

Computer Applications

The key concept of computing

What is a Computer?

- An electronic device, operating under the control of instructions stored in its own memory.
- Accept data (input)
- Process the data (process)
- Produce results (output)
- Store results (storage)

Parts of a computer system

- Hardware
- Software
- Data
- User

Computer Hardware

Parts you can see and touch.

- Processors
- Storage devices
- Input/output devices
- Communication connections
 - Wires,
 - Transistors
 - Circuits.

Characteristics of Computers

- Speed
- Arithmetical and Logical Operations
- Accuracy
- Reliability
- Storage
- Retrieving Data and Programme
- Automation
- Versatility (Flexible)
- Consistency
- Communications

Types of Computers

- Desktop computers
- Notebook (laptop) computers
- Tablet PCs
- Subnotebook computers
- Netbooks
- Slate computers
- Handheld computers
- Smartphones
- MP3 players
- Mainframe computers
- Supercomputers

Input Device

- Is any hardware component that allows you to enter data, programs, commands, and user responses into a computer.

Input Device (Cont.)

- Examples:
 - Mouse
 - Keyboard
 - Trackball
 - Touchpad
 - Light pen

Input Device (Cont.)

- Examples:
 - Joystick
 - Digital camera
 - Microphone
 - Bar code reader
 - Scanner

Processing Device

- Is any hardware component that is responsible for processing or converting data into meaningful information.

Processing Device (Cont.)

- Examples:
 - Central processing unit (CPU)
 - Graphics processing unit (GPU)
 - Motherboard.
 - Network card.
 - Sound card.
 - Video card.

Output Device

- Is any hardware component which converts information into human-readable form. It can be text, graphics, tactile, audio, and video.

Output Device (Cont.)

- Examples:
 - Monitor
 - Audio Speakers
 - Printer
 - Plotters
 - Speech synthesizer
 - LCD Projector

Storage Device

- Is any hardware component that is used for storing, porting and extracting data files and objects. It can hold and store information both temporarily or permanently, and can be internal or external to a computer, server or any similar computing device.

Storage Device (Cont.)

- There are two types of storage devices used with computers: a primary storage device, such as RAM, and a secondary storage device, such as a hard drive. Secondary storage can be removable, internal, or external.

Storage Device (Cont.)

- Examples:
- Magnetic storage devices: Today, magnetic storage is one of the most common types of storage used with computers. This technology found mostly on extremely large HDDs or hybrid hard drives.

Storage Device (Cont.)

- Examples:
- Magnetic storage devices
 - Floppy diskette
 - Hard drive
 - Magnetic strip
 - SuperDisk
 - Tape cassette
 - Zip diskette

Storage Device (Cont.)

- Optical storage devices: Another common storage is optical storage, which uses lasers and lights as its method of reading and writing data.
 - Blu-ray disc
 - CD-ROM disc
 - CD-R and CD-RW disc.
 - DVD-R, DVD+R, DVD-RW, and DVD+RW disc.

Storage Device (Cont.)

- Flash memory devices: have replaced most magnetic and optical media as it becomes cheaper because it is the more efficient and reliable solution.

Storage Device (Cont.)

- **Flash memory devices:**
 - USB flash drive, jump drive, or thumb drive.
 - CF (CompactFlash)
 - M.2
 - Memory card
 - MMC
 - NVMe

Storage Device (Cont.)

- Flash memory devices
 - SDHC Card
 - SmartMedia Card
 - Sony Memory Stick
 - SD card
 - SSD
 - xD-Picture Card

Storage Device (Cont.)

- Online and cloud: Storing data online and in cloud storage is becoming popular as people need to access their data from more than one device.
 - Cloud storage
 - Network media

Storage Device (Cont.)

- Paper storage: Early computers had no method of using any of the above technologies for storing information and had to rely on paper. Today, these forms of storage are rarely used or found.
 - OMR (Optical Mark Reader)
 - Punch card

Computer memory (Cont.)

- Is any hardware component that is capable of storing information temporarily or permanently.

Computer memory (Cont.)

- Types of Computer Memory
 - READ ONLY MEMORY (ROM) contains the pre-programmed computer instructions such as the Basic Input Output System (BIOS). It stores information permanently.
 - RANDOM ACCESS MEMORY (RAM) is used to store the programs and data that you will run. Exists only when there is power. It stores information temporarily.

Memory Units

- Memory unit is the amount of data that can be stored in the storage unit. This storage capacity is expressed in terms of Bytes.

Memory Units

S.N o.	Unit & Description
1	<p>Bit (Binary Digit)</p> <p>A binary digit is logical 0 and 1 representing a passive or an active state of a component in an electric circuit.</p>
2	<p>Nibble</p> <p>A group of 4 bits is called nibble.</p>

Memory Units

S.No.	Unit & Description
3	<p>Byte</p> <p>A group of 8 bits is called byte. A byte is the smallest unit, which can represent a data item or a character.</p>
4	<p>Word</p> <p>A computer word, like a byte, is a group of fixed number of bits processed as a unit, which varies from computer to computer but is fixed for each computer.</p> <p>The length of a computer word is called word-size or word length. It may be as small as 8 bits or may be as long as 96 bits. A computer stores the information in the form of computer words.</p>

Storage Units

Unit	Description
Kilobyte (KB)	1 KB = 1024 Bytes
Megabyte (MB)	1 MB = 1024 KB
GigaByte (GB)	1 GB = 1024 MB
TeraByte (TB)	1 TB = 1024 GB
PetaByte (PB)	1 PB = 1024 TB

Number Systems

- **Decimal (0,...,9)**
- **Binary(0,1)**
- **Octal(0,...7)**
- **Hexddecimal(0,...,9,A,...E)**

Decimal to Binary Number

- Divide the decimal number by 2.
- **Example 1.**
- Convert $(25)_{10}$ to binary number.

