UNIT III

What is an operating system?

An operating system is a program that acts as an interface between the computer user and computer hardware, and controls the execution of programs.

Every computer system must have at least one operating system to run other programs. Applications like Browsers, MS Office, Notepad Games, etc., need some environment to run and perform its tasks.

The OS helps you to communicate with the computer without knowing how to speak the computer's language. It is not possible for the user to use any computer or mobile device without having an operating system.

The operating system's job

The operating system (OS) manages all of the software and hardware on the computer. It performs basic tasks such as file, memory and process management, handling input and output, and controlling peripheral devices such as disk drives and printers.

Most of the time, there are several different computer programs running at the same time, and they all need to access your computer's central processing unit (CPU), memory and storage. The operating system coordinates all of this to make sure each program gets what it needs.
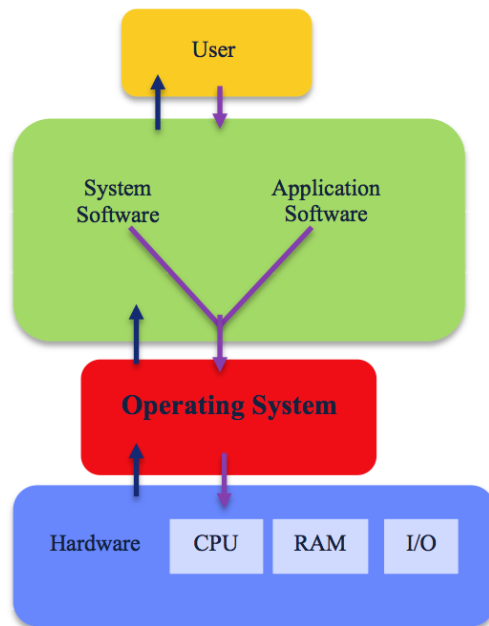

In the image above the **User** interfaces with the **System & Application software**. The System & Application software interfaces with the **Operating System**. The Operating system interfaces with the **Hardware**. Each of these interfaces is two way transactions with each sending and receiving data.

Features of Operating System (OS)

Here is a list important feature of OS:

- Protected and supervisor mode
- Allows disk access and file systems Device drivers Networking Security
- Program Execution
- Memory management Virtual Memory Multitasking
- Handling I/O operations
- Manipulation of the file system
- Error Detection and handling
- Resource allocation
- Information and Resource Protection
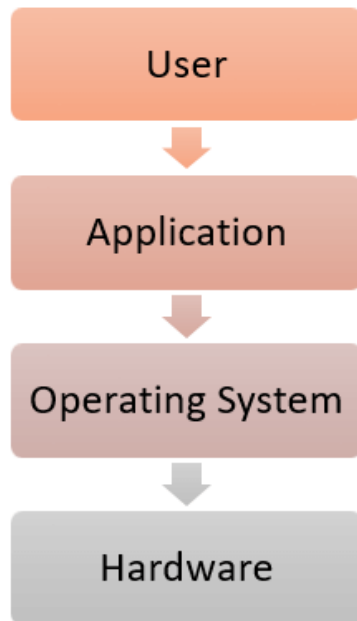
Objectives of Operating System

The objectives of the operating system are −

- To make the computer system convenient to use in an efficient manner.
- To hide the details of the hardware resources from the users.
- To provide users a convenient interface to use the computer system.
- To act as an intermediary between the hardware and its users, making it easier for the users to access and use other resources.
- To manage the resources of a computer system.
- To keep track of who is using which resource, granting resource requests, and mediating conflicting requests from different programs and users.
- To provide efficient and fair sharing of resources among users and programs.

Types of Operating System (OS)

Following are the popular types of OS (Operating System):

- Batch Operating System
- Multitasking/Time Sharing OS
- Multiprocessing OS
- Real Time OS
- Distributed OS
- Network OS
- Mobile OS

Batch Operating System

Some computer processes are very lengthy and time-consuming. To speed the same process, a job with a similar type of needs are batched together and run as a group.

The user of a batch operating system never directly interacts with the computer. In this type of OS, every user prepares his or her job on an offline device like a punch card and submit it to the computer operator.

Multi-Tasking/Time-sharing Operating systems

Time-sharing operating system enables people located at a different terminal(shell) to use a single computer system at the same time. The processor time (CPU) which is shared among multiple users is termed as time sharing.

Real time OS

A real time operating system time interval to process and respond to inputs is very small. Examples: Military Software Systems, Space Software Systems are the Real time OS example.

Distributed Operating System

Distributed systems use many processors located in different machines to provide very fast computation to its users.

Network Operating System

Network Operating System runs on a server. It provides the capability to serve to manage data, user, groups, security, application, and other networking functions.

Mobile OS

Mobile operating systems are those OS which is especially that are designed to power smartphones, tablets, and wearable devices.

Some most famous mobile operating systems are Android and IOS, but others include BlackBerry, Web, and watch OS.

Functions of Operating System

Some typical operating system functions may include managing memory, files, processes, I/O system & devices, security, etc.

Below are the main functions of Operating System:
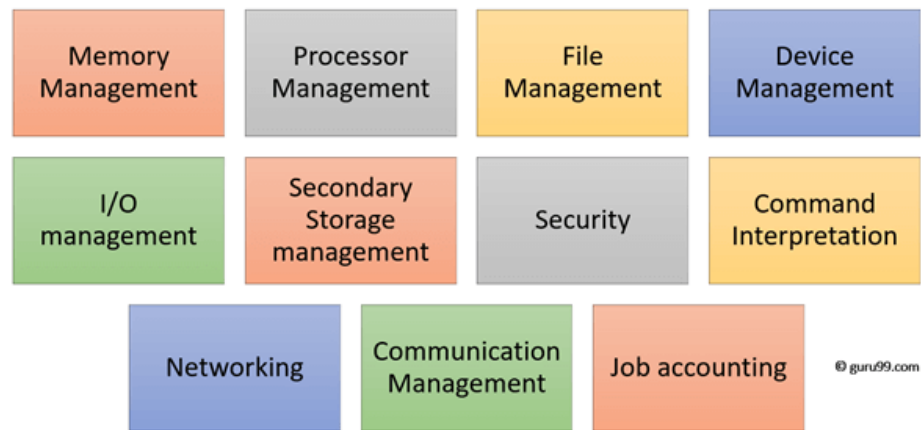
Functions of Operating System
In an operating system software performs each of the function:

1. **Process management**: Process management helps OS to create and delete processes. It also provides mechanisms for synchronization and communication among processes.

2. **Memory management:** Memory management module performs the task of allocation and de-allocation of memory space to programs in need of these resources.

