example, or when the report is printed or previewed), the report footer appears *above* the page footer, just after the last group footer or detail line on the final page.	Use the report footer to print report totals or other summary information for the entire report.

You'll find that it's much easier to create meaningful reports when your database has a well-designed table structure and relationships.

Create a report in MS Access

You can create reports for you MS Access desktop database by following the steps below:

Step 1: Choose a record source

The record source of a report can be a table, a named query, or an embedded query. The record source must contain all of the rows and columns of data you want display on the report.

- If the data is from an existing table or query, select the table or query in the Navigation Pane, and then continue to Step 2.
- If the record source does not yet exist, do one of the following:
- Continue to Step 2 and use the **Blank Report** tool,

  Or

- Create the table(s) or query that contains the required data. Select the query or table in the Navigation Pane, and then continue to Step 2.

Step 2: Choose a report tool

The report tools are located on the **Create** tab of the ribbon, in the **Reports** group.

The following table describes the options:

Tool	Description
Report	Creates a simple, tabular report containing all of the fields in the record source you selected in the Navigation Pane.
Report Design	Opens a blank report in Design view, to which you can add the required fields and controls.
Blank Report	Opens a blank report in Layout view, and displays the Field List from where you can add fields to the report
Report Wizard	Displays a multiple-step wizard that lets you specify fields, grouping/sorting levels, and layout options.
Labels	Displays a wizard that lets you select standard or custom label sizes, as well as which fields you want to display, and how you want them sorted.

Step 3: Create the report

1. Click the button for the tool you want to use. If a wizard appears, follow the steps in the wizard and click **Finish** on the last page. MS Access displays the report in Layout view.
2. Format the report to achieve the looks that you want:
   - Resize fields and labels by selecting them and then dragging the edges until they are the size you want.
   - Move a field by selecting it (and its label, if present), and then dragging it to the new location.
   - Right-click a field and use the commands on the shortcut menu to merge or split cells, delete or select fields, and perform other formatting tasks.

In addition, you can use the features described in the following sections to make your report more attractive and readable.

Add grouping, sorting, or totals

The fastest way to add grouping, sorting, or totals to a desktop database report is to right-click the field to which you want to apply the group, sort, or total, and then click the desired command on the shortcut menu.

You can also add grouping, sorting, or totals by using the Group, Sort, and Total pane while the report is open in Layout view or Design view:

1. If the Group, Sort, and Total pane is not already open, on the **Design** tab, in the **Grouping and Totals** group, click **Group & Sort**.
2. Click **Add a group** or **Add a sort**, and then select the field on which you want to group or sort.
3. Click **More** on a grouping or sorting line to set more options and to add totals.

Highlight data with conditional formatting

MS Access includes tools for highlighting data on a report. You can add conditional formatting rules for each control or group of controls, and in client reports, you can also add data bars to compare data.

To add conditional formatting to controls:

1. Right-click the report in the Navigation Pane and click **Layout View**.
2. Select the required controls and on the **Format** tab, in the **Control Formatting** group, click **Conditional Formatting**.

   Tip: To select multiple controls, hold down the CTRL key and click the controls.

3. In the **Conditional Formatting Rules Manager** dialog box, click **New Rule**.
4. In the **New Formatting Rule** dialog box, select a value under **Select a rule type**:
   - To create a rule that is evaluated for each record individually, select **Check values in the current record or use an expression**.
   - To create a rule that compares records to each other by using data bars, click **Compare to other records**.

1. Under **Edit the rule description**, specify the rule for when the formatting would be applied as well as what formatting should be applied, and then click **OK**.
2. To create an additional rule for the same control or set of controls, repeat this procedure from step 4.

Customizing color and fonts

Try an **App Theme** options to customize the color and fonts.