Decimal to Binary Number

Operation	Output	Remainder
$25 \div 2$	12	1(MSB)
$12 \div 2$	6	0
$6 \div 2$	3	0
$3 \div 2$	1	1
$1 \div 2$	0	1(LSB)

Decimal to Binary Number

- Therefore, from the above table, we can write,
- $(25)_{10} = (11001)_2$

Decimal to Octal Number

- Divide the decimal number by 8.
- **Example 1.**
- Convert $(128)_{10}$ to Octal number.

Decimal to Octal Number

Operation	Output	Remainder
$128 \div 8$	16	0(MSB)
$16 \div 8$	2	0
$2 \div 8$	0	2(LSB)

Decimal to Octal Number

- Therefore, $(128)_{10} = 200_8$

Decimal to Hexadecimal Number

- Divide the decimal number by 16.
- **Example 1.**
- Convert $(128)_{10}$ to Hexadecimal number.

Decimal to Hexadecimal Number

Operation	Output	Remainder
$128 \div 16$	8	0(MSB)
$8 \div 16$	0	8(LSB)

Decimal to Hexadecimal Number

- Therefore, $(128)_{10} = (80)_{16}$

Binary to Decimal

- multiplying each digit from MSB to LSB with reducing the power of the base number 2.
- **Example 1.** Convert $(1101)_2$ into a decimal number.
- $1 \times 2^3 + 1 \times 2^2 + 0 \times 2^1 + 1 \times 2^0$
- $= 8 + 4 + 0 + 1$
- $= 13$
- Therefore, $(1101)_2 = (13)_{10}$

Octal to Decimal

- Multiply the digits of octal number with decreasing power of the base number 8, starting from MSB to LSB and then add them all together.
- **Example 2:** Convert 22_8 to decimal number.
- $2 \times 8^1 + 2 \times 8^0$
- $= 16 + 2$
- $= 18$
- Therefore, $22_8 = 18_{10}$

Hexadecimal to Decimal

- Multiply the digits of octal number with decreasing power of the base number 16, starting from MSB to LSB and then add them all together.
- **Example 3:** Convert 121_{16} to decimal number.
- Solution: $1 \times 16^2 + 2 \times 16^1 + 1 \times 16^0$
- $= 16 \times 16 + 2 \times 16 + 1 \times 1$
- $= 289$
- Therefore, $121_{16} = 289_{10}$

Two-way Communication: Modem

- MOdulator / DEModualter = MO-DEM
- Converts digital computer signal to analog telephone signal and vice versa
- Sends and receives information
- 56K is current standard
- Connect speeds often slower than 56K

Cable Modems

- Cable Modems convert from cable interface to Ethernet or USB interface.
- External, \$50-\$200 to buy
- Must subscribe to Broadband/ Cable Internet Service through your cable provider
- Best way to go from home but expensive (\$45/month)
- Cable provider has a monopoly so prices won't drop

DSL

- Digital Subscriber Line
 - Works over phone line but doesn't interfere with phone calls
 - The speed is much higher than a regular modem (1.5 Mbps vs. 56 Kbps)
 - Works better closer to phone company
 - Not available everywhere

Network Cards

- Network cards allow connection to the Internet via ETHERNET
- Wireless network cards require a wireless router to connect
- Ethernet is FAST!

CD Burners – Optical Read/Write

- CD RW
 - 48x/16x/52x means 48x maximum write speed, 16x max. rewrite speed, and 52x max. read speed
- Media: CD-R is cheapest, write once
- CD-RW – good medium for transporting files

Computer Software

Parts you cannot see nor touch.

- **Programs**

- For the computer's use
- For the user

- **Data**

- Collection of basic facts

- **Information**

- Processed data

Types of computer programs

- Systems software
- Application software
- Programming Languages

What is Process?

- Computer works on data as per program is called process.
- Processing means operations like.....
 - Calculations,
 - Logical decision making,
 - Outputting data,
 - Communicating with others computer etc.

Systems software

- Dedicated to managing the computer itself
 - Operating systems
 - File management utilities.

Systems software (Cont.)

- Windows XP, Windows 7, Windows 8
- Mac OS
- Linux, Unix
- Android
- Anti virus
- Disk formatting

Applications software

- Enable the user to complete tasks.
- They are specific to the task they are designed for.
- Written for a specific operating system and computer hardware.
- Cannot function without the OS.
 - Word processing
 - Calculations
 - Information storage and retrieval
 - Accounting

Programming Languages

- Used in building blocks of any software.
- To write instructions that a computer can understand.
- Have some resemblance to the English language.
 - BASIC
 - Pascal
 - Fortran
 - C++
 - Java

Operating System Software

- Loads automatically when you switch on a computer
- Main roles:
 - Controls hardware (CPU, RAM, I/O)
 - Controls Software
 - Permits you to manage files
 - Acts as intermediary between user and applications
 - Manages the security, system interface and application interface

