Summary

ملخص "تـقـن" CT Chapter 1

"هذا الملخص لا يغني عن الكتاب."

الله يوفق الجميع !

- NJ ♡   2021

IT-Skills

Introduction

Information & Communication Technology (ICT) plays a vital role and been embraced and incorporated into our daily lives.

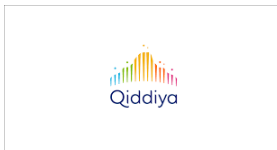### ICT for Cultural Development – The Saudi Vision 2030.

The aim of of Saudi Vision 2030 is to use ICT advancements of human computer interaction and automation with AI.

NEOM نيوم

To build modern and highly automated city.

To build a Hyperloop: a massive, high-speed pneumatic transit system that would travel between several cities in KSA&UAE.

Qiddiya

To build the world's largest entertainment city as a part of an economic diversification strategy.

The Red Sea UNFORGETTABLE

Tourism project. Each of such steps of development will help in ICT interventions in it.
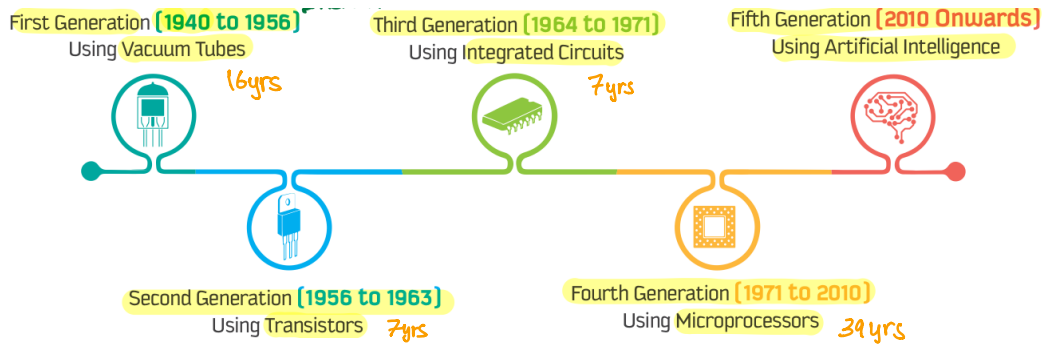
What is the Computer? Compute = Calculate

Computer means a device, which accepts the data from the input devices. It processes the input data to produce the required output and stores as required.

History of Computer

Started from basic calculator to the Babbage's engine
Significant technological development – leading to more compact, less expensive but more powerful, efficient and robust machines.

First Generation [1940 to 1956]
Using Vacuum Tubes
16yrs

Third Generation [1964 to 1971]
Using Integrated Circuits
7yrs

Fifth Generation [2010 Onwards]
Using Artificial Intelligence

Second Generation [1956 to 1963]
Using Transistors 7yrs

Fourth Generation [1971 to 2010]
Using Microprocessors 39yrs

Features of Computer

High speed of calculation, attentiveness, precision, consistency, and a huge capacity to store data, which has made it an integrated part of our life.

- ◉ High processor speed
- ◉ Huge storage
- ◉ Precision & Diligence
- ◉ Versatility & Reliability

How Computer Works?

The computer is integration of hardware and software.

Computer works with the support of hardware devices & software programs.

Hardware devices consist of input and output devices "physical components"

Software applications referred as the background process consist of programs coded with different programming languages to interact graphically with the computer machine.

> The working of a computer involves the processing of data received from input devices and providing the output using output devices.
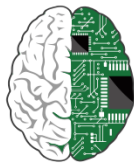
CPU is the "brain" of the computer.

INPUT ⟶ PROCESS ⟶ OUTPUT

DATA   CPU   SCREEN
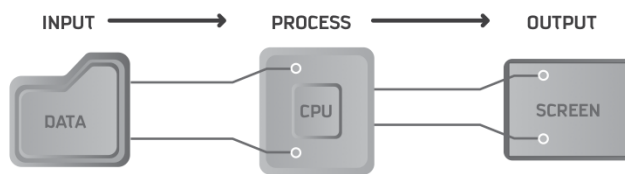
Applications of Computers

○ **Software Development :**

The development of various system software or applications designed with different programming languages for different types of application such as operating systems. like : Mac , Windows

○ **Visualization and Multimedia concepts :**

There are various visualization tools such as Photoshop for editing pictures and data representations, such as ppt. Using advanced tenchniques of Computers, data can be represented in the combination of various forms such as audio, text.-- Using augmented and virtual reality .

○ **Networking and Communication :**

Connection and interaction between two or more computers using different sources such as wireless and wired.

○ **Information Security :**

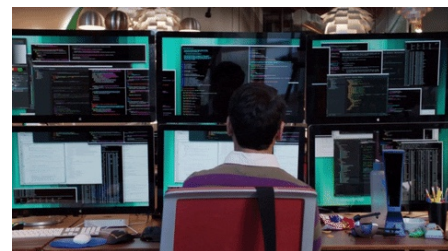The information stored in digital devices such as computers and smart devic

To   ticity various

information security measures should be taken.

Classification of Computers

○ Computers can be classified based on it's size and performance.

1 - Supercomputer.

- perform near the currently highest operational rate for computers.
- Very expensive, handle very large data bases, do great amount of computation.
- have been used for scientific and engineering application.

– **Shaheen II** system has a total of 197,568 processor cores and 790TB of aggregate memory.
– Shaheen II was the seventh fastest supercomputer in the world.

2 - Mainframe Computers.

- large size, amount of storage, processing power, and high level of reliability.
- primarily used by large organizations for special applications requiring high volumes of data processing.
- In someways, mainframes are more powerful than supercomputers because they support more simultaneous programs. However, supercomputer can excute a single program faster.

The main difference between a supercomputer and a mainframe is that a supercomputer channels all its power into executing a few programs as fast as possible, whereas a mainframe uses its power to execute many programs concurrently.

3 - Mini Computers.

- processesses most of the features and capabilities of a large computer but is smaller.
- mainly used as small or mid-range servers operating business and scientific app.
- merged with servers which are capable of supporting from 4-200 users simultaneously.

4 - Micro Computers.

Desktop Computer: A personal computer, sufficient to fit on a desk and is designed for regular use at a single location due to its size and power requirements.

Laptop Computer: A portable computer with an integrated screen and keyboard. It is generally smaller in size than a desktop computer and larger than a notebook computer.

Palmtop Computer/Digital Diary/Notebook/PDAs: A hand sized computer that have no keyboard but the screen serves both as an input and output device.

Computer Peripherals Devices

Computer requires hardware devices which supports the entire process of computing. Computer hardware comprises of some electromechanical components.

These required components are classified into three parts:

1) Input / Output Devices

The end user interacts with input and output devices. The computer recognises it's input, it accepts the data or information. Further processed by the system unit and provides the required info. using output devices.

○ Input devices: Keyboard, mouse, scanner.

○ Output devices: monitor screen, printer, speaker.

2) System Unit

Known as motherboard which consists integrated circuits.

Motherboard consists of the main component (CPU), which controls the instructions from input/output devices and process it accordingly. CPU has registries for the temporary storage of the instructions. CPU : brain of computer.

It consists of the Arithmetic Logic Unit (ALU) and Control Unit (CU).

- ALU executes all the arithmetic and logical operations such as basic additions, subtractions and comparisons (+, -, *, /, <, >, =).

- CU is like an execution unit which controls the rest of the computer instructions and coordinates with other devices in the queues.

Does everything except ALU
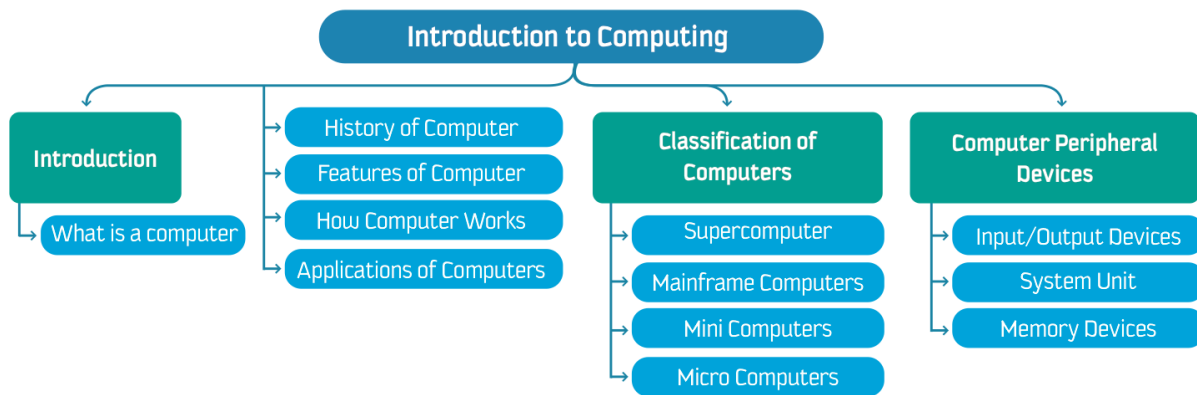
3) Memor Devices

Memory devices are used to store data and programs on a temporary or permanent basis. Memory is categorized as primary and secondary storage. The primary memory is the storage space in computer where data and instructions to be processed by CPU are stored. Primary memory is also known as main memory and consists of RAM and ROM. Secondary storage is used to store data and information permanently. These include the storage devices like HDD, DVD, Flash Drives, Memory Cards etc.

List of Acronyms

Computer	Electronic device
Hardware	Physical Equipment's
ICT	Information & Communication Technology
Applications	Different types Software Programs

Introduction to Computing

Introduction
- What is a computer

- History of Computer
- Features of Computer
- How Computer Works
- Applications of Computers

Classification of Computers
- Supercomputer
- Mainframe Computers
- Mini Computers
- Micro Computers

Computer Peripheral Devices
- Input/Output Devices
- System Unit
- Memory Devices

Chapter 1 Session 1

ICT : Information communication technology

Know the aim of Saudi vision   4:00

Understant the projects : Neom, hyperloop ---

Don't have to know how things work in generation (History)

Memorize dates In the history of Computer

hardware : physical components has input & output.