1. Open a report in Layout view by right-clicking it in the Navigation Pane and then clicking **Layout View**.
2. From the **Report Layout Tools** options, on the **Design** tab, click **Themes** and point the cursor over the various themes in the gallery to preview the effects. Click on a theme to select it, and then save your report.
3. Use the **Colors** or **Fonts** galleries to set colors or fonts independently.

Add a logo or background image

You can add a logo or background image to a report and If you update the image, the update is automatically made wherever the image is used in the database.

To add or remove an image:

1. In the Navigation Pane, right-click the report and click **Layout View**.
2. In the report, click the position where you want to add the image and on the **Design** tab, in the **Header/Footer** group, click **Logo**.
3. Navigate to the image, and click **Open**. MS Access adds the image to the report.
4. To remove the image, right-click the image and click Delete from the shortcut menu.

To add a background image:

1. In the Navigation Pane, right-click the report and click **Layout View**.
2. On the **Format** tab, in the **Background** group, click **Background Image**.
3. Select an image from the **Image Gallery** list or click **Browse**, select an image, and then click **OK**.

Preview and print a report

Preview a report

1. Right-click the report in the Navigation Pane and click **Print Preview**. You can use the commands on the **Print Preview** tab to do any of the following:
    - Print the report

- Adjust page size or layout
- Zoom in or out, or view multiple pages at a time
- Refresh the data on the report
- Export the report to another file format.

2. Click **Close Print Preview.**

Print a report

To print a report without previewing it:

- Right-click the report in the Navigation Pane and click **Print**. The report is sent to your default printer.

  Note: If you select the report in the Navigation Pane and select **Print** from the **File** tab, you can select additional printing options such as number of pages and copies and specify a printer.

- To open a dialog box where you can select a printer, specify the number of copies, and so on, click **Print**.

Change the page settings

1. Open the report in **Print Preview**. You can change page settings in any view, but Print Preview is best because you can see the effects of any changes immediately.
2. On the **Print Preview** tab, in the **Page Layout** and **Page Size** groups, click **Portrait** or **Landscape** to set the page orientation, **Size** to set the paper size, **Margins** to adjust the margins, and so on.
3. After you make a change, use the navigation buttons to view several pages to ensure that you haven't created any formatting problems on later pages.

Send your report to a printer

1. Open the report in any view, or select the report in the Navigation Pane.
2. Click **File** > **Print** > **Print**.

   MS Access displays the **Print** dialog box.

3. Enter your choices for options such as printer, print range, and number of copies.
4. Click **OK**.

Send your report as an e-mail message

You can send your report to recipients as an e-mail message instead of printing a paper copy:

1. In the Navigation Pane, click the report to select it. On the **External Data** tab, in the **Export** group, click **Email**.
2. In the **Send Object As** dialog box, in the **Select Output Format** list, click the file format that you want to use.
3. Complete any remaining dialog boxes.
4. In your e-mail application, type the message details and send the message.

Decide which data to put in each report section

Each report has one or more report sections. The one section that is present in every report is the Detail section. This section repeats once for each record in the table or query that the report is based on. Other sections are optional and repeat less often and are usually used to display information that is common to a group of records, a page of the report, or the entire report.