Security

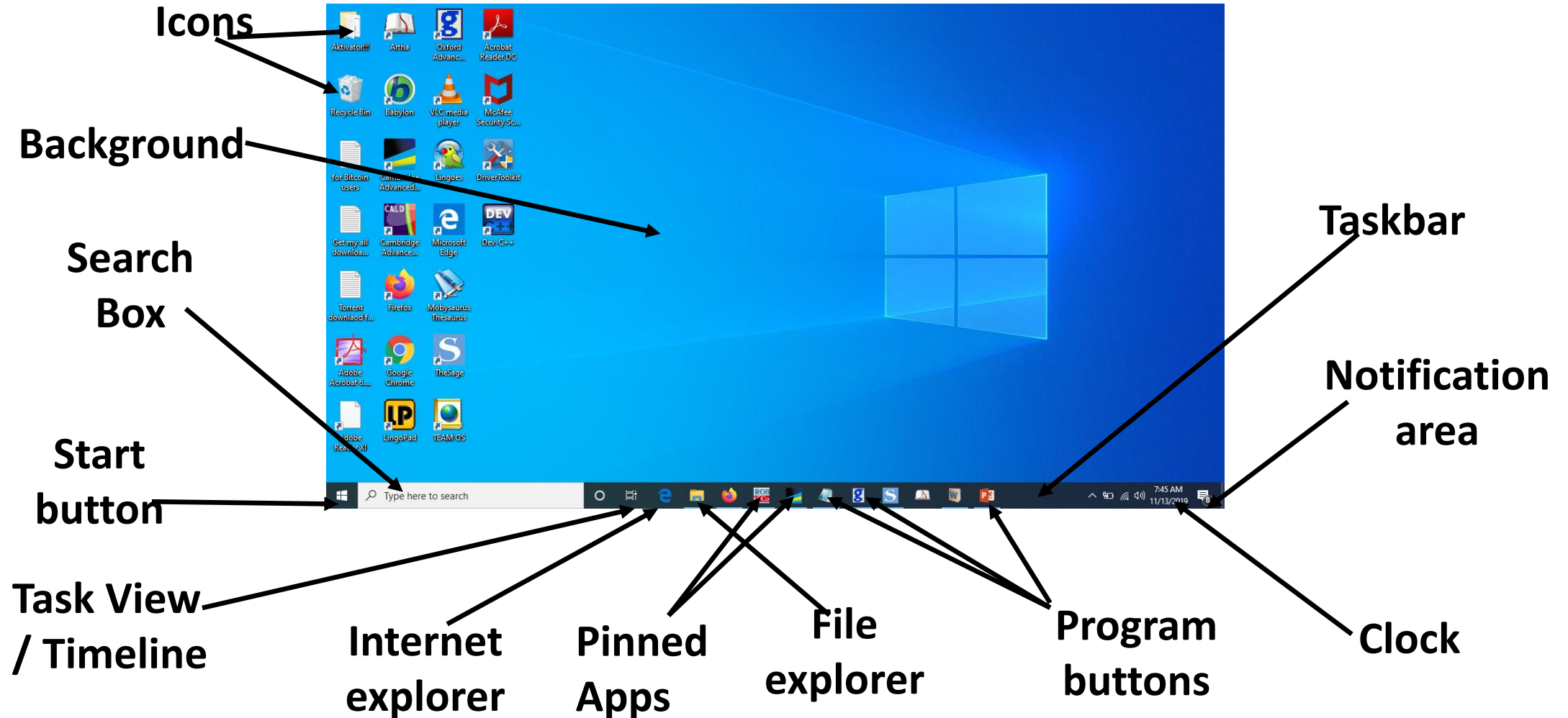
- **Security** refers to the steps a computer owner takes to prevent unauthorized use of or damage to the computer
 - **Malware**
 - **Viruses**
 - **Antivirus software**
 - **Spyware**
 - **Adware**
 - **Firewall**
 - **Spoofed site**
 - **Phishing**
 - **Pharming**

Computing in the Cloud

Cloud computing means that data, applications, and even resources are stored on servers accessed over the Internet rather than on users' computers, and you access only what you need when you need it

Windows Live SkyDrive

MICROSOFT WINDOWS 10 DESKTOP



Desktop Components

- **Start Menu:** The start menu is like a road map for your computer. It lets you launch applications, shut down your computer, access system settings, and much more.
- **Search Box:** The search box allows you to quickly search your computer and the Internet at a point, right from the taskbar.
- **Task View / Timeline:** The task view button, in version 1709, allows you to manage your virtual desktops and move application windows between them.
- **Pinned Apps:** Applications that you use commonly can be pinned to your taskbar.
- **Task Tray:** If an application is open, and has not been pinned to the taskbar, it will show in the task tray.

Desktop Components (Cont.)

6. Notification Tray & Clock: The notification tray shows icons of applications that are running in the background and provides access to Internet and sound settings.

The clock: displays the current time and date.

7. Action Center: The Action Center is Windows' main notification system. Any slide-out notification that you receive will be stored in this panel until you clear them. The Action Center also provided quick access to system features such as Wi-Fi, Bluetooth, and Projection.

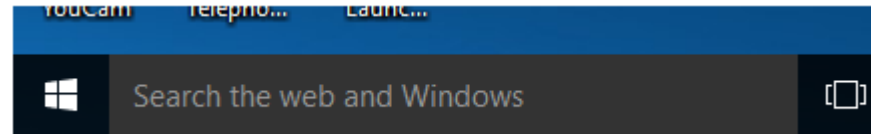
8. Desktop Icons: The desktop holds application icons. By default, we include shortcuts to log off or restart your computer, and Firefox.