Software : background process.

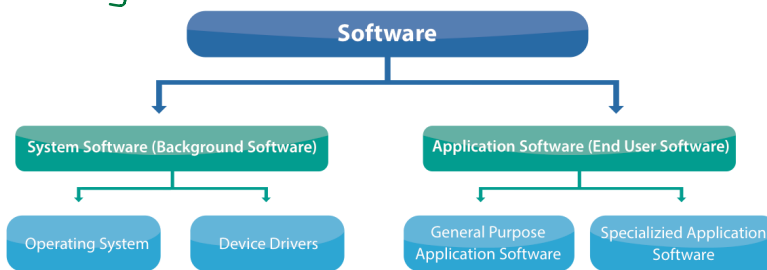takes data recived from input and process it in CPU "central process unit"

Introduction :

The necessity of software is to convert the data into user understandable information, so that the end user can interact easily with the computer.

Software :

- Set of programs ⇒ set of instructions ⇒ Commands given by human to run prog.
- BIOS is controlled by the software.

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                        ┌─────────────────────┐
                        │      Software        │
                        └─────────────────────┘
            ┌─────────────────────────────┴──────────────────────────────┐
  ┌──────────────────────────────────┐        ┌──────────────────────────────────┐
  │ System Software (Background       │        │ Application Software (End User    │
  │ Software)                         │        │ Software)                         │
  └──────────────────────────────────┘        └──────────────────────────────────┘
      ┌──────────────┴──────────────┐              ┌──────────────┴──────────────┐
 ┌──────────────┐  ┌──────────────┐      ┌──────────────────┐  ┌──────────────────┐
 │  Operating   │  │    Device    │      │  General Purpose │  │ Specialized      │
 │   System     │  │   Drivers    │      │ Application      │  │ Application      │
 └──────────────┘  └──────────────┘      │ Software         │  │ Software         │
                                          └──────────────────┘  └──────────────────┘
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System Software :

① Controls and manages the hardware devices & other end user applications

② Manages to perform all the utility functions.

- Works in the background and requires little or no user interface.

Ex. - Device Driver software : controls the operation of a particular device.

   · Operating system.

Operating System :

- most common system software, and the backbone of a computer system.
- Controls and manages the entire operations of a computer.

Device Driver

- Controls the operation of a particular device.

Ex. Printer Driver software

Types of Operating Systems:

Classified as User based, Interface based, and processing method.

○ User - Based Operating Systems

1 - Single-User Operating systems:

- Designed to manage the computer so that one user can effectively do one task at a time.

> **Example**
> MS-DOS (Single User Single Task)

- You will find a single user multitasking system on a personal computer. Designed to deal with many applications running at the same time by single user.

> **Example**
> WIN95, IOS and Android.

2 - Multi - User Operating Systems:

Allows multiple users to work at the same time on a Computer.

> **Example**
> Linux, UNIX, macOS and Windows Server

○ User Interface Operating Systems

1 - Command Line Interface:

- Also called as character based OS.

- CLI OS are command based that require typing of commands to perform a task.

> Modern computers support CLI, batch processing and GUI in one interface.

> **Example**
> MS-DOS (Disk Operating Systems)

2 - Graphical User Interface:

- Provides the easy user interface with pointing devices or touch screens to select the icons from the screen. GUI makes it easier to work on computer.

> **Example**
> Windows, MAC, Linux

○ Based on Processing Method

1 - Real-Time Systems:

- Used for direct control over electromechanical equipment such as industrial robots.

- They monitor external events and react instantaneously.

> **Example**
> LynxOS

2 - Batch Systems:

> **Example**
> Banks process millions of cheques each month. These are processed together in a long run, usually overnight.

Used for running batch operations such as calculating. They often run single task

Functions of Operating Systems:

Many fxn. are performed by the OS, but the main goal is to provide the interface between the user and the hardware.

○ **Storage Management**

- Controls all the storage operations like how data or files will be stored.
- All the operations which are responsible for storing & accessing the files are determined by OS.

○ **Process Management**

- OS manages all the running processes of the system.

○ **Resource Managment**

- OS is managing and facilitating the operations of the resources connected to computer.

Such as memory devices, printer, scanner, etc.

○ **Providing User Interface**

- OS provides a user interface (UI) for the novice user to interact with machine.
- The way to interact with computers is termed as the User Interface.

○ **Run Applications**

- OS loads and runs applications, such as Microsoft Edge or MS Word. Most OS supports multitasking which allows to run multiple apps simultaneously & switch.

Present Days Operating Systems

Apple Macintosh (macOS)

Apple Macintosh, commonly known as macOS, is actually the first OS to provide the GUI. It is designed to run with Apple computers. It is not as widely used as the Windows OS; thus fewer applications have been developed to run on macOS. It is a powerful, easy-to-use operating system and it is popular with professional graphic designers, desktop publishers, and many domestic users.

Microsoft Windows

Microsoft's Windows is by far the most popular operating system for PCs. Most of the desktop applications are developed to run under windows as compared to any other OS. Windows comes in different versions and was initially designed to run with Intel or Intel-compatible processors. Windows 10 is the latest release from Microsoft, which has a modern user interface and supports tablet computing as well.

Linux

Another famous name in the operating systems category is Linux. The specialty of Linux is that it is an Open Source OS, which means it is freely distributable. It can be customized and used with different types of computers, tablets or smartphones. We will learn about it in details at the end of this session.

Android

Android is one of the Linux based operating systems developed by Google and the Open Handset Alliance (OHA), a coalition of more than 30 hardware, software and telecom companies. It is designed primarily for mobile and touchscreen devices such as Smartphones and Tablets. Android's User Interface is mainly based on touch gestures that correspond to real-world actions, such as swiping, tapping and pinching along with a virtual keyboard for text input.

Android is now the most popular mobile OS providing lots of exciting features. Its open nature has encouraged a large community of developers to develop Android based applications (or apps). Thus, Google Play Store has over billions of android apps.

Overview of Different Operating Systems

Windows 10

Windows 10 is the latest version of Microsoft Windows operating system. It is a major shift from the previous versions of Windows. It has been essentially modernized to support the touch devices and pen input. Lots of enhancements and new features have been added to it. The following parts will take you through the Windows 10 Operating System.

New Features of Windows 10

Once you Sign in to Windows 10, you are in the all-new Windows 10 environment. You should first go through the new features Microsoft has come up with. Some of the interesting and exciting new features of Windows 10 are as follows:

New Start Menu

Microsoft has changed the start menu based on the experiences and feedback from the users. It is now more comprehensive, efficient and modern. It has a tile-based start screen along with the classic features of a start menu. The tiles on the start menu can display live contents making it an intuitive start. You can customize it right on its place, such as resizing tiles or start menu itself and pin or unpin applications etc.

> *Keyboard shortcut to open start menu is "Ctrl+Esc" or simply press "Windows key" on keyboard.*

Windows Ink

As the world is moving towards the mobile and touch based computing, Windows 10 has introduced the Windows Ink feature. It allows you to use pen input in different apps or annotate on snapshot of your current screen. If you have a touch screen device, the Windows Ink icon appears in the Notification Area of the Taskbar by default. Otherwise, to activate it, you need to Right-Click on the Taskbar and choose "Show Windows Ink workspace button." When you click on Windows Ink icon, a sidebar of the Windows Ink workspace appears, which usually has the following options:

Sticky Notes: Allows you to create brief sticky notes by using pen tools such as adding a schedule reminder. Windows uses character recognition (or handwriting recognition) to read your sticky notes.

Sketchpad: Enables you to create freehand drawings with pen tools and save it as an image file.

Screen Sketch: Allows you to draw or annotate on a snapshot of the current screen.

Get More Pen Apps: You can click on "Get more pen apps" link to open the windows store and download desired pen apps.
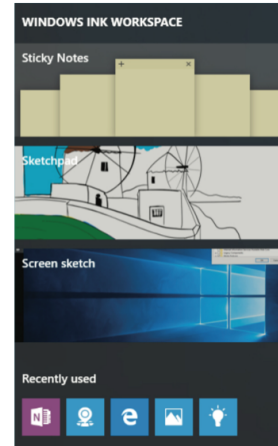
Virtual Desktops

Virtual Desktop is the very useful feature Microsoft has provided with Windows 10. This gives you the experience of working with multiple screens; although having just one. So while you work on multiple apps, you can better organize them with multiple Virtual Desktops. You can group your personal apps together in one desktop and work apps in another. You can Add New Desktops as you want and switch between them easily. The Task View button on the taskbar helps you manage it.
You can easily move running apps from one desktop to another with just the Right Click of the mouse. Interestingly, if you close a Virtual Desktop, the apps that were running on it won't be closed, rather they will be shifted to previously available desktop.
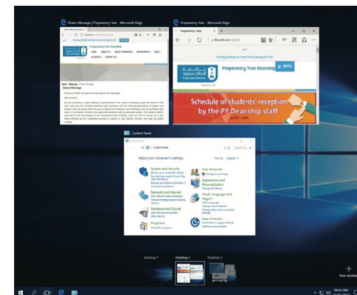
Cortana or Search

Cortana is another enhancement in Windows 10. Cortana is a voice-activated personal digital assistant, which provides relevant suggestions and alerts. The more you use Cortana, the more personalized your experience will be. For example, you can use Cortana to find files/apps on computers, search the internet, send emails, help out with navigation, setting reminders, and more. Cortana is available only in certain countries or regions. It is accessible from the search box at the taskbar right next to the start button. You can command Cortana by either typing in the search box or by clicking on the mic button to talk to her.
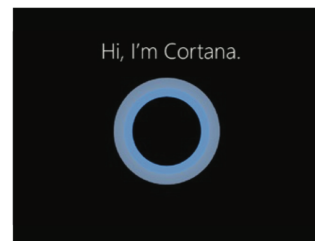
You can also say "Hey, Cortana" to activate via Mic through audio input. When Cortana is not available, it is replaced with the Windows Search, helping you to search for apps, files, folders, and settings on your computer.