3. **File management**: It manages all the file-related activities such as organization storage, retrieval, naming, sharing, and protection of files.

4. **Device Management**: Device management keeps tracks of all devices. This module also responsible for this task is known as the I/O controller. It also performs the task of allocation and de-allocation of the devices.

5. **I/O System Management:** One of the main objects of any OS is to hide the peculiarities of that hardware device from the user.

6. **Secondary-Storage Management**: Systems have several levels of storage which includes primary storage, secondary storage, and cache storage. Instructions and data must be stored in primary storage or cache so that a running program can reference it.

7. **Security**: Security module protects the data and information of a computer system against malware threat and authorized access.

Working with Windows Operating System

INTRODUCTION: Windows is a **graphical operating system** developed by Microsoft. It allows users to view and store files, run the software, play games, watch videos, and provides a way to connect to the internet. It was released for both home computing and professional works.

Every computer needs an Operating System to function. Microsoft Windows is one of the most popular Graphical User Interface (GUI). Multiple applications can execute simultaneously in Windows, and this is known as **"Multitasking".**

Windows is an operating system program that communicates our instructions to the actual computer hardware and displays the results. Windows is a rectangular area which provides an environment to run many programs.

Windows Operating System uses both Keyboard and mouse as input devices. Mouse is used to interact with Windows by clicking its icons. Keyboard is used to enter alphabets, numerals and special characters.

**Some of the functions of Windows Operating System are:**

·   Access applications (programs) on the computer (word processing, games, spread sheets, calculators and so on).

·   Load any new program on the computer.

·   Manage hardware such as printers, scanners, mouse, digital cameras etc.,

·   File management activities (For example creating, modifying, saving, deleting files and folders).

Change computer settings such as color scheme, screen savers of your monitor, etc.

THE DESKTOP: It is the very first screen that we see once the windows start. Here we can see "My Computer", "My Documents", "Start Menu", "and Recycle Bin", and the shortcuts of any applications that we might have created.

A **desktop** describes a desktop computer or system unit.

When referring to an operating system or GUI (graphical user interface), the **desktop** is the primary place to display and organize icons on a screen. The Microsoft Windows desktop was first introduced with Microsoft Windows 95 and has been included with every version of Windows since then. The image below is an example of the Microsoft Windows desktop.

Windows 10 Desktop
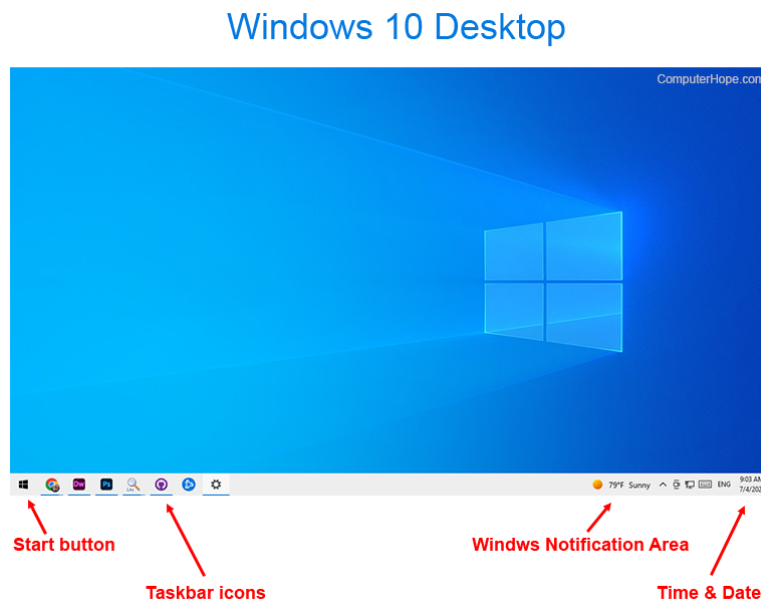
It consists of a visual area containing some of the graphical user interface of the program it belongs to and is framed by a window decoration. It usually has a rectangular shape that can overlap with the area of other windows. It displays the output of and may allow input to one or more processes.

Windows Explorer: Windows Explorer is the file manager used by Windows 95 and later versions. It allows users to manage files, folders and network connections, as well as search for files and related components.

Windows Explorer has also grown to support new features unrelated to file management such as playing audio and videos and launching programs, etc. The desktop and the taskbar also form part of Windows Explorer. The look, feel and functionalities of Windows Explorer have been enhanced with each version of Windows.

Starting with Windows 8.0, Windows Explorer has been called File Explorer.

Windows Explorer should not be confused with Internet Explorer. Windows Explorer is a file browser, whereas Internet Explorer is a Web browser.

There are different ways to run Windows Explorer: one is by holding down the Windows button on the keyboard (the button with the Windows logo) and then pressing the "E" key. Another way is by clicking the Start menu and then "Run" and then typing in "explorer" in the dialog box that appears.

FILE AND FOLDER OPERATIONS: The File and Folder Operation allows us to copy, move, rename, delete files and folders in computers. The File and Folder Operation Configuration enables us to copy/move/delete files for several computers from central location.

What is a file?

There are many different **types of files** you can use. For example, Microsoft Word documents, digital photos, digital music, and digital videos are all types of files. You might even think of a file as a **digital version** of a real-world thing you can interact with on your computer. When you use different applications, you'll often be **viewing**, **creating**, or **editing files**.

Files are usually represented by an **icon**. In the image below, you can see a few different types of files below the Recycle Bin on the desktop.
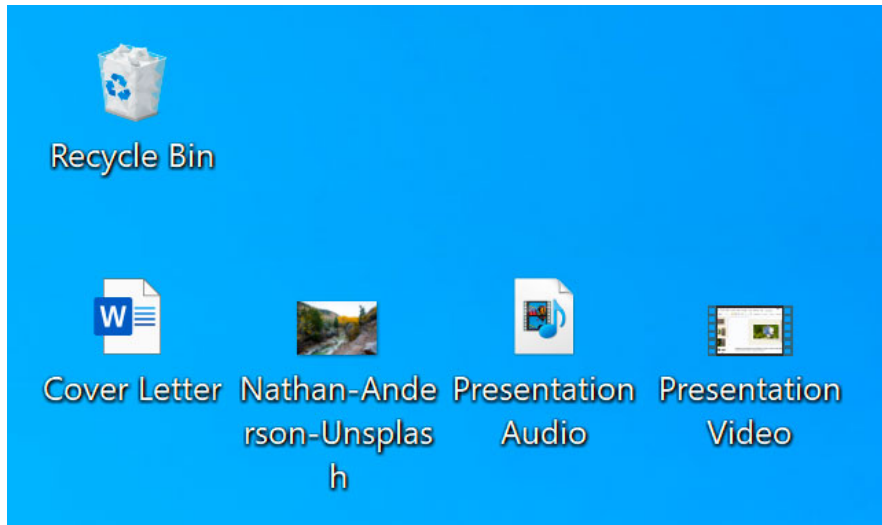
What is a folder?