9. Desktop: The desktop holds your desktop icons and has a customizable background image.

START MENU Windows 10

- The Start Menu is the main point of access to your applications. There are two main ways to open it –
- Step 1 – Use your mouse to click Windows icon in the lower-left corner of the taskbar.

- Windows Icon



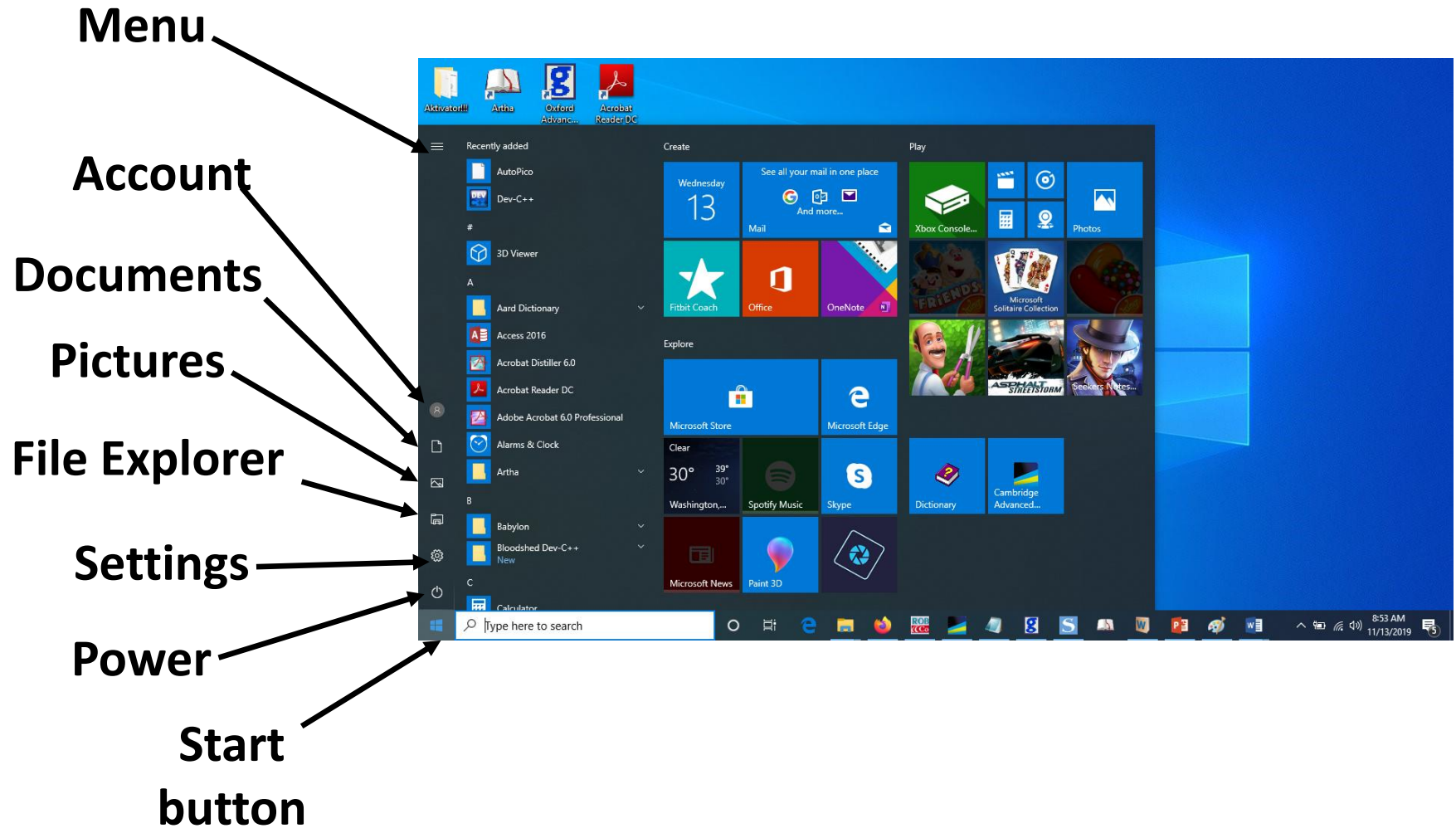
- Step 2 – Press the Windows key on your keyboard.

- Windows Key



- The Windows 10 Start Menu features two panes.

START MENU Windows 10



START MENU (Cont.)

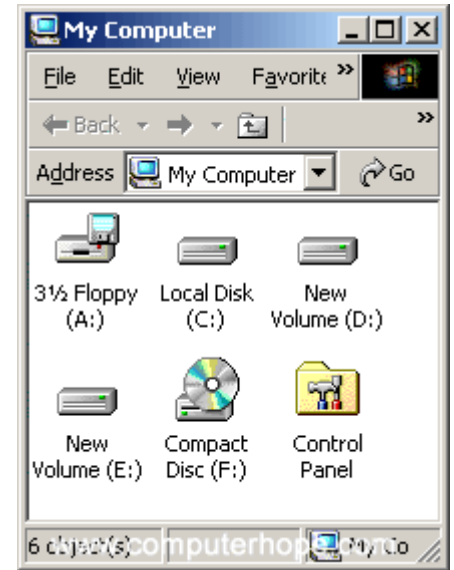
- Enables you to access all programs, documents, and other computer resources.
- The programs listed in the left pane of the Start menu vary depending on which programs you have used recently.
- All programs can be located by clicking All Programs.
- The right pane contains links to files and resources on your computer. One of the key links that will be useful is Help and Support.
- Note that the Shut down button is also located on the Start menu.