MacOS is the graphical operating system powered by Apple MAC. Compared to other OS, it is simple to work using high-end graphics. It is specially designed to run on Mac(Apple) devices. MacOS provides a complete suite of smart apps on its app store. It also offers cloud storage "iCloud" to store your personal information and to synchronize with all other devices. It works with your iPhone also. It is designed to provide data security and protection with enabled security measures.

The latest version of Apple's operating system is called macOS High Sierra. Upgraded with different software enhancements, it also lays the foundation for future innovations in the world of VR (Virtual Reality) and AR (Augmented Reality).

Features of MacOS High Sierra

• Apple File System.

• Virtual reality for Mac.

• Siri

• iCloud Drive and Optimized Storage
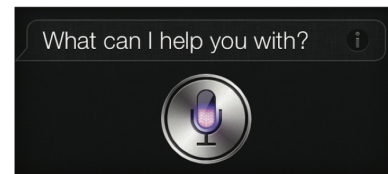
Introduction of Open Source Software

Open source software is a free to use software for your individual use. A developer of such software freely share knowledge and makes the source code available to the public. Generally, such software is distributed with a license which allows other developers to modify it and/or add to it. Some examples of open source software are Linux, Android, Ubuntu, Firefox etc.

Generally, the major difference between open source software and commercially available programs is the huge amount of money which you pay as a license fee. Some developers make free products for all users while other developers create commercially available products. Some developers come with a different idea and create a free and paid version of their products.

In 1983, Richard Stallman started the project on developing a free operating system called the GNU (Linux) project. The concept was developed with the new idea of open source code to the users without any copyrights. The operating system and most of its software is created by volunteers and employees of companies, governments, and organizations from all over the world. It emphases on the right to use the software code and motivates the users to develop with new enhanced features. Generally, it is distributed under General Public Licenses. (GPL) which to give the freedom to the users to change and prevent software being changed into proprietary software.

The developer has the freedom to contribute to the operating system and it is free to use. This co-operative development model is meant for the benefits of everyone. That is why it is better known as Socially Responsible Software. Tech world abbreviated it as FOSS - Free and Open Source Software.

Linux has many other benefits, including speed, security, and stability. It comes from the well-established UNIX family of OS and so has been built to keep security in mind. Hence, viruses, worms, spyware, and adware are basically a non-issue on Linux.

Application Software

The Application software is a group of programs that facilitate the end-user with different features of the computer to perform certain tasks. Application softwares are designed specifically in the view of the end-user's requirements. You will learn practical skills of this type of software in the coming sessions.

Examples | MS Office, Microsoft Edge, Safari, etc.

Applications Software can be categorized into two types.

General Purpose Application Software

Applications that are used commonly by computer users are called general purpose applications,such as word processors, spreadsheets, databases, desktop publishing packages, graphics packages etc

Specific Purpose Application Software

Applications which are designed for specific task or organization according to the defined requirements of the user is called as Specific Purpose Application Software. Examples include Air Traffic Control System, Learning Management System for Universities etc.

By now, you have got a basic understanding of an OS and basic information about the different OS available in the market.

Software	Set of programs
Open Source Software	It is a freeware software can be used without licenses
OS	Operating System
GUI	Graphical User Interface
CLI	Command Line Interface

Computer Applications

- **Introduction**
  - Software

- **Classification of Software**
  - System Software
  - Application Software

- **Introductions to Open Source Software**
  - Introduction to Linux
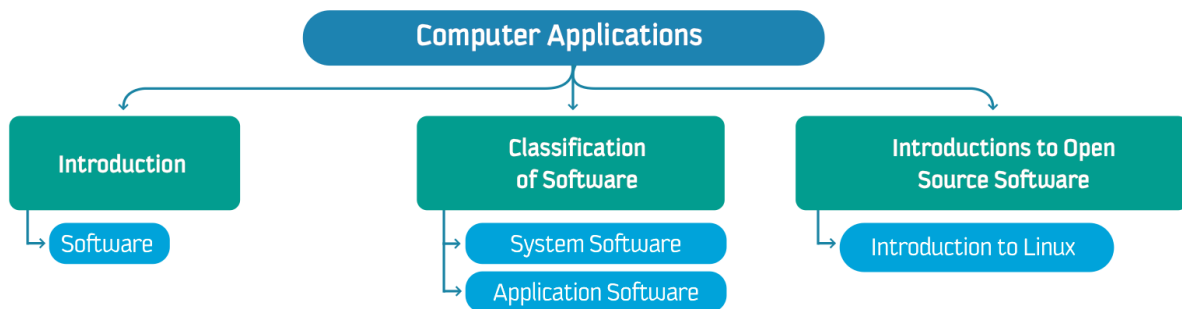
Introduction

Microsoft office is the best example which is the collection of multiple prog.

Overview of Text Processing

- The application used for text processing is commonly known as a Word Processor.
- Word Processor enables you to create a document, store it electronically on a disk, display it on screen, modify it...etc
- The major advantage of text processing is that you can make changes without retyping the entire document.

A text processor provides variant common useful features, such as:

Font and Formatting Options.

Referencing and Citations.

Spelling checker.

Design and Layout.

Smart tools such as 'Tell me box', Lookup, etc.

Popular Text Processors

Apple Pages

'Pages' is a text processor and a part of a productivity suite called iWork along with both Keynote and Numbers, and is recognized for its user-friendly, intuitive interface. It is a product of Apple which supports and runs in the Apple products such as Mac Book and iPhone, with macOS and iOS operating systems. Pages have distinct features to create and collaborate the documents. Its powerful word processor helps you create documents by touch devices to illustrate with hands and allows you to collaborate your documents with any devices and anywhere to work with your group in the real-time. It is compatible with mobile devices such as iPhone.

Microsoft Word 2016

Microsoft Word is the text processor, which is one of the programs of MS Office 2016 suite. It is developed by Microsoft Corporation. MS word supports the different operating systems such as Windows and macOS. It can be installed and run in the microcomputers such as smartphones, tablets. MS Word let's you create attractive documents with a different type of templates such as Letters, Flyers, Brochures, Manuals, CVs and more. It also allows you to collaborate your work with anyone. Word 2016 has various features such as inserting online pictures which can be helpful to create the documents.

Overview of MS Word 2016

User Interface of Word 2016
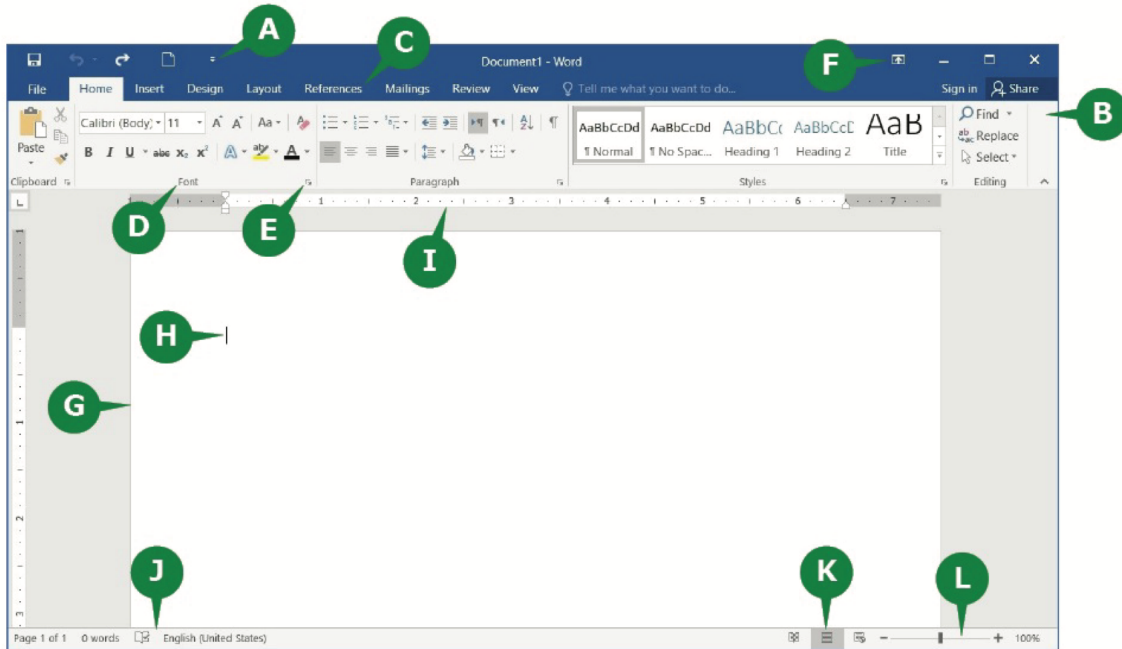
|		
A	**Quick Access Toolbar**	It provides the easy access to the commands which you use frequently. By default, it has the Save, Undo & Repeat commands. You can add or remove commands to Quick Access Toolbar by simply clicking on the Customize arrow button on its right.
B	**Ribbon**	Almost all the commands in Word 2016 are compiled together in the form of a Ribbon, in order to help you work efficiently.
C	**Tabs**	At the top of the Ribbon is a set of tabs. Clicking a tab displays an associated set of commands.
D	**Groups**	Related commands of a Ribbon Tab are organized in Groups.
E	**Dialog Box Launcher**	Clicking the Dialog box launcher displays the associated dialog box or pane.
F	**Ribbon Display Options**	It allows you to Show or hide the Ribbon. Click on it to choose from the menu options Auto-hide ribbon, Show Tabs, or Show Tabs and Commands.
G	**Work Area**	The white area in the middle of the Word 2016 user interface is the Work Area or Workspace. This represents the actual page where you type text, edit or format a document.
H	**The Insertion Point (Cursor)**	The Insertion Point or Cursor is the blinking vertical line in the Work Area. It indicates the current active place in the document where you can insert text, images, apply editing or formatting commands.
I	**Rulers**	It helps you to view and adjust the position of the contents of the document.
J	**The Status Bar**	It displays the information about the current document such as the total number of pages, the current page number, total number of words in the document, current proofing language and proofing status.
K	**View Buttons**	Three view buttons Read Mode, Print Layout, and Web layout on the right side of the Status bar allows you to easily switch between the document views.
L	**Zoom Slider and Buttons**	These allow you to easily adjust the zoom level of the document contents as per your convenience.