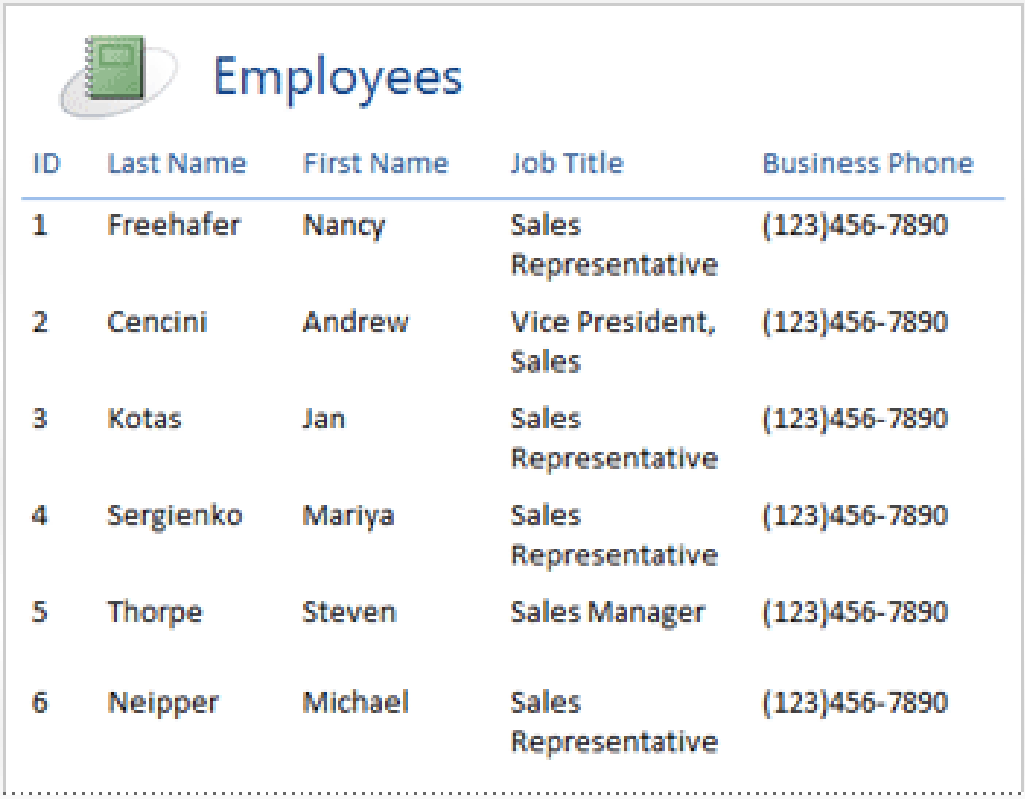
The following table describes where each section is located and how the section is typically used.

Section	Location	Typical contents
Report header section	Appears only once, at the top of the first page of the report.	▪ Report title ▪ Logo ▪ Current date
Report footer section	Appears after the last line of data, above the Page Footer section on the last page of the report.	Report totals (sums, counts, averages, and so on)
Page header section	Appears at the top of each page of the report.	▪ Report title ▪ Page number
Page footer section	Appears at the bottom of each page of the report.	▪ Current date ▪ Page number
Group header section	Appears just preceding of a group of records.	The field that is being grouped on
Group footer section	Appears just after a group of records.	Group totals (sums, counts, averages, and so on)

Decide how to arrange the detail data

Most reports are arranged in either a tabular or a stacked layout, but MS Access gives you the flexibility to use just about any arrangement of records and fields that you want.

Tabular layout A tabular layout is similar to a spreadsheet. Labels are across the top, and the data is aligned in columns below the labels. Tabular refers to the table-like appearance of the data. This is the type of report that MS Access creates when you click **Report** in the **Reports** group of the **Create** tab. The tabular layout is a good one to use if your report has a relatively small number of fields that you want to display in a simple list format. The following illustration shows an employee report that was created by using a tabular layout.