Windows uses **folders** to help you organize files. You can put files **inside a folder**, just like you would put documents inside a real folder. In the image below, you can see some folders on the desktop.
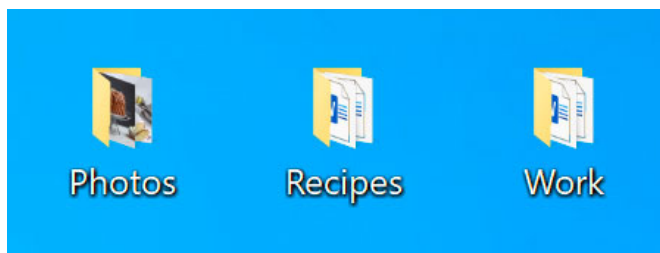

File Explorer

We can view and organize files and folders using a built-in application known as **File Explorer** (called **Windows Explorer** in Windows 7 and earlier versions).
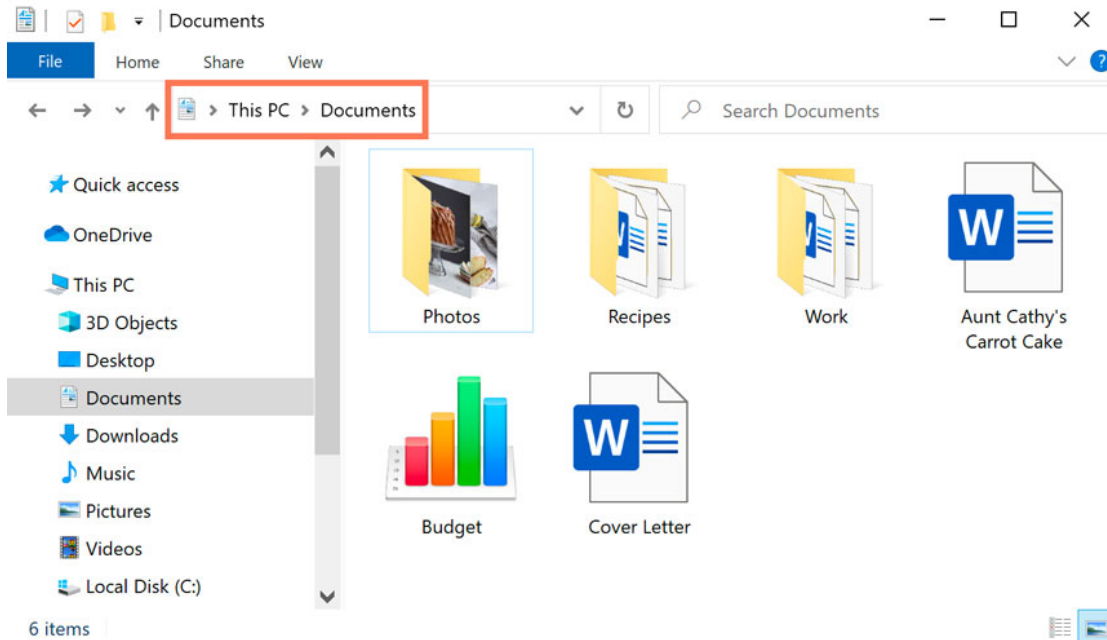
To open File Explorer, click the **File Explorer** icon on the taskbar, or double-click any folder on your desktop. A new File Explorer window will appear.
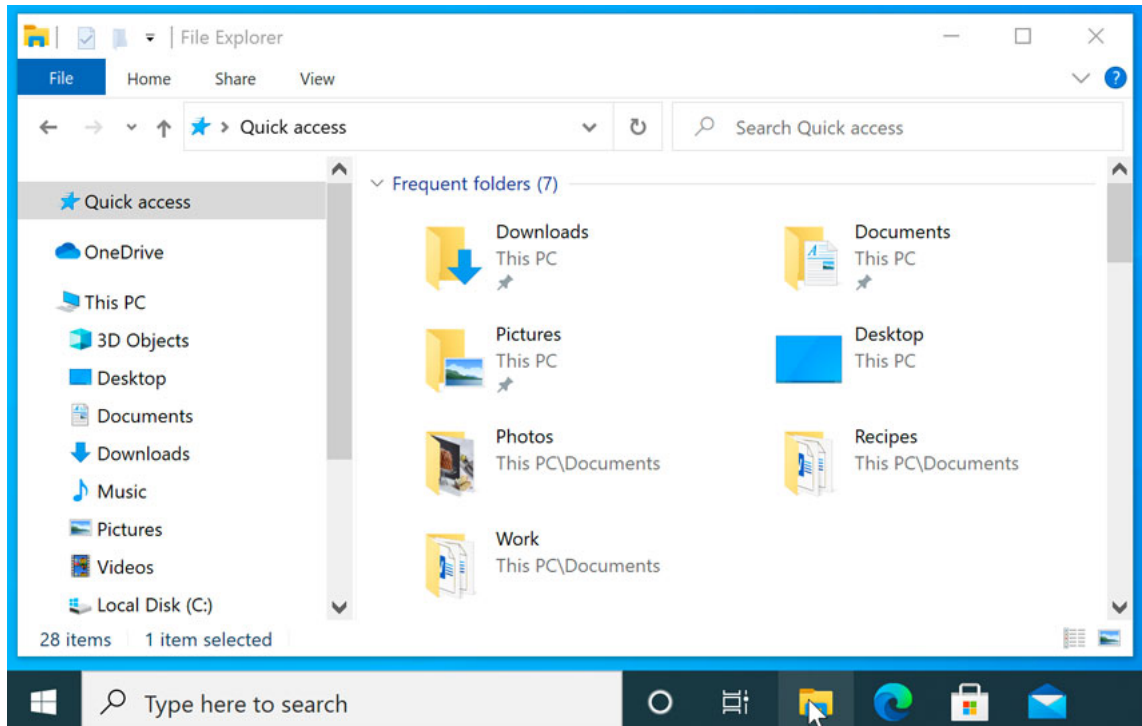
From File Explorer, **double-click a folder to open it**. We can then see all of the files stored in that folder.
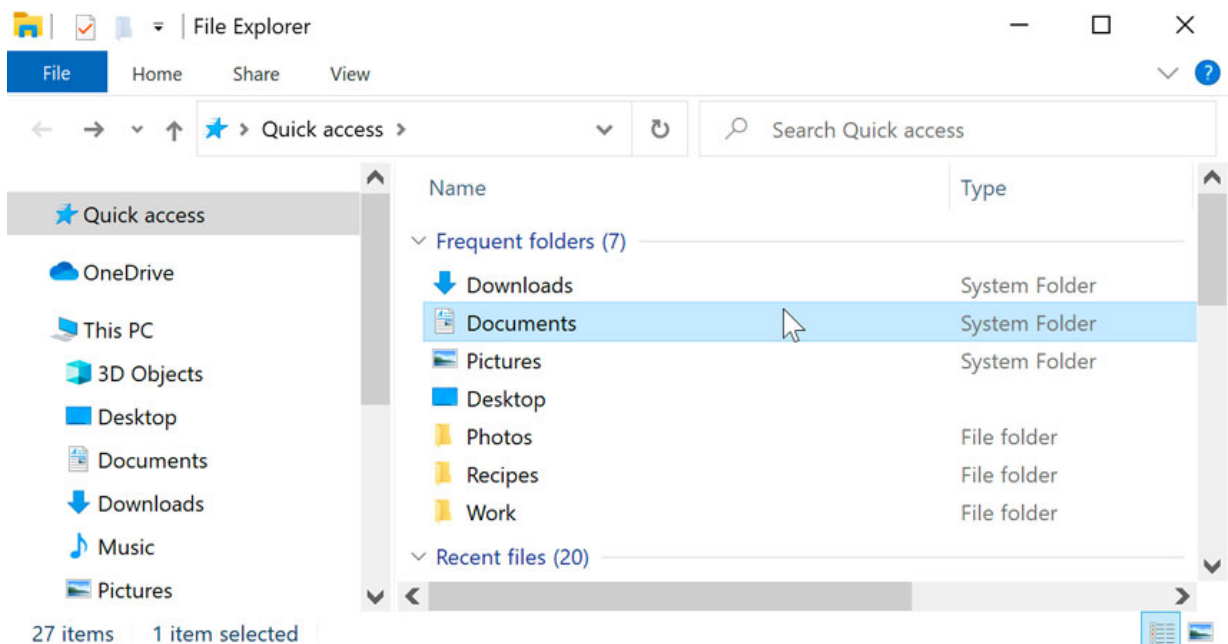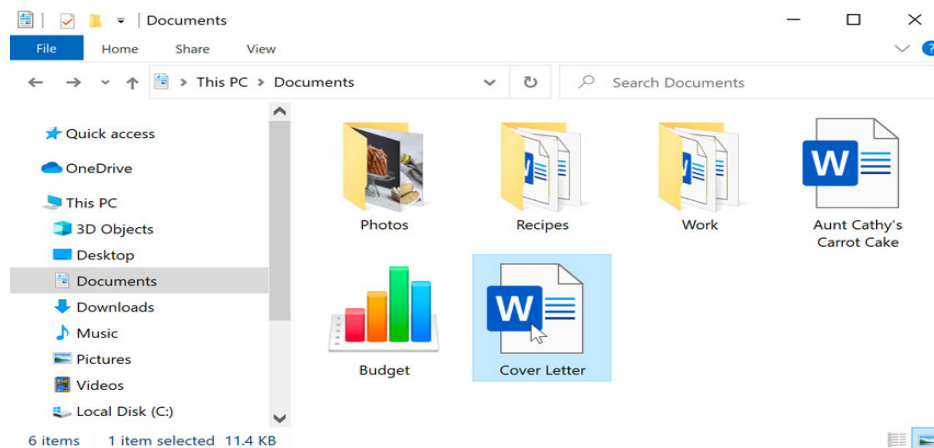