Tool tip
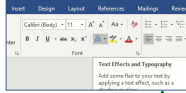
- GUI used in conjunction with the cursor/mouse pointer to display info about an item without needing to click on it. Known as a hint/info tip/screen tip

New Features of Word 2016

Tell Me Box

In Word 2016 user interface screen, you might have noticed a text box on the right of the ribbon tabs with a bulb sign that says "Tell me what you want to do…" It allows you to do the things quickly and efficiently, keeping you free from remembering and locating the commands in various tabs & ribbons. All you have to do is to simply enter a word or a phrase in the Tell Me box about the command you want. It provides you a list of the related options to get help with a particular command.
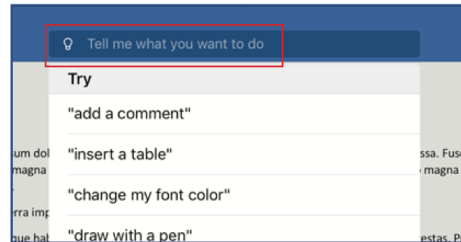
Smart Lookup

Another interesting feature of Word 2016 is 'Smart Lookup'. It allows you to get the definitions, Wikipedia articles, and other top related searches from the web about any word or phrase in your document. Thus, bringing the research directly into Word 2016.

The File Tab

The first tab in Word 2016 is the File Tab. When you click the File tab, the document window becomes invisible and a menu is displayed on the left with the options such as Save, Close, and Print a document. It also displays the information about the current document on the right side. The view of File tab is also called the Backstage View. Following are the options to manage the documents under File Tab.

- Create a new document.
- Saving a document.
- Using save as option.
- Closing a document.
- Opening an existing document.
- Pinning a recent document.
- Printing a document.

Keyboard Shortcuts	
CTRL + N	Create a New Blank Document
CTRL + S	Save a Document
CTRL + O	Open a Document
CTRL + W	Close a Document
F12	Save As a Document
CTRL + P	Print a Document

- By default, a document in Word 2016 is saved with the file extension .docx.
- The Save As option is the way to save the document to a different file format.

One Drive

When you save a document in OneDrive, your document is stored in a central location that you can access from anywhere. Even if you're away from your PC, you can work on your document whenever you have a connection to the Web.

Overview of Formatting Options

Home Tab

The next tab after the File tab in Word 2016 is the Home Tab. Home tab is generally used to format the documents. You can use effects like Bold, Italic, Underline, Size of Text, Alignment of Text, Quick Styles and Formatting of the whole paragraph, etc. You can also use it to find and replace words or phrases in the document.
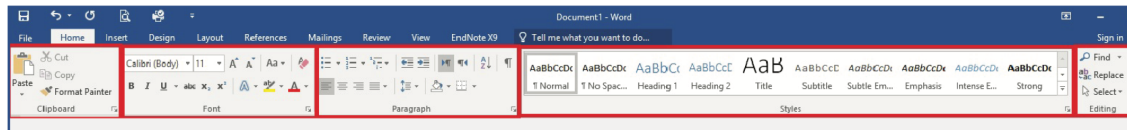

The Home Tab commands are divided into five groups.

Clipboard	This group contains the main editing commands such as Cut, Copy and Paste.
Font	This group commands enable you to modify and enhance the appearance of your text.
Paragraph	This group commands enable you to format complete paragraphs.
Styles	This group commands enable you to apply pre-defined formatting styles.
Editing	This group commands help you to find and replace text as well as select text or objects.

Overview of Illustrations and Design of Documents

Insert Tab

The Insert Tab has a lot of useful features that enable you to insert different items in your document. You can insert a cover page, table, pictures, shapes, chart, hyperlink, header footer, equation, symbols, etc. in your document. The commands in the Insert Tab are divided into several groups.
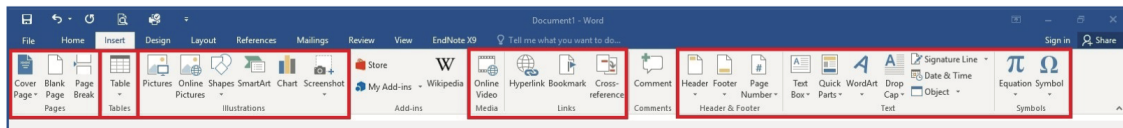
| Pages | Tables | Illustrations | Add-ins | Media |
| Links | Comments | Header & Footer | Text | Symbols |

Design Tab

The next tab after the Insert tab is the Design tab. This tab consists of commands that enable you to quickly apply different formatting styles to your document. It also helps you to add page background where you can apply a watermark, give a color to the page and insert page borders as well.
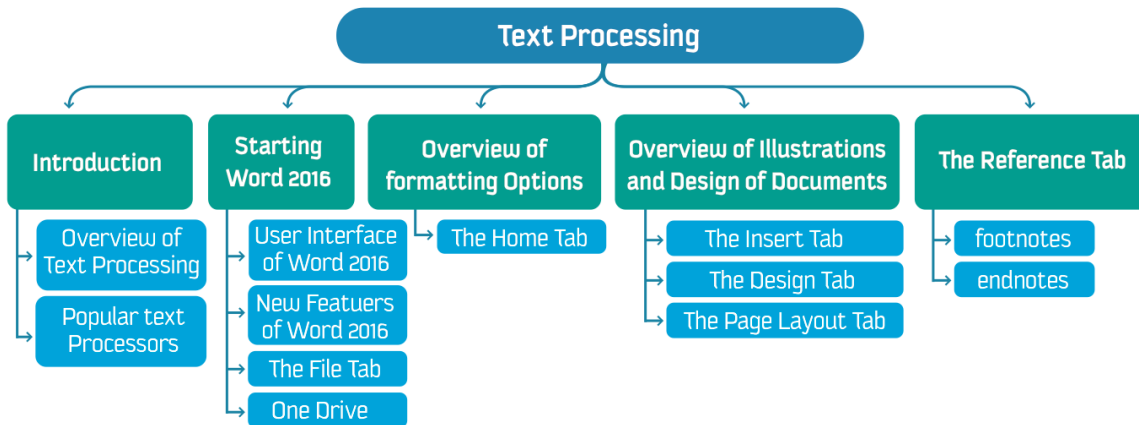
The Layout tab allows you to customize the way your document's page is set up. It helps you to change the document orientation, page size, margins, indentation, line spacing, and paragraph settings. It is better to adjust the Page settings before you start creating a document.
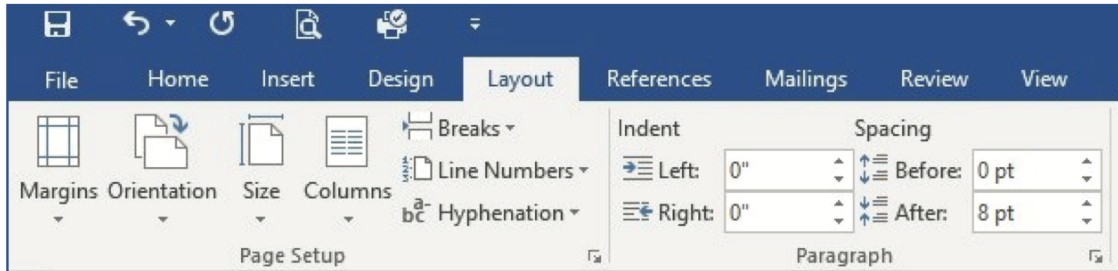
The following options are available in the Page Setup group of Layout Tab.

Margins	Orientation	Size
Columns	Line Numbers	Hyphenation
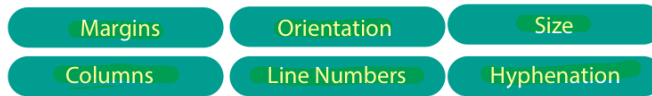
Text Processing	Productive tool to create text document
Reference	Used for referencing

Text Processing

- **Introduction**
  - Overview of Text Processing
  - Popular text Processors
- **Starting Word 2016**
  - User Interface of Word 2016
  - New Featuers of Word 2016
  - The File Tab
  - One Drive
- **Overview of formatting Options**
  - The Home Tab
- **Overview of Illustrations and Design of Documents**
  - The Insert Tab
  - The Design Tab
  - The Page Layout Tab
- **The Reference Tab**
  - footnotes
  - endnotes

Overview of Refrencing

Reference Tab

The References Tab commands help researchers & professionals in creating references in the document. In this section, you will learn about footnotes and endnotes.
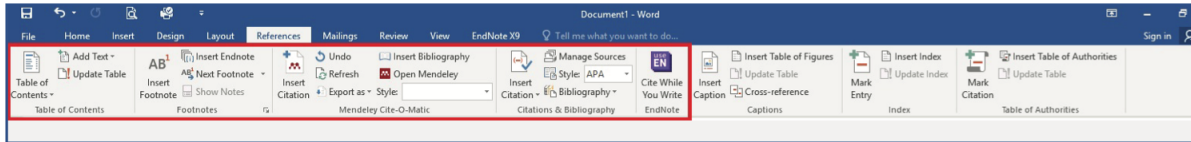
Footnotes and Endnotes

Footnotes and endnotes are used to explain, comment on, or provide references to text in a document. Footnotes are referenced items that are used to cite a source or provide additional information about a quote or some such item within a document. Footnotes appear at the foot (or bottom) of the page.

Endnotes are very similar to footnotes and serve the same general purpose. The difference is that endnotes do not appear at the bottom of each page, but at the end of a section, a chapter of a book or at the end of the book itself. A number or symbol on the footnote or endnote matches up with a reference mark in the document.

Insert footnotes and endnotes

Word allows you to create both footnotes and endnotes. You have complete control over placement and appearance of both of these note types in your document.

1 - Put your cursor where you want to insert your new footnote or endnote and click on the Reference Tab.

2 - On the References Ribbon, in the Footnotes Group, click either the Insert Footnote or Insert Endnote icon.