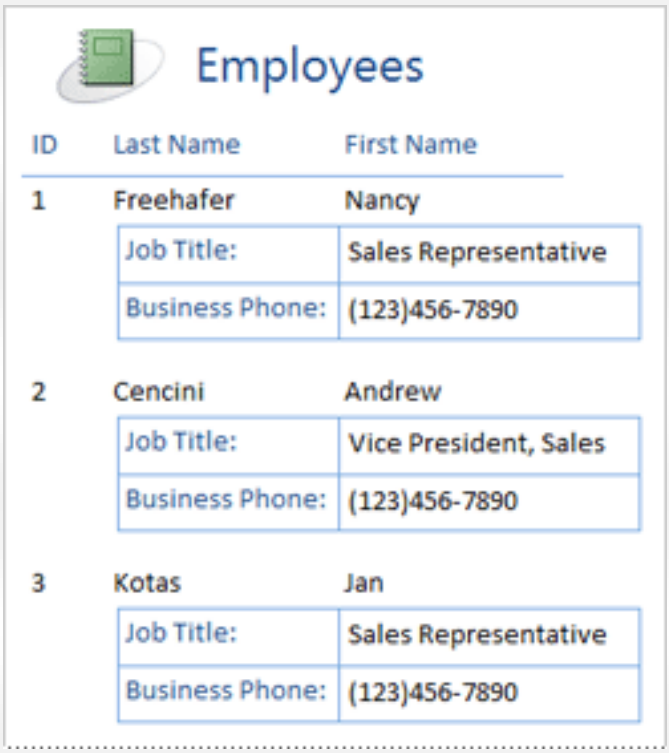
Employees

ID	Last Name	First Name	Job Title	Business Phone
1	Freehafer	Nancy	Sales Representative	(123)456-7890
2	Cencini	Andrew	Vice President, Sales	(123)456-7890
3	Kotas	Jan	Sales Representative	(123)456-7890
4	Sergienko	Mariya	Sales Representative	(123)456-7890
5	Thorpe	Steven	Sales Manager	(123)456-7890
6	Neipper	Michael	Sales Representative	(123)456-7890

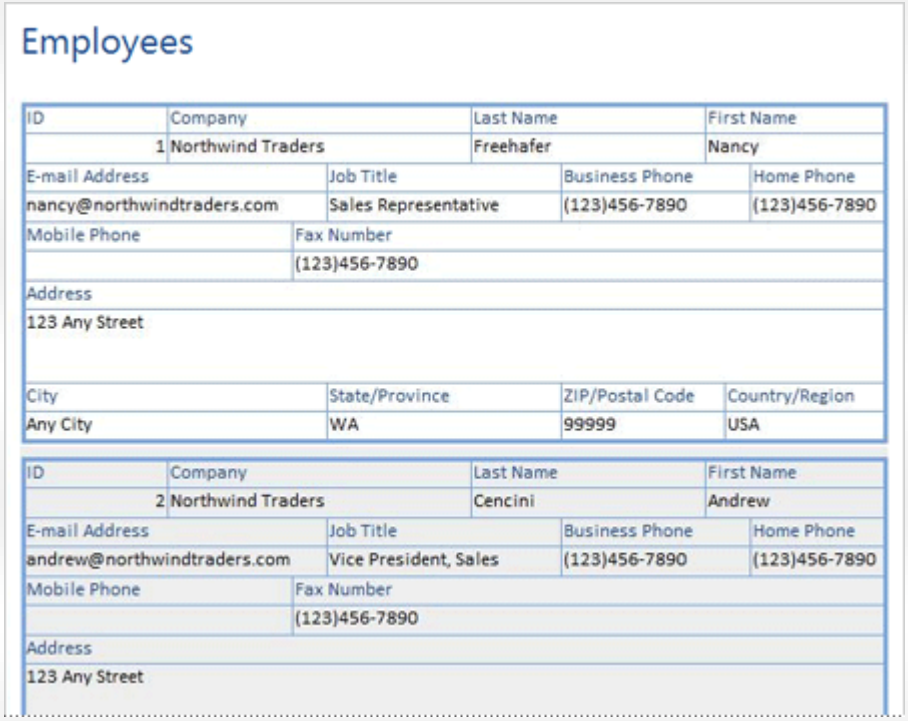
Stacked layout A stacked layout resembles a form that you fill out when you open a bank account or make a purchase from an online retailer. Each piece of data is labeled, and the fields are stacked on top of each other. This layout is good for reports that contain too many fields to display in a tabular format — that is, the width of the columns would exceed the width of the report. The following illustration shows an employee report that was created by using a stacked layout.