DRIVE

- It is a location (medium) that is capable of storing and reading information that is not easily removed, like a disk or disc. All drives store files and programs that are used by your computer.

COMPUTER DRIVES

In the example shown on this page, drive A: is the floppy drive, C: is the primary hard drive, D: and E: are partitions of the hard drive, and F: is the CD-ROM drive. The CD-ROM drive is usually the last drive letter, so in most situations the hard drive is the C: drive and a CD-ROM or other disc drive is the D: drive.



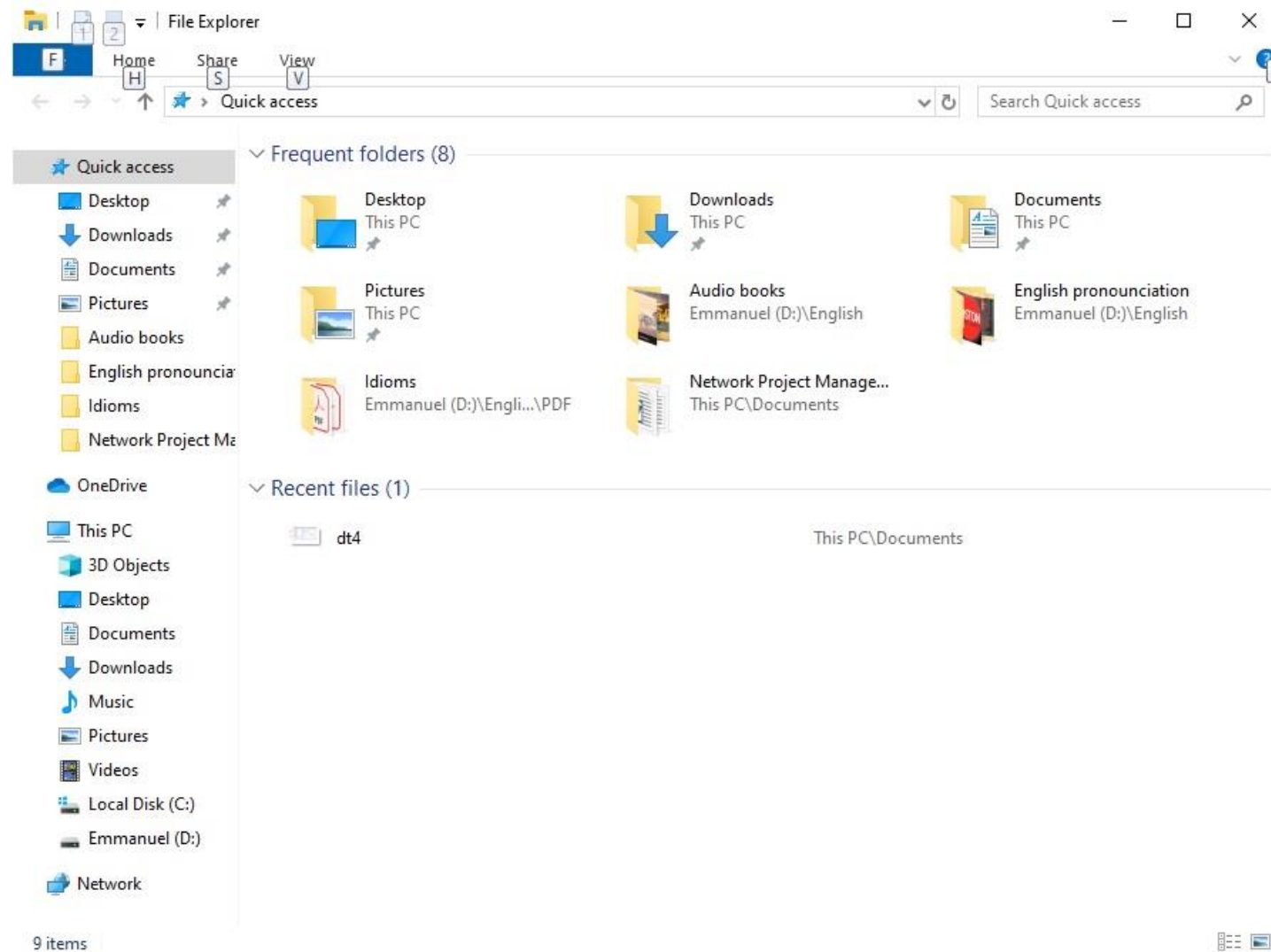
DRIVES ACCESS

- Click the Start button to display the Start menu.
- Click Computer in the right pane to view the drives and storage devices connected to your computer.

FILE EXPLORER

- *It* is a file management program.
- You can access *File Explorer* by right-clicking the Start button, selecting Windows System and clicking File Explorer (Windows 10).
- **LIBRARIES**
- When Windows Explorer opens some libraries: Documents, Music, Pictures, and Videos...

FILE EXPLORER Windows 10 (Cont.)