3 - You can enter the reference text manually or you can copy and paste the reference text. You can also search and cite the online reference, copy the reference and paste it in the MS Word document.
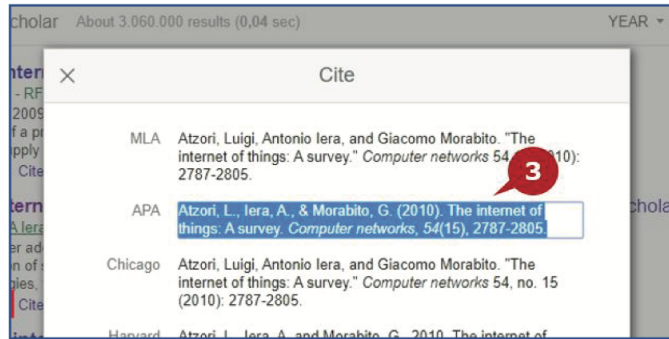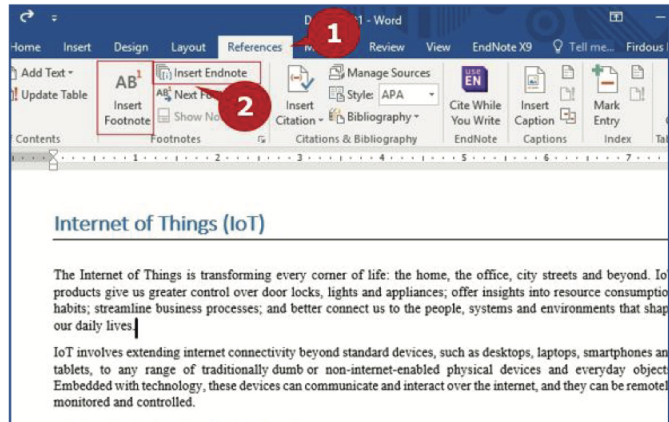
Introduction

A spreadsheet is an interactive computer application for organization, analysis, and storage of data in tabular form.

Various Spreadsheet Programs

Apple iWork – Numbers

The "Numbers" is a kind of spreadsheet applications product of Apple. One of the programs of iWork software package is Pages. Numbers have similar features to Microsoft Excel. It is available for Apple products which work through iOS such as iPhones and iPads. Numbers also supports touch pen input.

It has various features listed below.

Supports Touch devices with Apple Pencil.

It can be shared with any device.

It can collaborate with any user.

Friendly with Microsoft Excel.

Microsoft Excel

MS Excel is the product of Microsoft. It is the productive tool from Microsoft Office suite family, with a member like MS Word. Microsoft Excel is the spreadsheet program that comprises of worksheets used to analyze data and provides an easy way for all types of computations. It can be used with all types of microcomputer devices like Laptops, Desktop, Smartphones etc. It can be used on various platforms like Android, iOS etc. It supports Windows and Mac OS.

Overview of MS Excel 2016

- Works with both textual and numerical data.

- Common scenarios is for creating Schedules, Inventory, Report, Budgetting, Account.

Features of Excel 2016

- ▶ Quick Access tool
- ▶ Functions
- ▶ Forecasting
- ▶ Date Grouping
- ▶ Histograms and Pareto charts
- ▶ Automatic Preview Options
- ▶ Tell me Box
- ▶ Sunburst charts
- ▶ 3D Data Map
- ▶ Effective automatic calculations

Starting Excel 2016

To start the excel 2016 in Windows 10, follow the steps given below:

**1 -** Click on the start button to open the start menu.
2 - Locate and click on the Excel 2016 from All Apps list.
The Start Screen of Excel 2016 appears with a list of recently used files and available templates. You can either open an existing file, choose a template, or start with a new blank workbook. You can also press the ESC key to start with a new blank workbook.

The User interface of Excel 2016

Excel 2016 is a very interactive program which is very easy for the novice user. It is organized in many tabs consisting of groups and functions. Same is mentioned below in the screenshot.
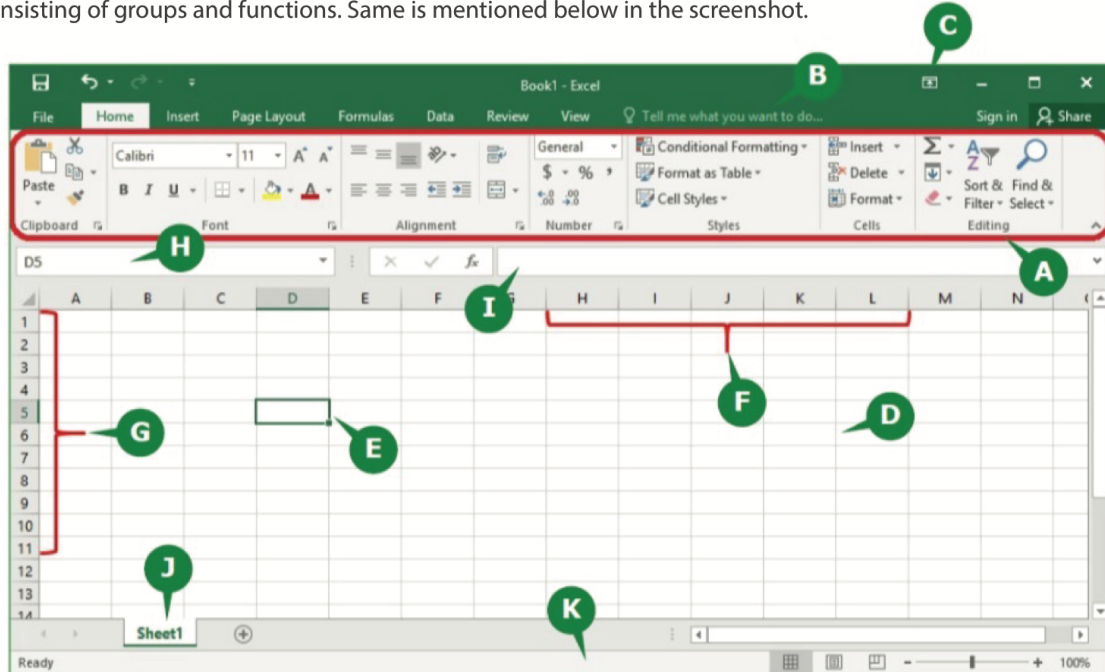
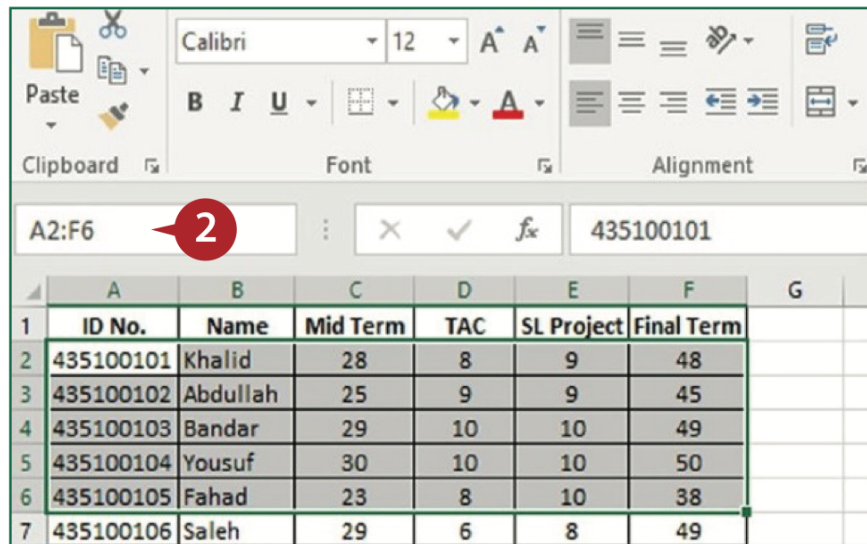|		
A	**Ribbon**	Ribbon includes a set of commands located below different tabs. Every tab is split into groups, having logically related commands.
B	**Tell Me Box**	This field, positioned to the right of the ribbon tabs, lets fast access to Excel commands and functions you need to use.
C	**Ribbon Display Options**	You can show or hide a ribbon to maximize or minimize your workspace. You could select from the options: Auto-hide the ribbon, show Tabs simplest or show Tabs and instructions.
D	**Worksheet**	A Worksheet is a workspace, which is organized into rows and columns. Used to keep and manage information in the form of a table.
E	**Cell and Active cell**	The intersection of a row and a column in a worksheet is called a cell. An active cell is the one which is selected in the sheet with a green outline.
F	**Columns**	Columns are the vertical separations in the sheet. The Column has sequential letters at the top as A, B, C etc.
G	**Rows**	Rows are the horizontal separations in the sheet. This rows named in the left side of the worksheets as 1, 2, 3, etc.
H	**Name Box**	Name box is just beside the formula bar which recognizes the selected cells and any other objects on the worksheets. Every cell has its own address recognizes by the column and the row number (Example A1, B16, Z28 – where alphabet represents the Column and number represents the Rows).
I	**Formula Bar**	Formula bar is mainly used to enter a formula to calculate cell data.
J	**Sheet Tab**	At the bottom of the worksheet where the name of the sheets is displayed. Sheet tabs help manage different worksheets.
K	**Status Bar**	At the bottom of the worksheet, status bar show count, sum, and an average of selected cells of data. It contains view buttons, zoom slider, and a zoom button.

Creating A Workbook

- A workbook is simply an excel file that contains one or more worksheets.

> **Note**
>
> Excel workbook is saved with the extension ".xlsx".
> Excel template is saved with the extension ".xltx".

Entering the data

The text, numbers, dates, and formulas can be entered in the worksheet cells. Select the cell and type the data you want to enter. Use "Enter key and Tab Key" to navigate between the cells.

Tips to Navigation a Worksheet

Key	Description
◄ ▲ ► ▼	used to move one cell left, right, up or down directions.
TAB Key	used to move the active cell one column to the right in the worksheet.
CTRL + Home	used to move the active cell to cell A1 in the worksheet.
CTRL + End	to move the active cell to the last cell in the worksheet that contains data
CTRL + ▼	used to move the active cell to the last row in excel sheet that contains data.
CTRL + ►	used to move the active cell to the last column in excel sheet that contains data.
CTRL	is used to select non-sequential cells.
shift	is used to select cells sequentially.