Notice that we can also see the **location** of a folder in the **address bar** near the top of the window.

To open a file:

There are two main ways to open a file:

- **Find the file on your computer and double-click it**. This will open the file in its **default application**. In our example, we'll open a Microsoft Word document (**Cover Letter.docx**), which will open in **Microsoft Word**.

- **Open the application, and then use the application to open the file**. Once the application is open, you can go to the **File** menu at the top of the window and select **Open**.
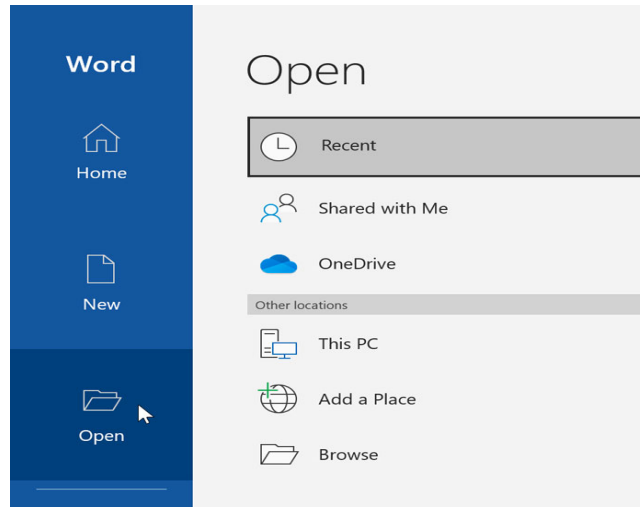
Moving and deleting files

As we begin using our computer, we will start to collect more and more files, which can make it more difficult to find the files we need. Fortunately, Windows allows us to **move files** to different folders and **delete files** we no longer use.
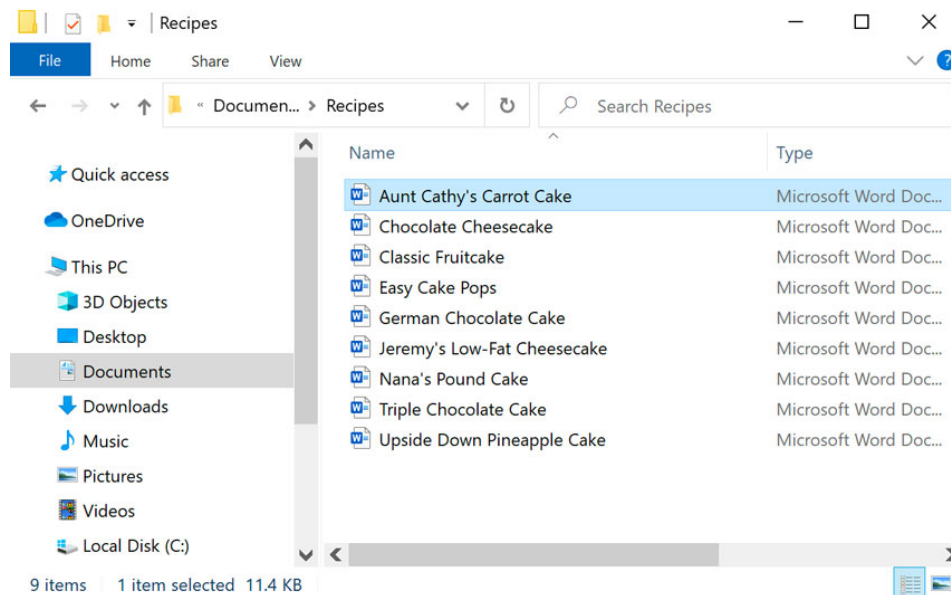
To move a file:

It's easy to move a file from one location to another. For example, we might have a file on the **desktop** that we want to move to our **Documents** folder.