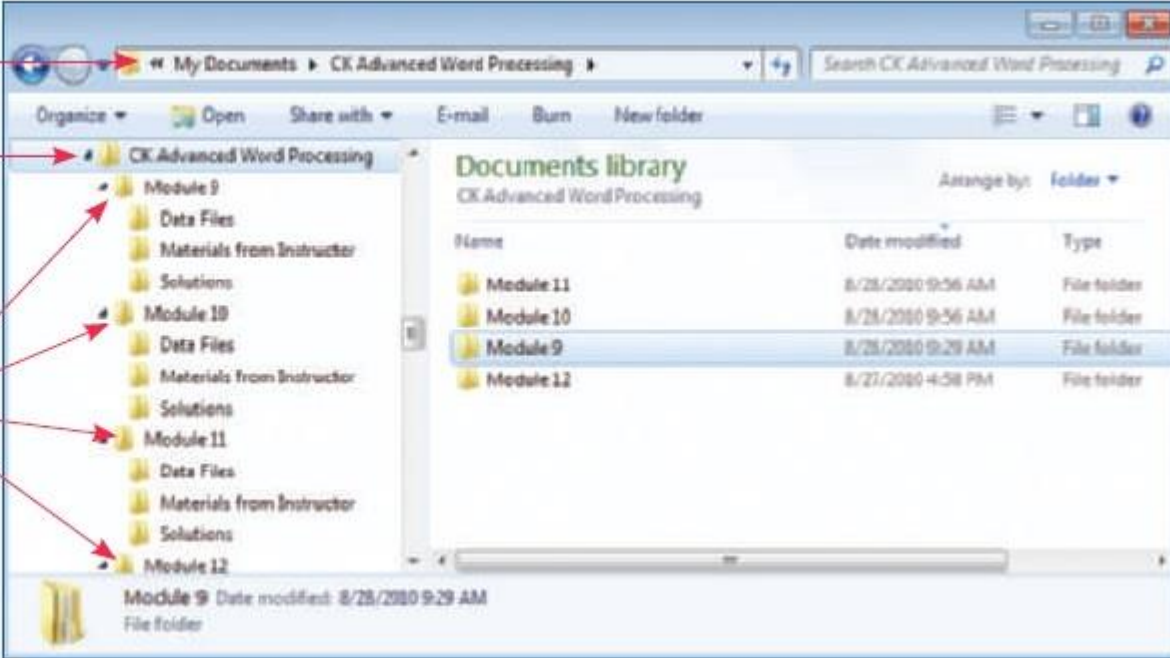
DOCUMENT MANAGEMENT

- A logical system for storing documents enables you to locate and retrieve the documents when you need them.
- **FOLDER STRUCTURE**

Address Bar

Note the first level folder—the CK Advanced Word Processing class is under My Documents.

These modules are folders under CK Advanced Word Processing and have subfolders for data files, materials from instructor, and solutions.



Name	Date modified	Type
Module 11	8/28/2010 9:56 AM	File folder
Module 10	8/28/2010 9:56 AM	File folder
Module 9	8/28/2010 9:29 AM	File folder
Module 12	8/27/2010 4:58 PM	File folder

Module 9 Date modified: 8/28/2010 9:29 AM
File folder

Organizing Files and Folders

- A file, or document, is a collection of data that has a name and is stored in a computer
- Organize files by storing them in folders
- Disks contain folders that hold documents, or files
 - USB drives
 - Compact discs (CDs)
 - Digital video discs (DVDs)
 - Hard disks
- Removable disks are inserted into a drive

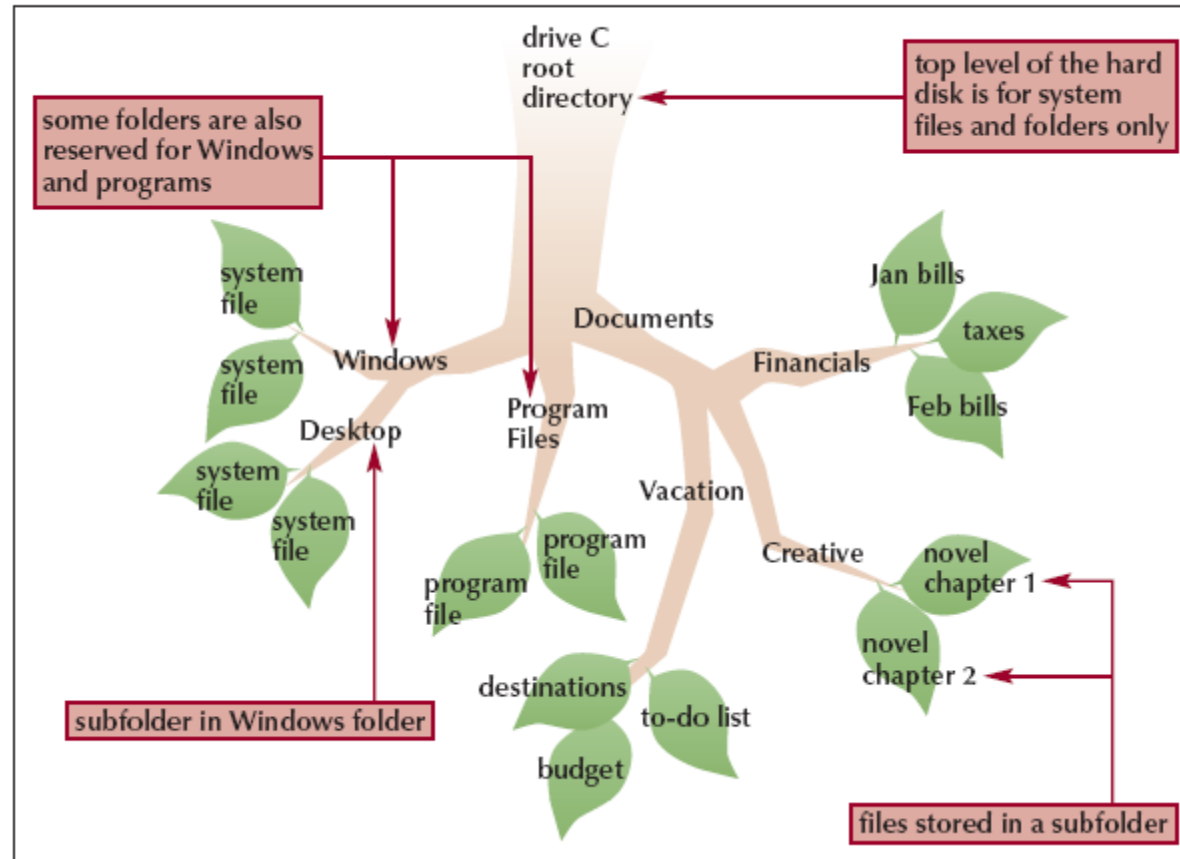
Understanding the Need for Organizing Files and Folders