Selecting the cells

In a worksheet, you may frequently need to select multiple cells to edit data, apply some formatting options, perform mathematical operations, etc.

To select sequential and non-sequential cells; Name Box or Mouse can be used.

1 Click on a cell and drag the mouse over a group of cells you want to select.

    A Excel highlights the selected cells in grey color.

    B Use the Select All Button if you want to select all the cells in the worksheet.
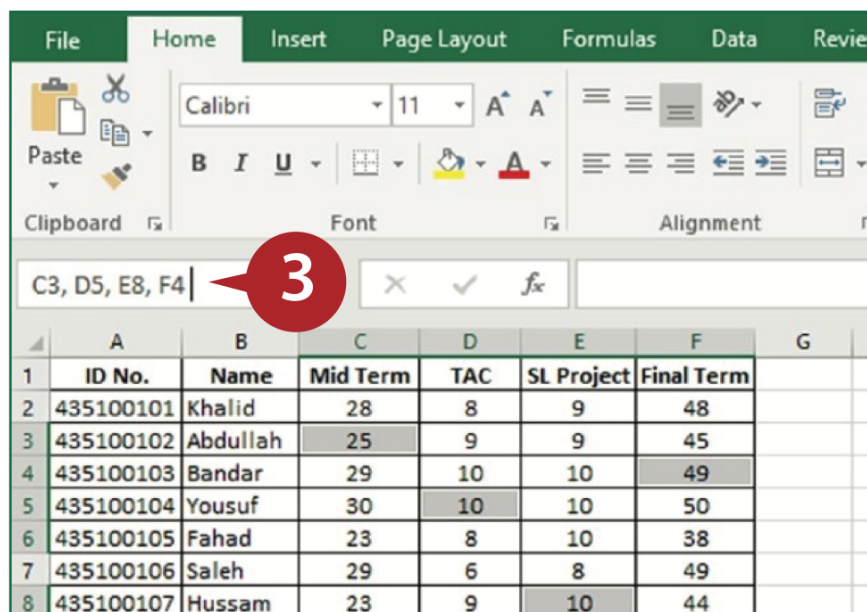
2 Enter the cell addresses of the first and last cells separated by a colon (:) in the Name Box and press Enter key e.g. A2:F6.

3 To select non-sequential cells using name box, Enter the cell addresses separated by commas in the Name Box and press Enter key e.g. C3, D5, E8, F4.

Managing Worksheets

Change Tab Color

A tab color applied to worksheet tabs, help you to identify different worksheets in a workbook.

To apply a tab color, follow the steps given below:

1 Right click on the sheet tab and point to Tab Color option from a popup menu.

2 Choose a color from the displayed color palette
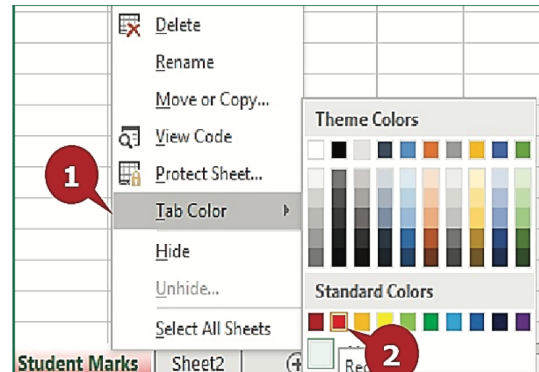
Inserting a Worksheet

In Excel 2016, a workbook contains only one worksheet by default. You can insert more worksheets to your workbook as shown in below screenshot.

To insert an additional worksheet, follow the steps given below:

1 Right click on the sheet tab.

2 Click Insert option from the popup menu.

3 Click on the Worksheet option.

4 Click on OK button to insert worksheet

Press Shift+F11 to insert a new Worksheet.

↳ Another method ↱
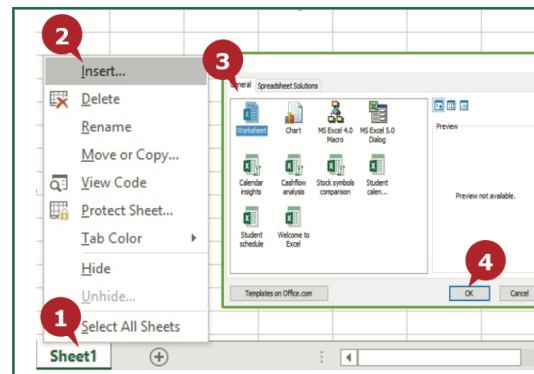
Deleting a Worksheet

You can delete a worksheet that you no longer need in your workbook. A worksheet can only be deleted if the workbook contains more than one worksheet.

To delete a worksheet, follow the steps given below:

1 Right click on the sheet tab you want to delete.

2 Click Delete option from the popup menu.

3 Excel prompts you with a box to confirm the deletion if the excel sheet contains data.

**4** Click on Delete button to delete the worksheet.
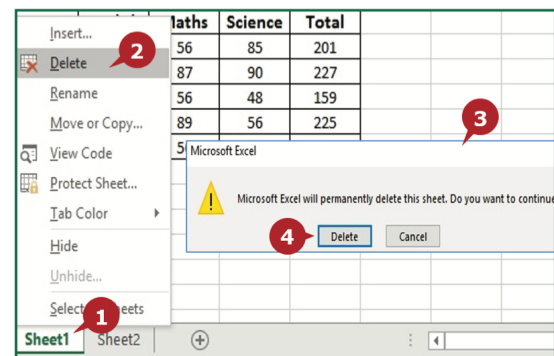
Renaming a Worksheet

Excel 2016 assigns a default name to each worksheet in a workbook like Sheet1, Sheet2. You can give specific names to worksheets to help you identify their content

To rename a worksheet, follow the steps given below:

1 Right click on the sheet tab you want to rename.

2 Click Rename option from the popup menu and type a new name for the worksheet.

Double click on the worksheet tab to rename it.
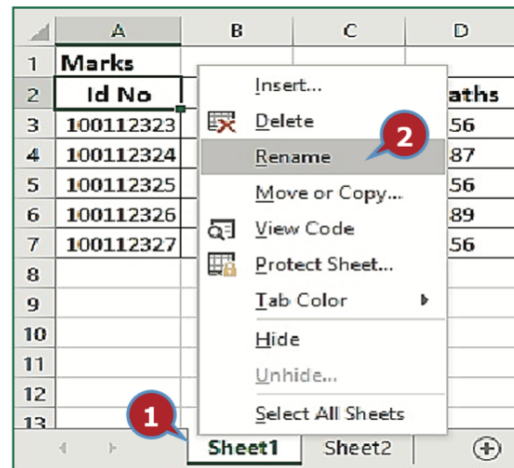
Move or Copy a Worksheet

Moving a worksheet within the same workbook or to a different workbook is helpful to keep worksheets in order. Copying a worksheet helps you to use the same worksheet in the same or different workbook.

To Move or copy a worksheet, follow the steps given below:

1 Right click on the sheet tab you want to Move or Copy.

2 Select Move or Copy option from popup menu. It opens Move or Copy dialog box.
- ► You can move selected sheet to another workbook.
- ► You can move selected sheet in the same workbook.

3 Select Create copy checkbox to copy the worksheet.

4 Click on OK button.
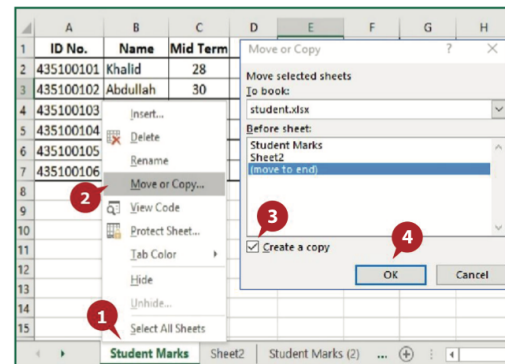
You can also Insert, Delete, Rename, Move or copy sheet and change Tab color from cells group of the Home Tab.

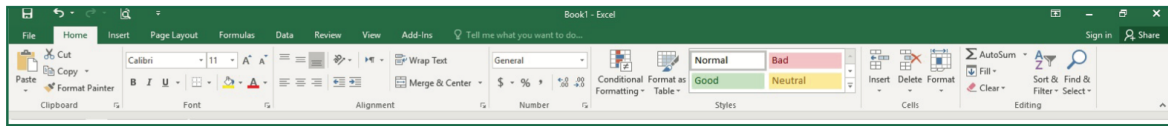Drag option also can be used to Move

Other Sheet Options

Select All Sheets	Selects all worksheets so that a formatting option can be applied at once, like Tab color.
Hide	Makes a worksheet invisible from sheet tabs.

The Home Tab

The Home Tab provides a collection of commonly used commands for easy access.

Following are different groups in the home tab

| Group	Description
Clipboard	This group contains main editing commands such as cut, copy and paste.
Font	This group contains commands used to apply a range of formatting options.
Alignment	This group contains commands used to position cell data and merge cells.
Number	This group contains commands used to apply different number formats to data.
Styles	This group contains commands used to apply various styles.
Cells	This group contains commands used to add, delete and format cells, rows, columns, and worksheets.
Editing	This group contains commands used to sort, filter and calculate data.

The Insert Tab

The Insert Tab emphasis to learn about Charts, Pictures, 3D Maps, Links, etc. Here specifically you will learn to insert charts and format Charts in Excel 2016 which helps you to visualize your worksheet data in a very attractive way. About the visualization topics, you will learn in detail in the coming chapters.

Chart and Elements of a Chart

A Chart is a graphical illustration of information, Charts are especially helpful to illustrate the workbook data graphically and in an attractive manner, which makes it easy to visualize comparisons.