1. Click and drag the file to the desired location.
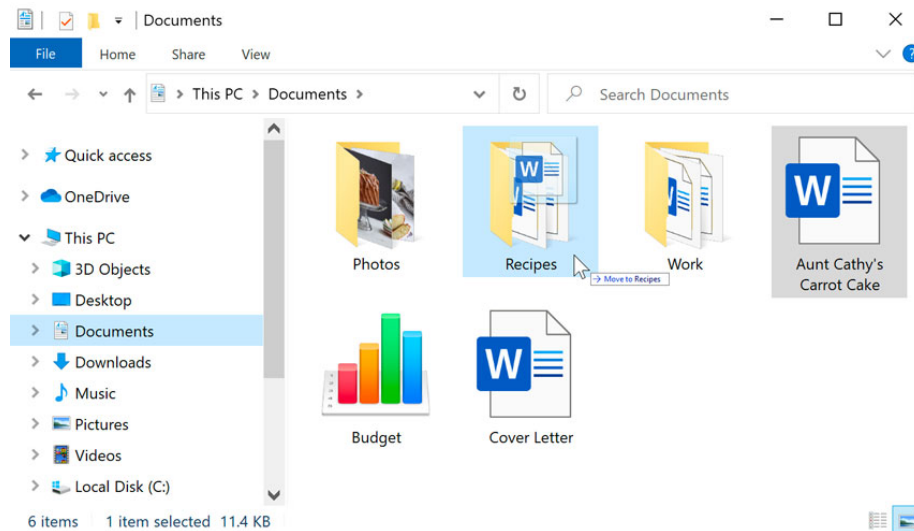
2. Release the mouse. The file will appear in the new location. In this example, we have opened the folder to see the file in its new location.


We can use this same technique to **move an entire folder**. Note that moving a folder will also move all of the files within that folder.

To create a new folder:

1. Within File Explorer, locate and select the **New folder** button. You can also **right-click** where you want the folder to appear, then select **New > Folder**.
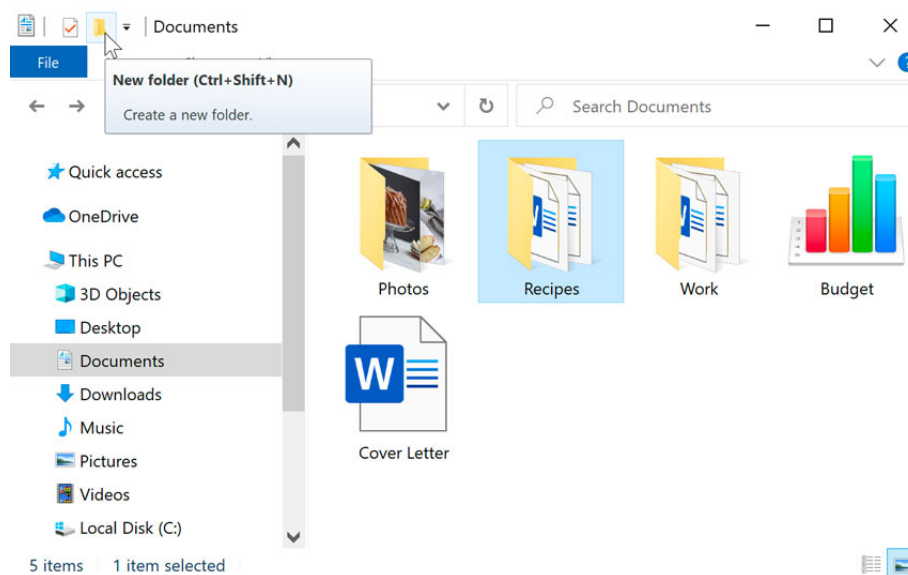
2. The new folder will appear. Type the desired **name** for the folder and press **Enter**. In our example, we'll call it **School Documents**.
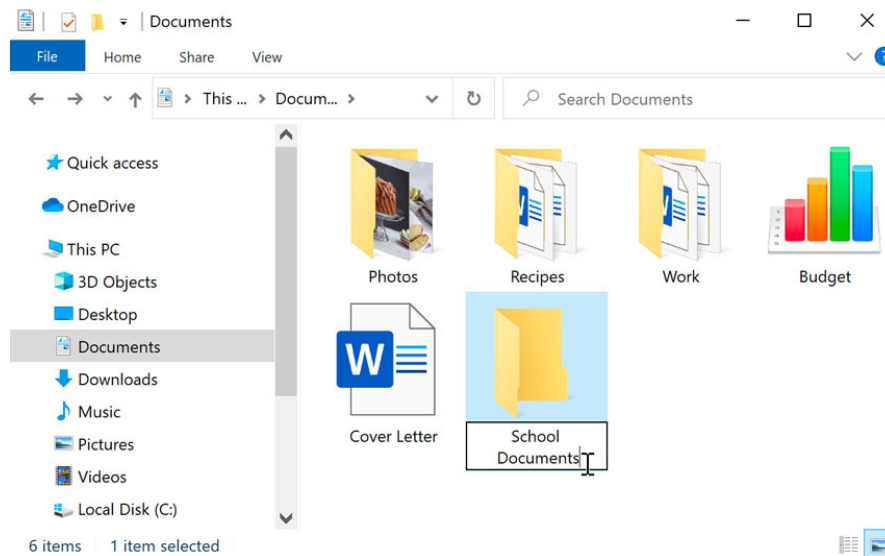
3. The new folder will be created. We can now move files into this folder.
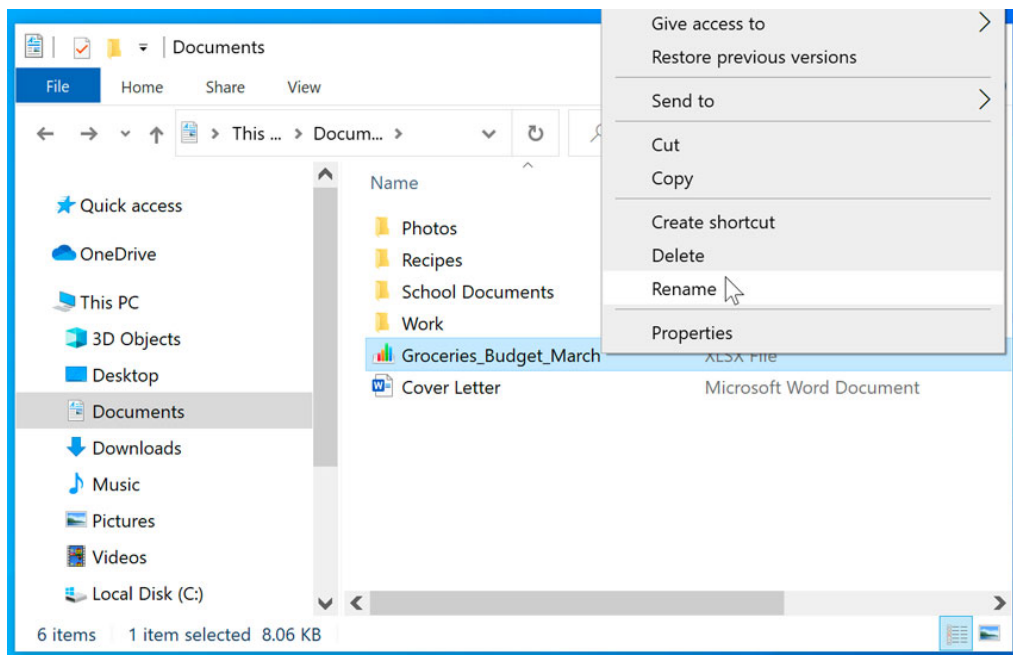
To rename a file or folder:

We can change the name of any file or folder. A unique name will make it easier to remember what type of information is saved in the file or folder.

1. Click the file or folder, **wait about one second**, and click again. An editable text field will appear.

2. Type the desired name on your keyboard and press **Enter**. The name will be changed.
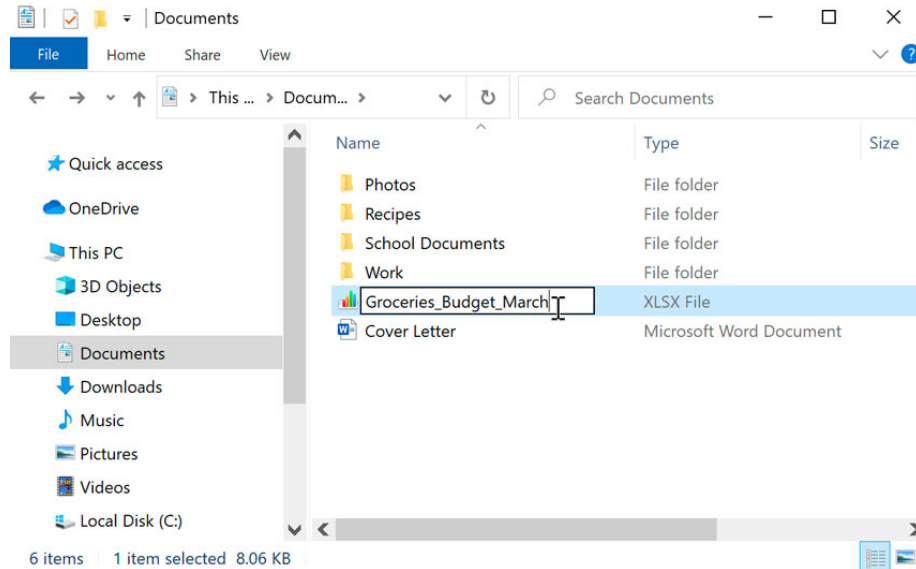
We can also **right-click** the folder and select **Rename** from the menu that appears.


To delete a file or folder:

If we no longer need to use a file, we can delete it. When we delete a file, it is moved to the **Recycle Bin**. If we change your mind, we can move the file from the Recycle Bin back to its original location. If we're sure we want to permanently delete the file, you will need to **empty the Recycle Bin**.

1. Click and drag the file to the **Recycle Bin** icon on the **desktop**. We can also click the file to select it and press the **Delete** key on your keyboard.
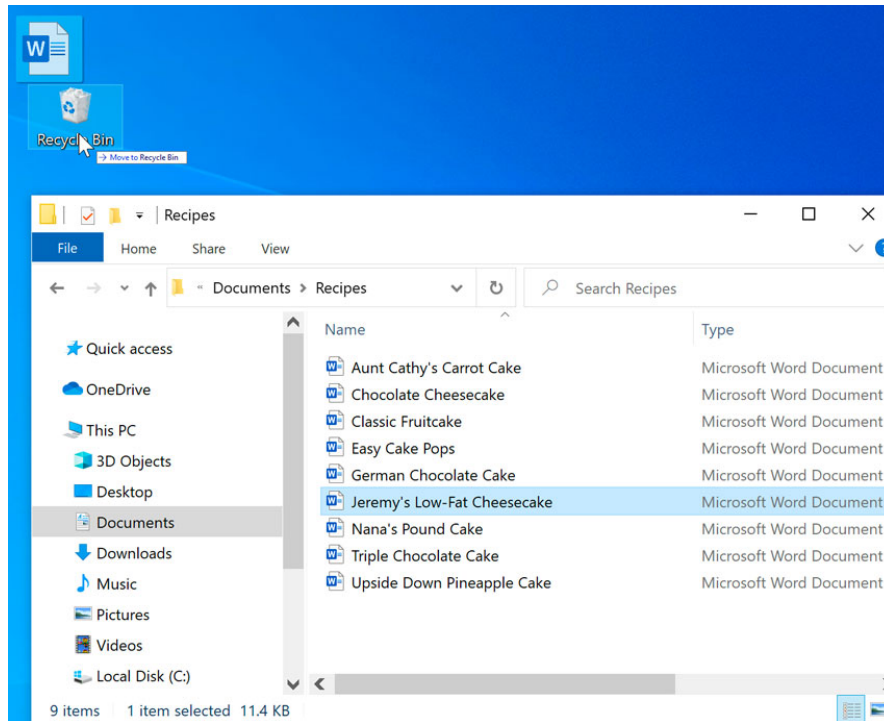
2. To permanently delete the file, right-click the **Recycle Bin** icon and select **Empty Recycle Bin**. All files in the Recycle Bin will be permanently deleted.
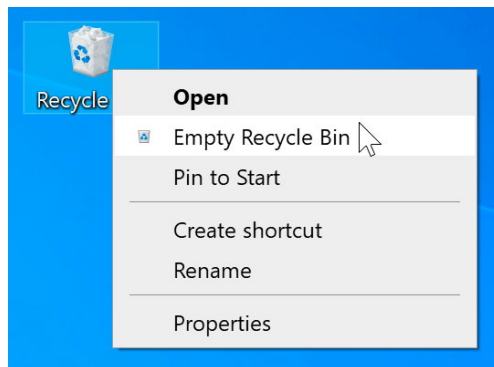
Note that deleting a folder will also delete all of the files within that folder.