- Windows organizes folders and files in a hierarchy, or file system
- Windows stores the folders and important files it needs to turn on the computer in its root directory
- Folders stored within other folders are called subfolders

Understanding the Need for Organizing Files and Folders

Windows file hierarchy

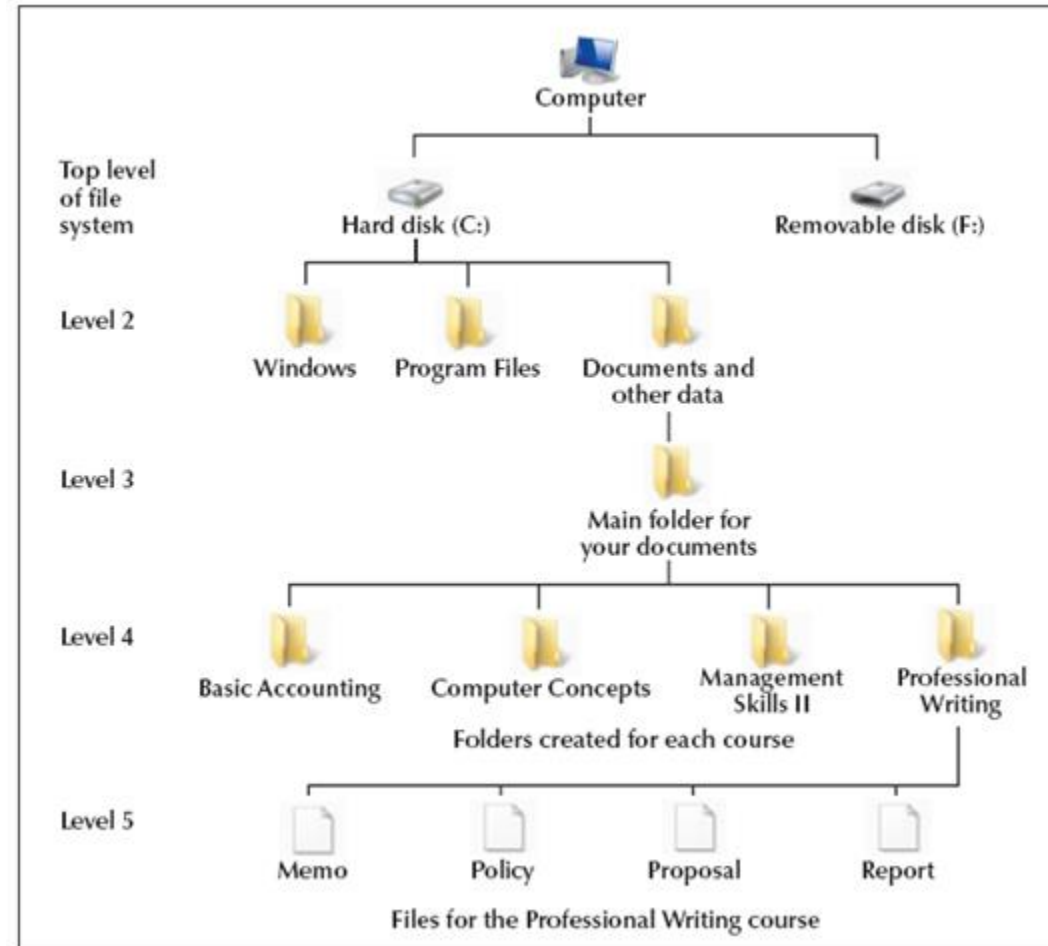
Figure 2



Strategies for Organizing Files and Folders

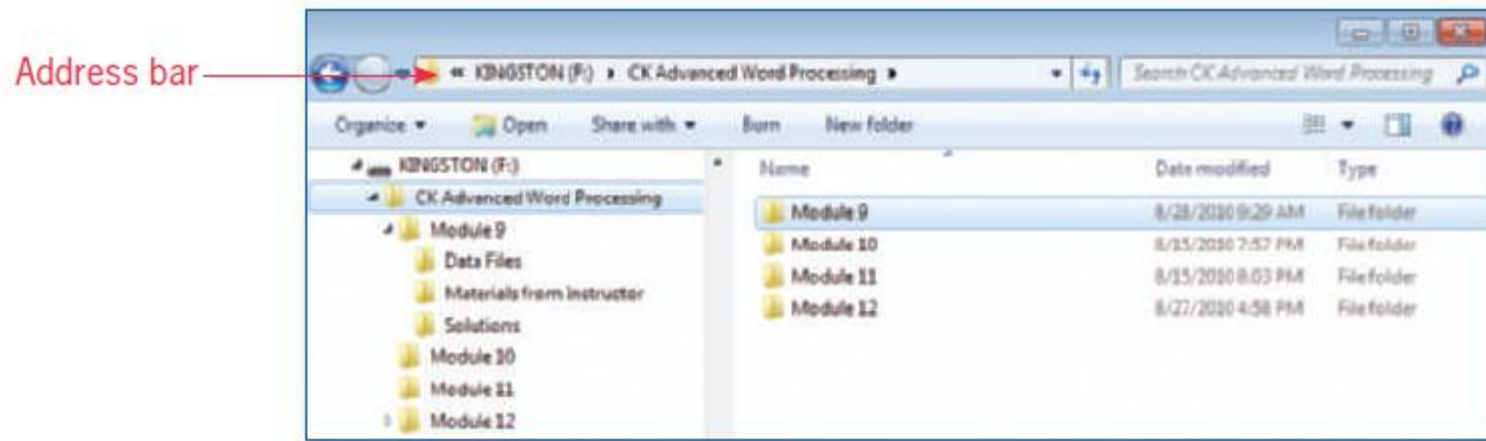
- Type of disk you use to store files determines how you organize those files
- Storing files on removable media allows you to use simpler organization
- The larger the medium, the more levels of folders you should use
- Documents folder
- You should have a backup, or duplicate copy, of important files

Organizing Files and Folders



FOLDER ADDRESSES

- A folder is a location for storing files or other folders. The Address Bar shows the location of the folders. In the Address bar, each level of the hierarchy is separated with a > symbol; the highest level folder displays at the left side of the Address bar. The > symbol indicates the next lower level.



WORKING WITH FOLDERS AND FILES

- To create a folder

1. In the Navigation pane, click the drive that is to contain the new folder. If a subfolder is desired, highlight the folder that will contain the new folder.
2. Click the New folder button to display a new folder.
3. Key the name of the new folder and tap ENTER.

- To copy a folder

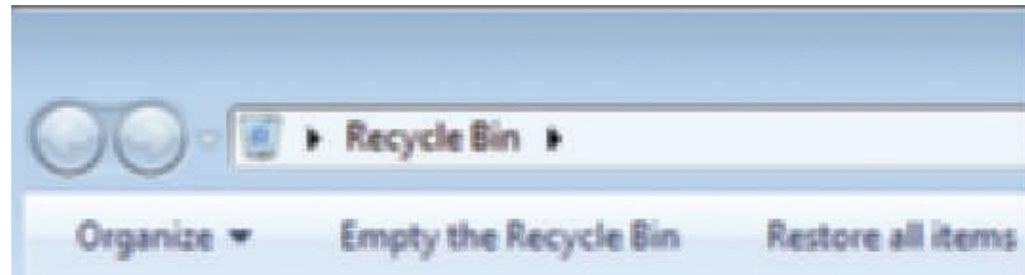
1. Highlight the file or folder that is to be copied. Click Organize and then click Copy.
2. Navigate to the desired location, such as a flash drive, and click the icon.
3. Click Organize and then click Paste.

WORKING WITH FOLDERS AND FILES

- To rename a folder or folder
 1. Right-click the file or folder icon.
 2. Left-click Rename from the Shortcut menu.
 3. Key the new name and tap ENTER..
- To copy a folder or folder
 1. Highlight the file or folder that is to be moved and click Organize.