Chart Buttons: To format the chart easily you have chart buttons which enables you to change different options such as chart elements.
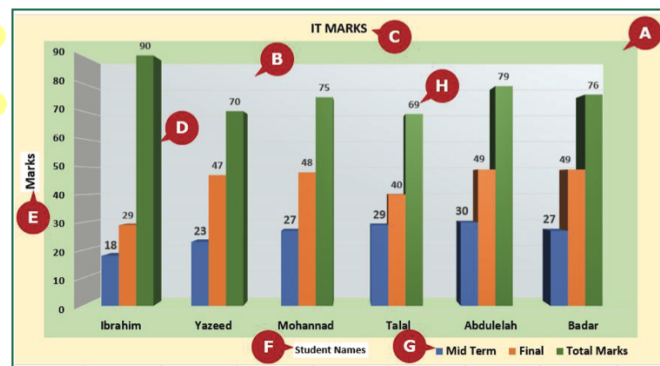
| A	Chart Area	It contains all the chart elements which cover the entire area of the chart.
B	Plot Area	The area that contains the representational data is called plot area.
C	Chart Title	Shows the title of the chart.

| D	Data Points	From the plotted area actual points represented with data points.
E	Primary VerticalAxis Title	It's a section to show the vertical title as Y-Axis Title
F	Primary HorizontalAxis Title	It shows as X-Axis Title as a horizontal title.
G	Legend	It shows data represents in a different color.
H	Data Labels	It shows the labels of the data on the chart.

Inserting Chart

Excel 2016 provides a number of chart types which are available to create. It also recommends charts as suggestions to create to the provided data. Based on the data in the rows and columns you can create the chart by selecting the best chart type.

To insert a column chart, follow the steps given below

1. Select the columns or rows containing data that you want to plot in the chart.

2. Click on the Insert Column or Bar Chart command in the Charts group.

3. Select a suitable column chart from the displayed list of charts.

4. Selected Chart type is inserted.
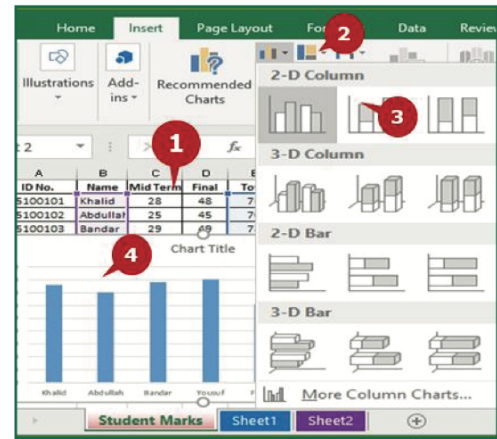
Design and Format Tab's – Contextual Tabs
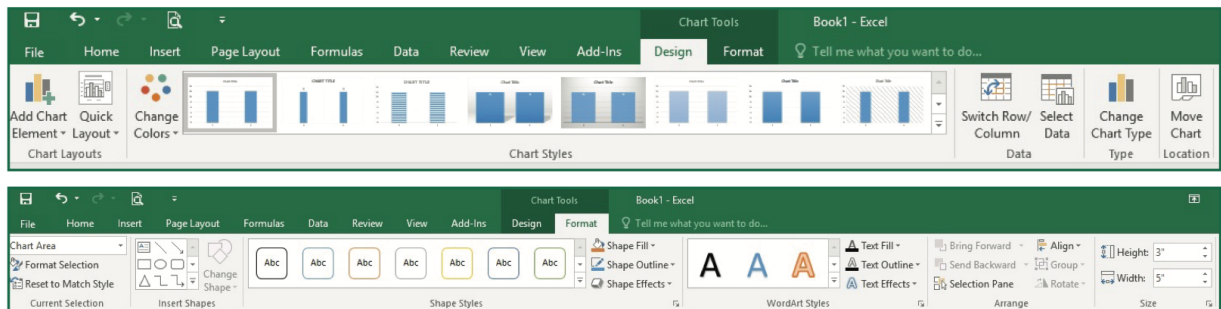
| Move Chart	Enables to move the chart in a separate chart sheet or a worksheet
Chart Styles	It provides you the customized styles with different colors to apply on the charts.
Change Chart Type	Enables to change your existing chart to a different chart type. For example, you can change a Column Chart to a Bar Chart.

The Page Layout Tab

The Page Layout tab lets you modify the way your worksheets are set up into different pages. It helps you to modify the Theme, Page Size, Margins, Print Area, and more. Here you will learn about the printing options.
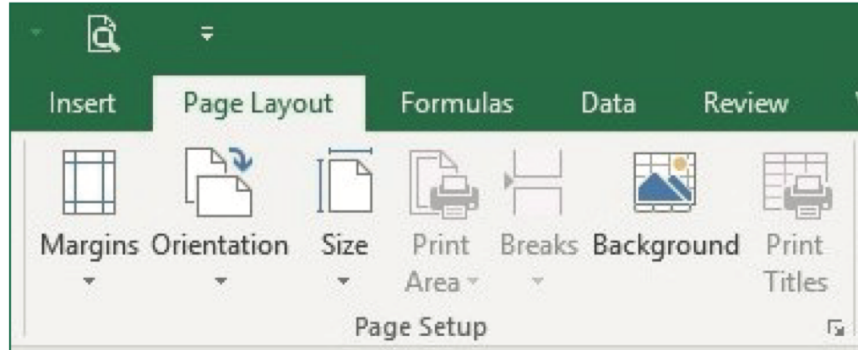

Print Area

The print area allows you to print on the selected range of cells to avoid printing in the entire sheet. You can clear the printing area which is selected for print from the print area command.
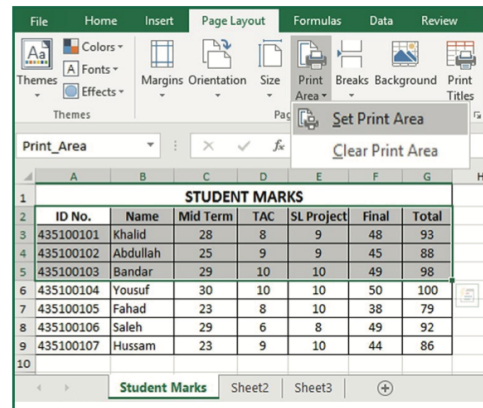

Print Titles

You can use Print Titles command to specify the rows to be printed at the top or columns to be printed at the left of each page. For example, you can print the header row on all pages when you have a large worksheet to print, so the readers don't have to go back to the first printed page to see the headers.
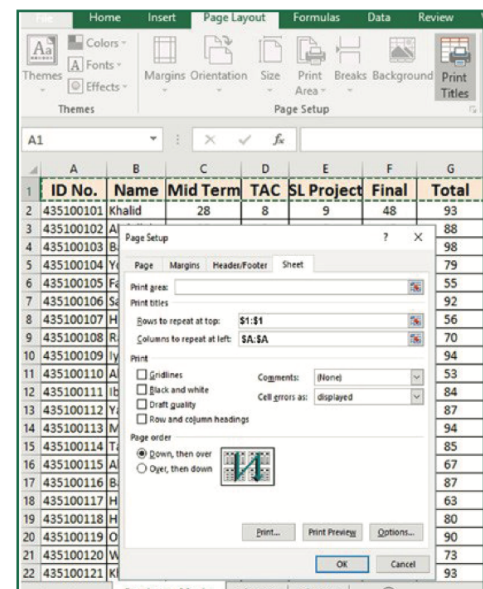
The Formula Tab

The Formulas Tab enables you to calculate data using a variety of functions available in Excel 2016 to make easy calculations. Excel 2016 provides several built-in functions to perform mathematical, statistical and logical operations. Function Library group in the formulas tab contains a number of functions grouped in different categories such as Financial, Logical, Text, Date & Time and Math & Trig.
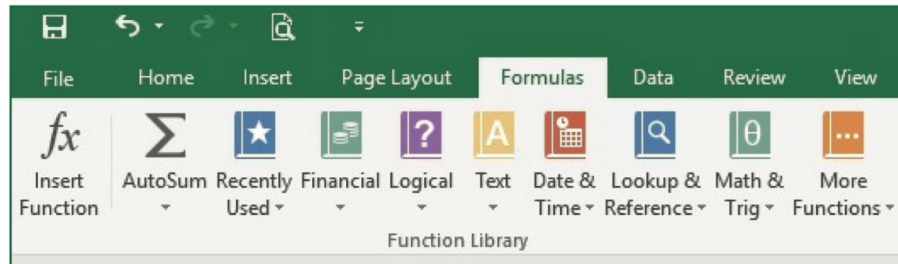
Logical	Logical Functions are used to test for a condition to evaluate it as true or false. It includes functions such as AND, FALSE, IF, NOT, OR, TRUE, etc.
Text	Text functions are used to manipulate text strings. It includes functions such as CHAR, LEN, LOWER, PROPER, TEXT, UPPER, etc.
Math and Trig	These functions perform arithmetic operations, conditional sum, exponents & logarithms, and the trigonometric calculations. It includes the functions such as SUM, SUMIF, LOG, COS, SIN, etc.
More Functions	It includes Statistical and Engineering functions such as AVERAGE, COUNT, MAX, MIN, CONVERT, DELTA, etc.

Functions

A Function in Excel 2016 is a pre-set or inbuilt formula that performs calculations automatically. Each function has a specific syntax, i.e. a set of rules associated with it.

Creating a Formula

A formula is an expression that executes all the calculations in the cell's data. A formula with arithmetic operators like +, -, *, /, %, to perform addition, subtraction, multiplication, division, and percentage respectively. In Excel 2016, a formula begins with an equal to (=) sign. You can manually enter the function and formulas. The general syntax of a function is as follows:

=Function Name (Cell Range)
Example: = SUM (number1, [number2],

The Basic Functions and their Syntax

| Sum	The SUM function calculates the sum of values contained in a range of cells. Syntax: =SUM (number1, [number2],....)
Average	The AVERAGE function is used to calculate the average of the values contained in a range of cells. Syntax: =AVERAGE (number1, [number2], ...)
Count	The COUNT function counts the number of cells in a range that contain numbers only. Syntax: =COUNT (Value1, [Value2], ...)
Max and Min	The MAX and MIN function is used to calculate the maximum and minimum value in the selected range of cells. Syntax: =MAX (number1, [number2], ...)
Lower and Upper	The LOWER and UPPER function is used to convert the text to lowercase and uppercase i.e. small letters and capital letters. Syntax: =LOWER(Text): =UPPER(Text)
Len	The LEN function is used to calculate the number of characters in a text string including spaces. Syntax: =LEN(Text)
Proper	The PROPER function capitalizes the first letter of each word of a text string and changes all other letters to lowercase. Syntax: =PROPER(Text)

AutoSum

AutoSum is a built in feature of Excel 2016 that allows you to quickly calculate the sum, count, average, maximum and minimum of values.