The Search: Search is right there on our taskbar, ready to help us to find whatever we're looking for. Use the search box to find our apps, files, settings, help, and more on Windows. We can also use Search to find files and people in our work organization through Microsoft Search.

The search box on the taskbar periodically updates fun illustrations to help our discover more, stay connected, and be productive.

To get to search home even faster, we can use the keyboard shortcut **Windows logo key** + S to open Search, or simply mouse hover on the illustration in the search box on the taskbar.
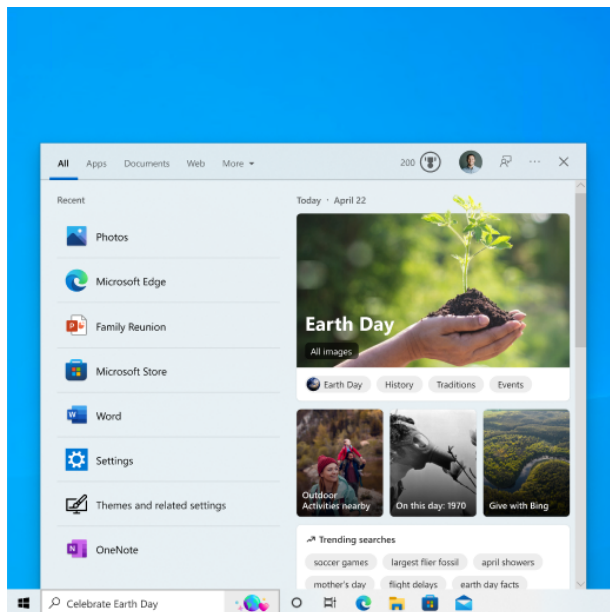
To get search results from our PC and the web, on the taskbar, tap or click **Search**, and type what we're looking for in the search box. Suggestions will appear, helping us to get what we're looking for faster. We can also search from Start just by typing.

To find more results of a certain type, choose a category that matches what we're looking for: Apps, Documents, Settings, Web, and more. We can select a category from the tabs at the top of Search before or after we've started typing.

The Recycle Bin: In Windows, the Recycle Bin is a folder or directory where deleted items are temporarily stored. Deleted files are not permanently removed from the hard drive but are sent instead to the Recycle Bin, unless they are too large. The files in the Recycle Bin can be restored to their original location. They cannot be used directly while they are in the Recycle Bin.

The Recycle Bin is available in all versions of Windows starting with Windows 95.

The Recycle Bin comes in handy when an item has been accidentally deleted. When a file is deleted, the system does not actually remove it from the system; it sends it instead to the Recycle Bin where it can be restored if necessary. If a file is deleted from the Recycle Bin, it is permanently deleted and cannot be recovered. Moreover, if a file in Windows is deleted through the DOS Command Prompt, it is also deleted permanently rather than sent to the Recycle Bin. Users

can configure their settings such that a deleted file or folder is not sent to the Recycle Bin once deleted.

Configuring the screen: To select different display settings at any time, open Display Settings in Control Panel.

1. Open Display Settings by clicking the Start button, clicking Control Panel, clicking Appearance and Personalization, clicking Personalization, and then clicking Display Settings.
2. Choose the appearance of additional displays
3. After we connect an additional monitor, we can use the New Display Detected dialog box to indicate how we want our desktop to appear on the monitor's display.

- Select Start > Settings > System > Display.
- If you want to change the size of your text and apps, choose an option from the drop-down menu under Scale and layout. Learn how to change just your text size in Make Windows easier to see.
- To change your screen resolution, use the drop-down menu under Display resolution. Note: You should use the recommended resolution. If you change the resolution, content might appear blurry or pixelated.
- To adjust your color calibration, search "calibrate display color" in the Settings search box and follow the directions.
- If you don't see a setting you're looking for, try searching for it in the search box on the taskbar.

Adding or removing new programs using control panel

The Add or Remove Programs is a feature in Microsoft Windows that lets a user uninstall and manage the software installed on their computer. This feature was introduced in Windows 98 as Add/Remove Programs, later renamed Programs and Features in Windows Vista and Windows 7, and then Apps & features in Windows 10.
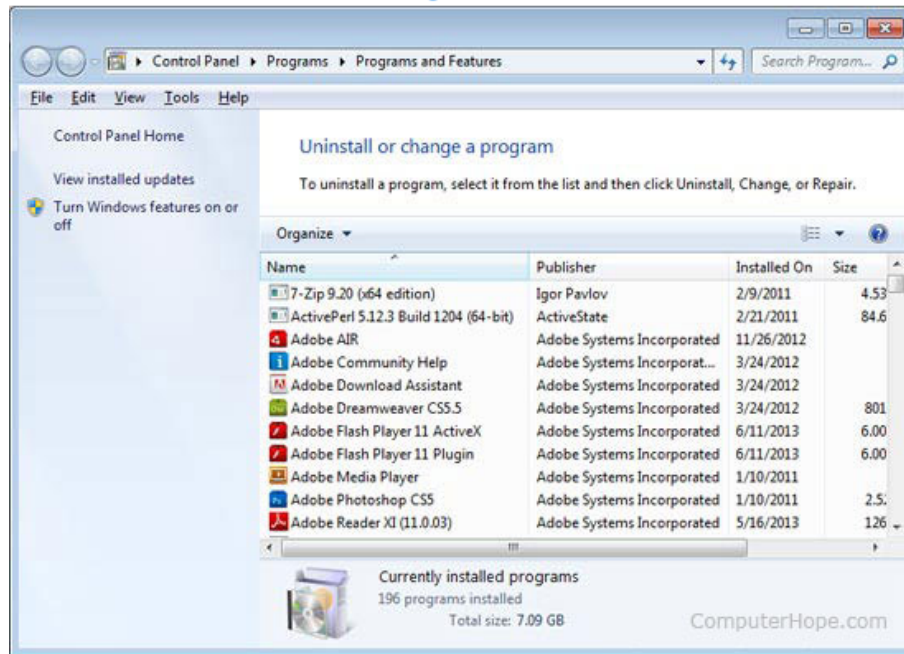
Open Add or Remove Programs in Windows 7 and 8

Open the Control Panel

Under the Programs section, click Uninstall a program.