Note: In the Report Wizard, this layout is referred to as a columnar layout.

Mixed layout You can mix elements of tabular and stacked layouts. For example, for each record, you can arrange some of the fields in a horizontal row at the top of the Detail section and arrange other fields from the same record in one or more stacked layouts beneath the top row. The following illustration shows an employee report that was created by using a mixed layout. The ID, Last Name, and First Name fields are arranged in a tabular control layout, and the Job Title and Business Phone fields are arranged in a stacked layout. In this example, gridlines are used to provide a visual separation of fields for each employee.



Justified layout If you use the Report Wizard to create your report, you can choose to use a justified layout. This layout uses the full width of the page to display the records as compactly as possible. Of course, you can achieve the same results without using the Report Wizard, but it can be a painstaking process to align the fields exactly. The following illustration shows an employee report that was created by using the Report Wizard's justified layout.



Employees

ID	Company	Last Name	First Name
1	Northwind Traders	Freehafer	Nancy

E-mail Address	Job Title	Business Phone	Home Phone
nancy@northwindtraders.com	Sales Representative	(123)456-7890	(123)456-7890

Mobile Phone	Fax Number
	(123)456-7890

Address
123 Any Street

City	State/Province	ZIP/Postal Code	Country/Region
Any City	WA	99999	USA

ID	Company	Last Name	First Name
2	Northwind Traders	Cencini	Andrew

E-mail Address	Job Title	Business Phone	Home Phone
andrew@northwindtraders.com	Vice President, Sales	(123)456-7890	(123)456-7890

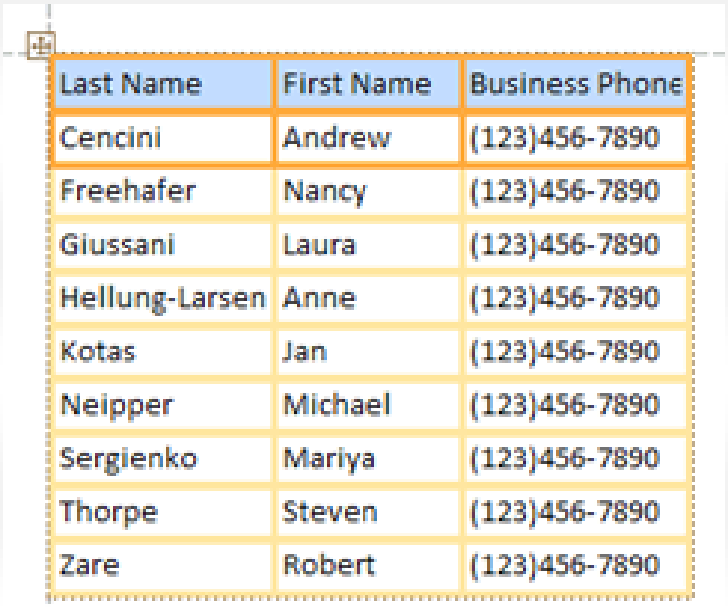
Mobile Phone	Fax Number
	(123)456-7890

Address
123 Any Street

The justified layout is a good layout to use if you are displaying a large number of fields on the report. In the preceding example, if you use a tabular layout to display the same data, the fields extend off the edge of the page. If you use a stacked layout, each record takes up much more vertical space, which wastes paper and makes the report more difficult to read.

Use control layouts to align your data

Control layouts are guides that you can add to a report while it is open in Layout view or Design view. MS Access adds control layouts automatically when you use the Report Wizard to build a report, or when you create a report by clicking **Report** in the **Reports** group of the **Create** tab. A control layout is like a table, each cell of which can contain a label, a text box, or any other type of control. The following illustration shows a tabular control layout on a report.