 2. Click Cut.
 3. Navigate to the desired location, such as a flash drive, and click the icon.
 4. Click Organize and then click Paste.

WORKING WITH FOLDERS AND FILES

- To delete a folder or folder
 1. Highlight the file or folder that is to be deleted.
 2. Click Organize and then click Delete.
 3. The Delete Folder dialog box displays to confirm the
 4. Delete request. Click Yes.
- **RECYCLE BIN**
- The Recycle Bin provides temporary storage for deleted files. If you accidentally delete a file, you can select the file and click Restore this item. To permanently remove all files, click Empty the Recycle Bin.



MS-DOS

- MS-DOS: "Microsoft Disk Operating System".
- Used a command-line interface for the user to input commands.
- Popularly used in PCs before a GUI operating system called Microsoft Windows came out, and still is used in some places today.

Get to a Command Prompt in Windows 10

- Click Start.
- Type cmd and press Enter.

NB: For some commands and options to work in the Windows 10 command line, you must run the command line as administrator. To do this, right-click on the cmd icon and choose Run as administrator.

MS DOS Commands

- **Change a directory -**
- Go to the folder you want to use. You use **cd** path where "path" is the address of the folder in which you want to create the new folder, then press ↵ Enter.
- Example: cd desktop ↵

- **Create a directory -**
- Enter the "make directory" command. Type in **mkdir** or **md** name where "name" is the name of the directory.

Example: mkdir Homework ↵

Leaving a directory

- **Leaving a directory**

Suppose you are in the C:\Windows\System32 directory and you want to move one level back and be in C:\Windows directory.

- You will have to typed: cd..

If you want to be in the root directory

- You will have to typed: cd\

The list of all MS DOS commands:

- help↵

Getting help for any command:

- help command name↵
- Example: help dir↵