A window similar to the one shown below should appear with a list of all the programs on your computer.

Windows 7 Programs and Features

From the Programs and Features section of Windows, you can uninstall a program, adjust Windows features, and view installed updates.

or

Press the Windows key, type Programs and Features or Add and remove programs, then press Enter.

A window similar to that shown above should appear.

From the Programs and Features section of Windows, you can uninstall a program, adjust Windows features, and view installed updates.

How to open Add or Remove Programs in Windows 10

Press the Windows key, type Apps & features or Add or Remove Programs, and press Enter.

A window similar to the picture below should appear.
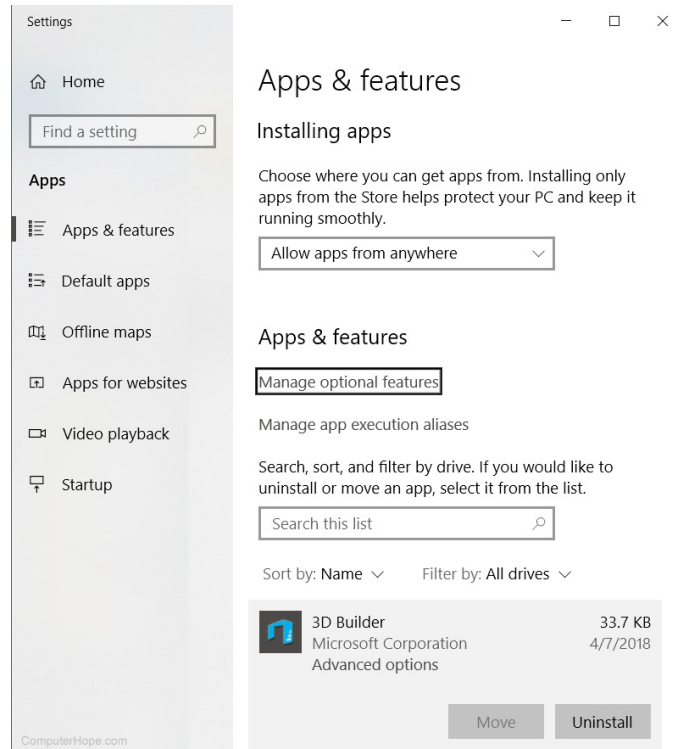
From this window, you'll be able to manage how Windows installs programs and also uninstall any programs that were installed.

or

Open the Control Panel

Click Programs and Features or under the Programs section click Uninstall a program.

From this window, you'll be able to manage how Windows installs programs and also uninstall any programs that were installed.

Uninstall from the Start menu

Select Start and look for the app or program in the list shown.

Press and hold (or right-click) on the app, then select Uninstall.

Uninstall from the Settings page

Select Start , then select Settings > Apps > Apps & features.

Select the app you want to remove, and then select Uninstall.

Uninstall from the Control Panel (for programs)

In the search box on the taskbar, type Control Panel and select it from the results.

Select Programs > Programs and Features.

Press and hold (or right-click) on the program you want to remove and select Uninstall or Uninstall/Change. Then follow the directions on the screen.

Applications in windows (Paint, Notepad, WordPad, Calculator).

The Accessories folder, accessible through the Windows Start Menu, is home to multiple useful programs, like the Calculator, Notepad, Paint, WordPad, and various System utilities. Where the Accessories folder is located, and the programs found in that folder, depends on your version of Windows. Older versions of Windows include the Accessories folder, while newer versions of Windows do not, but the programs previously in that folder are still available.

Calculator: Windows Calculator is a calculating application included in all the versions of Windows. It can be used to perform simple calculation, scientific calculation and Programming calculation. Choose Start >> Programs >> Accessories >> Calculator to start Calculator application, or Alternately you can open Run dialog box (Start >> Run) dialog box then type calc and hit enter. From View menu choose the required type of calculator – Standard, Scientific, Programmer, Statistical Edit >> Copy and Paste commands can be used to input the numbers into calculator or paste the result to other applications Calculator was first included with Windows 1.0 as a simple arithmetic calculator. In Windows 3.0, a scientific mode was added, which included exponents and roots, logarithms, factorial based functions, trigonometry (supports radian, degree and gradians angles), base conversions(2, 8, 10, 16), logic operations, Statistic functionssuch assingle variable statistics and linear regression. In Windows 7, separate Programmer, Statistics, Unit Conversion, Date Calculation, and Worksheets modes were added. Calculator's interface was revamped for the first time since its introduction.

Paint: Paint (formerly Paintbrush for Windows) is a simple graphics painting program that has been included with all versions of Microsoft Windows. It is often referred to as MS Paint or Microsoft Paint. The program opens and saves files as Windows bitmap (24 bit, 256 color, 16 color, and monochrome) .BMP, JPEG, GIF. Paintbrush supports GIF without animation or transparency. Since Windows 98 Paint supports GIF with transparency. It also supports PNG (without alpha channel), and TIFF (without multiple page support). The program can be in color mode or two color black and white, but there is no grayscale mode. For its simplicity, it rapidly became one of the most used applications in the early versions of Windows—introducing many to painting on a computer for

the first time—and still has strong associations with the immediate usability of the old Windows workspace.

Notepad: Notepad is a common text only (plain text) editor. The resulting files—typically saved with the .txt extension—have no format tags or styles, making the program suitable for editing system files that are to be used in a DOS environment. Notepad supports both left to right and right to left based languages, and one can alternate between these viewing formats by using the right or left Ctrl+Shift keys to go to right to left format or left to right format, respectively.

WordPad: WordPad is a basic word processor available in every version of Microsoft's operating systems since Windows 95. It can be used to create and modify documents. Although slower to load than Notepad, it can handle graphics and rich formatting, unlike notepad, along with handling larger files. WordPad is well preferred for taking quick notes and text-based writing.

Similar to other word processing applications, WordPad consists of the program and word processing engine. The program has a title bar, menu bar, toolbar, status bar, format bar, document ruler and selection bar. The .RTF extension is used by both WordPad and Microsoft Word. With each release, Microsoft has added more file format support for WordPad like .txt, .doc and .odt.

WordPad is preferred over Notepad for creating documents which need to be formatted. It can handle both formatted and plain text. It is simpler in features than Microsoft Word and can be considered as an excellent editor and mini viewer for Word documents. It is capable of changing font, character level formatting, margin creation and modification. It can insert sound files, charts and graphics into the document. Hypertext links can also be added and zoom in and zoom out feature is also available. Low system resource usage and simplicity are other benefits of WordPad.