Last Name	First Name	Business Phone
Cencini	Andrew	(123)456-7890
Freehafer	Nancy	(123)456-7890
Giussani	Laura	(123)456-7890
Hellung-Larsen	Anne	(123)456-7890
Kotas	Jan	(123)456-7890
Neipper	Michael	(123)456-7890
Sergienko	Mariya	(123)456-7890
Thorpe	Steven	(123)456-7890
Zare	Robert	(123)456-7890

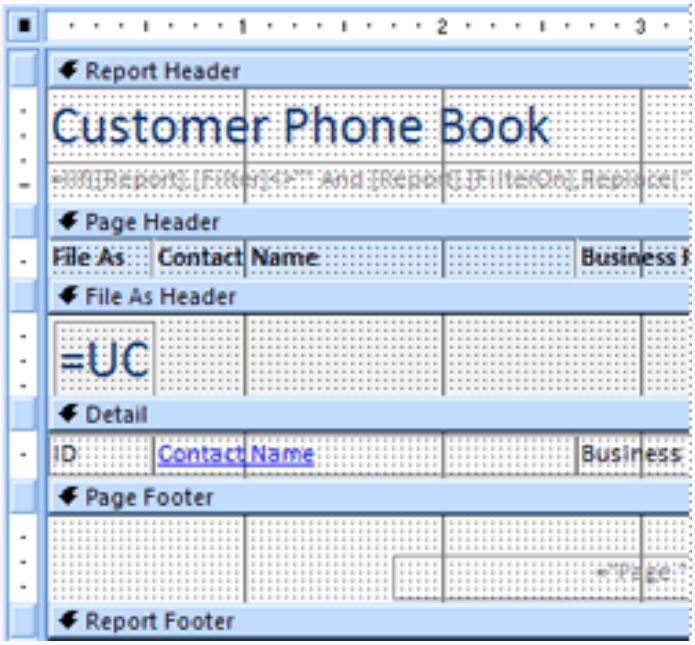
The orange lines indicate the rows and columns of the control layout, and they are visible only when the report is open in Layout view or Design view. Control layouts help you achieve a uniform alignment of data in rows and columns, and they make it easier to add, resize, or remove fields. By using the tools in the **Table** and **Position** groups on the **Arrange** tab (available in Layout view or Design view), you can change one type of control layout to another, and you can remove controls from layouts so that you can position the controls wherever you want on the report.

Add or remove report or page header and footer sections

As mentioned earlier in this article, headers and footers are report sections that you can use to display information that is common to the entire report, or to each page of a report. For example, you can add a Page Footer section to display a page number at the bottom of each page, or you can add a Report Header section to display a title for the entire report.

Add report or page header and footer sections

1. In the Navigation Pane, right-click the report that you want to change, and then click **Design View** on the shortcut menu.
2. Verify which sections are already on the report. The sections are separated by shaded horizontal bars called **section selectors**. The label on each section selector indicates what the section directly below it is.



Every report has a Detail section and can also contain Report Header, Page Header, Page Footer, and Report Footer sections. In addition, if there are grouping levels in the report, you might see group headers or footers (such as the **File As Header** shown in the preceding illustration). By default, group headers and footers are named by using the field name or expression that is the basis of the group. In this case, the name of the grouping field is "File As."

3. To add page header and footer sections or report header and footer sections to your report, right-click any section selector and then click **Page Header/Footer** or **Report Header/Footer** on the shortcut menu.

Caution: If the section is already present on the report, MS Access warns you that it will delete the existing section and the controls it contains.

You can now move existing controls or add new controls to the new sections.

MS Access always adds page and report header and footer sections in pairs. That is, you cannot add a page or report header section without also adding the corresponding footer section. If you do not need both sections, you cannot delete a section, but you can resize the unused section to a height of zero (0) to avoid adding extra vertical spacing to your report. Position the pointer at the bottom of the unused section until it turns into a double-headed arrow  , and then drag upward until the section is hidden. If there are any controls in the section, you must delete them before you can fully hide the section.