To use AutoSum Feature
- Select the cell where you want to display the result and follow the steps given below
- Select Home Tab or Formulas Tab
- Select the AutoSum Command and follow the steps given below

1 Click on Sum, to calculate the sum of values.

2 Click on Average, to calculate the average of values.

3 Click on Count Numbers, to count the number of cells.

4 Click on Max, to display the maximum of values.

5 Click on Min, to display the minimum of values.
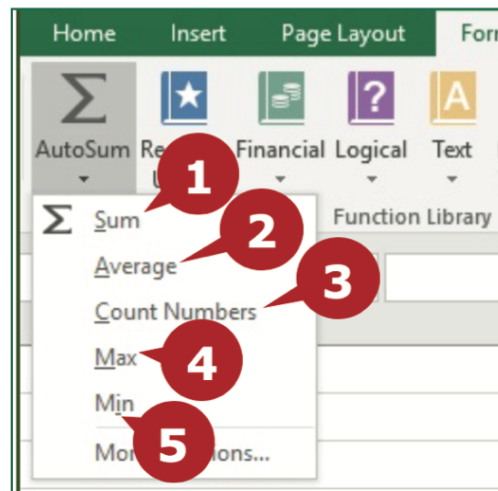
⬤ Error Checking

The Formulas and Functions can sometimes result in error values. The Error Checking command helps you to check for common errors that occur when using formulas or functions. This command shows you the cells containing the error, the type of error and other error information. Then you have the access to a number of options to check and correct these errors.

The table shows some type of errors with their description with examples.

| Error/ Solution	Description	Example
#DIV/0!	When a number is divided either by zero (0) or by a cell that contains ② zero (0) value or no value. ①	=A5/0
Solution	Change the cell reference or value of denominator.	=A5/3
#NUM!	When a formula or function contains invalid numeric values.	$\sqrt{-4}$=SQRT(-4)
Solution	Check and update the formula with valid numbers.	=SQRT (4)
#NAME?	The Formula is unrecognized i.e. a syntax error.	=SSUM(E10:E15)
Solution	Use the Function Wizard or type the correct formula.	=SUM(E10:E15)
#VALUE!	Formula or operator is wrong. Also, one or more cells that are included in an arithmetic formula contain text.	=D10, D34
Solution	Type the correct operand and make sure the appropriate data is referenced.	=D10+ D34

The View Tab

The view consists of several groups such as workbook views, show, zoom, and Windows. You will learn about the freeze panes from windows group.

⬤ Freeze Panes

The Freeze panes used to lock the selected rows and columns in place to keep them locked while the rest of the sheets moving.

You can use this options to freeze just top row, first column or any selected multiple rows and columns.
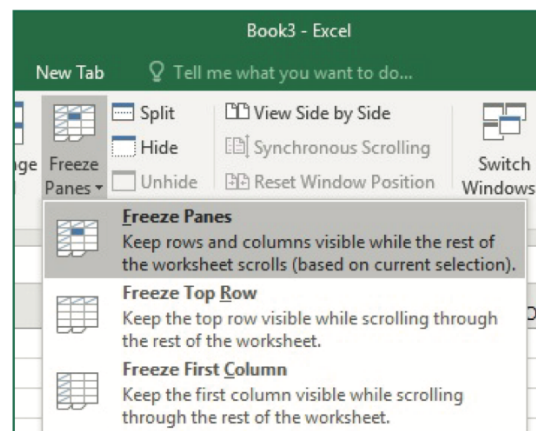
Workbook Security

Excel 2016 enables you to secure your work and prevent unauthorized access to your workbook. Workbooks may contain sensitive information like Credit Card Numbers, National ID Numbers, Employee Information etc. The following section will guide you through Excel's password protection feature.

Encrypt with Password

A workbook can be protected with the password used as encryption to open the workbook. It is recommended to remember the password by listing out. Noted forgotten passwords can't be recovered.
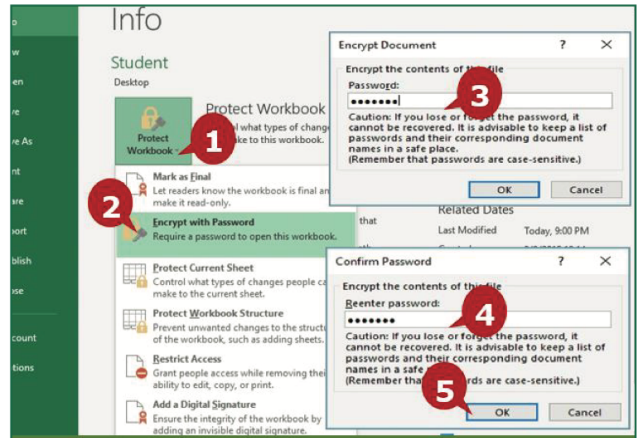
**To create a Workbook Password, click on the File Tab and follow the steps given below:**

1) In the Backstage view, from the Info option, click on the Protect Workbook command.
2) Click on the Encrypt with Password option from the displayed list.
3) Type the password in the Encrypt Document dialog box and click on the OK button.
4) Re-enter the password in the Confirm Password dialog box.
5) Click on the OK button and save the workbook to apply the password. When you open the workbook, Excel 2016 prompts you to enter the password for the workbook.
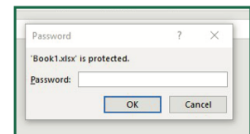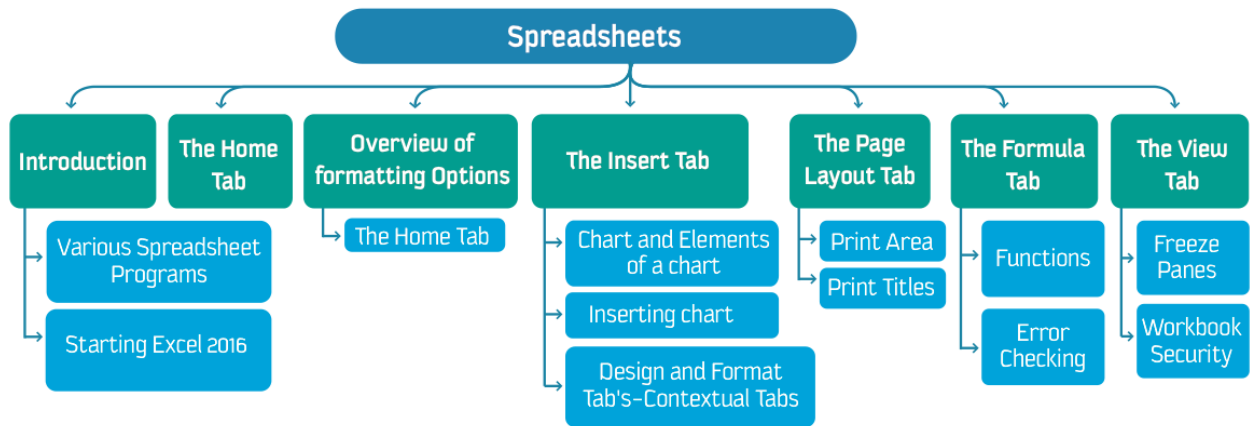
Removing a Password

You can also remove the password from the protected workbook. To Remove the Password, click on the File Tab and follow the steps given below:

1) In the Backstage view, from the Info option click on the Protect Workbook Command.

2) Click on the Encrypt with Password option from the displayed list.

3) In the Encrypt Document dialog box, select the password and press the Delete key.

4) Click on the OK button and save the workbook.
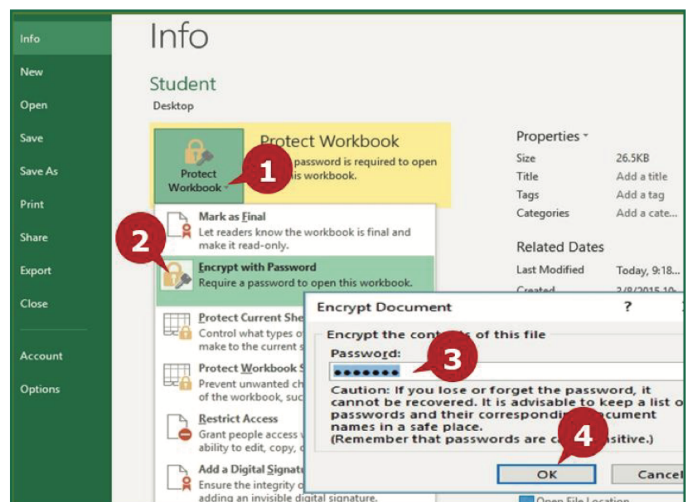
List of Acronyms

Formula	An expression to perform calculations by using mathematics equation.
Function	A predesigned formula which performs calculations automatically.
Charts	A graphical representation of the data
Worksheet	Work area in the excel workbook

Spreadsheets

- **Introduction**
  - Various Spreadsheet Programs
  - Starting Excel 2016
- **The Home Tab**
- **Overview of formatting Options**
  - The Home Tab
- **The Insert Tab**
  - Chart and Elements of a chart
  - Inserting chart
  - Design and Format Tab's-Contextual Tabs
- **The Page Layout Tab**
  - Print Area
  - Print Titles
- **The Formula Tab**
  - Functions
  - Error Checking
- **The View Tab**
  - Freeze Panes
  - Workbook Security

THE END

الحمدلله انتهينا من الوحدة الأولى !

NJ ♡