Remove report or page header and footer sections

1. In the Navigation Pane, right-click the report that you want to change, and then click **Design View** on the shortcut menu.
2. Right-click any section selector and then click **Page Header/Footer** or **Report Header/Footer** on the shortcut menu.

If you are removing a header and footer pair and those sections contain controls, MS Access warns you that deleting the sections will also delete the controls and that you will not be able to undo the action. Click **Yes** to remove the sections and delete the controls, or click **No** to cancel the operation.

Tips for formatting different data types

When you create a report by using the **Report** tool (available on the **Create** tab, in the **Reports** group), or by using the Report Wizard, MS Access adds the fields to the report for you and creates the most appropriate control to display each field, based on the field's data type. If you are adding fields to a report yourself, the preferred method is to drag each field from the **Field List** to the report. As with the Report Wizard or the **Report** tool, MS Access creates the most appropriate control for each field, depending on the field's data type. For most data types, the most appropriate (default) control to use is the text box.

The following sections provide tips about how to format some of the special case data types.

Multivalued fields The default control for a multivalued field is a combo box. This can seem like a strange choice for a control on a report, because you can't click the arrow on a combo box in a report. However, in the context of a report, a combo box behaves like a text box. The arrow is visible only in Design view.

If the field contains multiple values, those values are separated by commas. If the combo box is not wide enough to display all the values on one line and the **CanGrow** property of the combo box is set to **Yes**, the values wrap to the next line. Otherwise, the values are truncated. To set the **CanGrow** property for a control, open the report in Design view or Layout view, click the control, and then press F4 to display the control's property sheet. The **CanGrow** property is located on both the **Format** tab and the **All** tab of the property sheet for the control.

Rich text fields The default control for a rich text field is a text box. If the text box is not wide enough to display all the values on one line and the **CanGrow** property of the text box is set to **Yes**, the values wrap to the

next line. Otherwise, the values are truncated. To set the **CanGrow** property for a control, open the report in Design view or Layout view, click the control, and then press F4 to display the control's property sheet. The **CanGrow** property is located on both the **Format** tab and the **All** tab of the property sheet for the control.

A rich text field helps you to format text in a variety of ways. For example, several words in a field can be underlined, and several other words in the same field can be in italic. You can, however, still set an overall formatting style for the text box that contains the rich text. The text box formatting applies only to the text that has not been specifically formatted by using rich text formatting.

Set formatting styles for a text box that displays a rich text field

1. Right-click the report in the Navigation Pane, and then click **Layout View** on the shortcut menu.
2. Click the text box that displays the rich text field, and then, on the **Format** tab, in the **Font** group, click the formatting style that you want to apply.

   MS Access applies the formatting to all text in the rich text field that has not already had that type (but not value) of formatting applied in a view that supports data entry, such as Datasheet view for a table or query, or Form view for a form. For example, if a portion of the text in the field is formatted with a red font color, and you apply a blue font color to the text box, MS Access turns all of the text blue except for that which was individually formatted as red. As another example, if a portion of the text in the field is formatted with an 11-point font size, and you apply a 14-point font size to the text box, MS Access applies the 14-point font

size to all of the text except for that which was individually formatted at 11 points.

Checkpoint 12

Instructions: Find the true statement below. Then, rewrite the remaining false statements so they are true.

1. An Access database can have a maximum of one table
2. Datasheet View is used to precisely determine the characteristics of each field
3. You cannot modify the size of a field in Design View
4. Tables are composed of records

ACTIVITY

Explain a database that you usually use. How many fields that it has. What is the key for the table

SUMMARY

- Microsoft Access is a software to manage database
- It comprise of table, queries, report and form

KEY TERM

Table	**Report**
Field	**Primary Key**
Form	**Query**

REFERENCES

Microsft 365 Training, Support Microsoft, Oct 20th, 2021, https://support.microsoft.com/en-us/training


INTERNATIONAL COLLEGE
of YAYASAN MELAKA
ICYM