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Seminar On Introduction to Computer

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What is a Computer?

- The straightforward meaning of a computer is a machine that can calculate. However, modern computers are not just a calculating device anymore. They can perform a variety of tasks. In simple terms, a computer is a programmable electronic machine used to store, retrieve, and process data.
- According to the definition, "**A computer is a programmable electronic device that takes data, perform instructed arithmetic and logical operations, and gives the output.**"

History of Computers

- Charles Babbage - father of computer
  - » 1800's planned analytical engine
- ENIAC - developed at end of WW II
- 1951 - 1963 1st and 2nd generation
  - » very large, used unreliable vacuum tubes
- 1963 - present - 3rd and 4th generation
  - » smaller, faster - use transistors and integrated circuits

History - Microcomputers

- Apple
  - First sold in late 1970's
  - Developed by Jobs and Wozniak
- IBM Personal Computers
  - First sold in 1981
  - Was quickly accepted by businesses
  - IBM compatibles soon developed

Generations of Computer

- **First Generation (1946 - 1959)**: During the first generation, computers were based on electronic valves (Vacuum Tubes). Some popular computers of first-generation are ENIAC, EDVAC, UNIVAC, etc.
- **Second Generation (1959 - 1965)**: During the second generation, computers were based on Transistors. Some popular computers of second-generation are IBM 1400, IBM 1620, IBM 7000 series, etc.

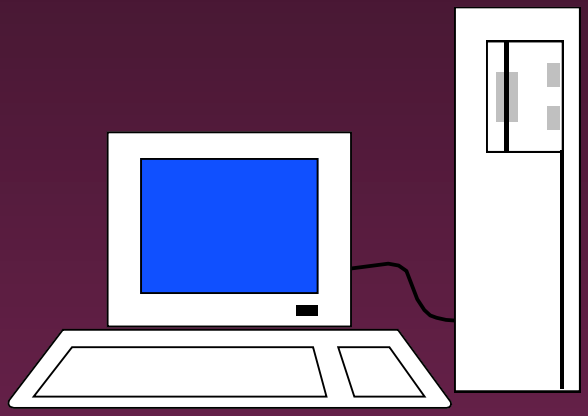
Generations of Computer

- **Third Generation (1965 - 1971)**: During the third generation, computers were based on **Integrated Circuits (ICs)**. Some popular computers of the third generation are IBM 360, IBM 370, PDP, etc.
- **Fourth Generation (1971 - 1980)**: During the fourth generation, computers were based on **very large scale integrated (VLSI)** circuits. Some popular computers of fourth-generation are STAR 1000, CRAY-1, CRAY-X-MP, DEC 10, etc.

Generations of Computer

- **Fifth Generation (1980 - Present)**: The fifth generation is still ongoing. The computers are based on multiple technologies, such as **ultra large scale integration (ULSI), artificial intelligence (AI)**, and parallel processing hardware. The fifth generation of computers includes Desktop, Laptop, NoteBook, etc.

Types of Computers – Personal Computers (PC)



- Also called Microcomputers
- Available in desktop size, notebook size and handheld
- Can be IBM, IBM Compatible or Apple

Types of Computers - Minicomputers

- Size of filing cabinet
- Used by small and medium size companies and institutions
- Operated by computer specialist
- Terminals allow many people to use

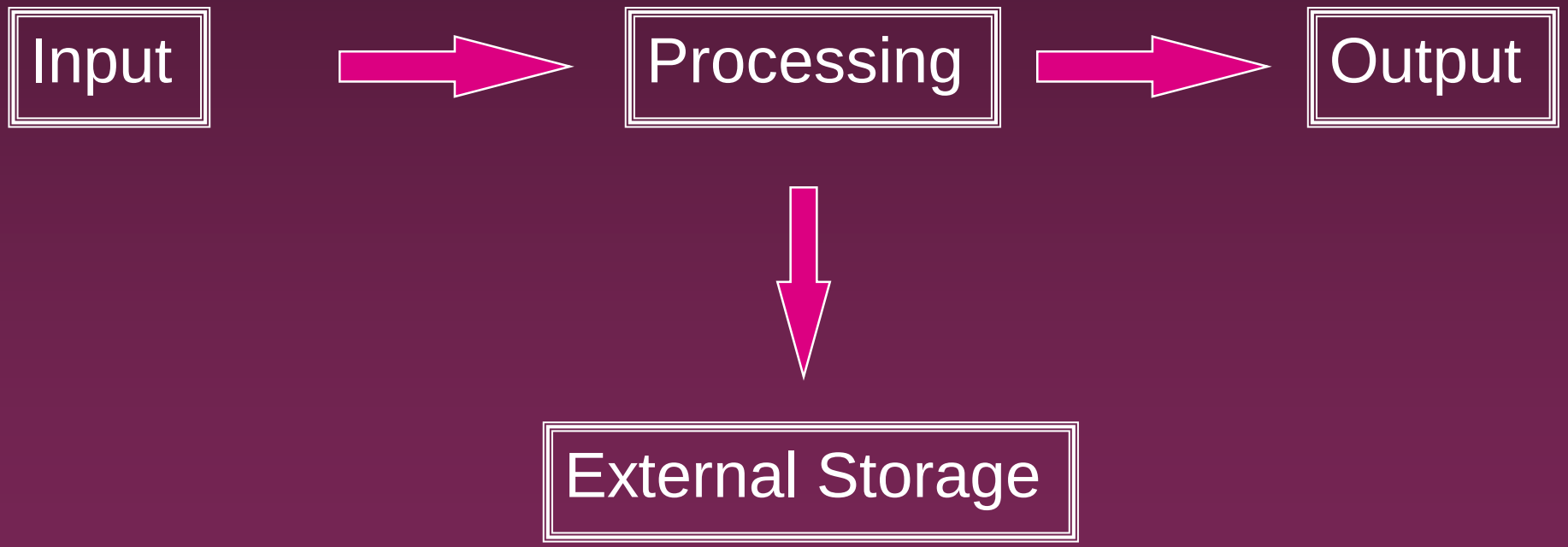
Types of Computers - Mainframes

- Very powerful
- Very fast
- Used by large corporations and governmental agencies
- Operated by computer specialist

Types of Computers- Supercomputers

- Most powerful
- Fastest
- Most expensive
  - Several million dollars each
- Used only by
  - Governmental agencies
  - Large international corporations

Computer Operations



Hardware

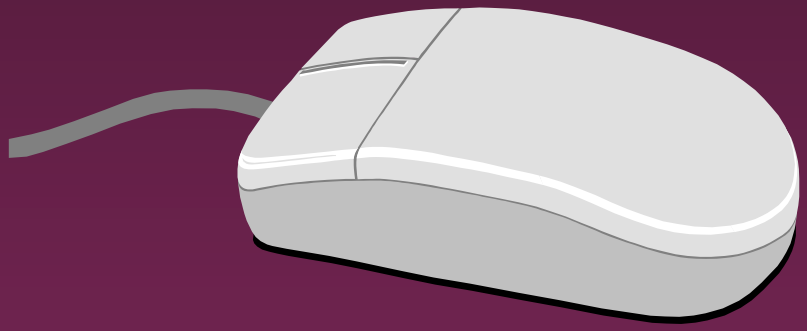
Computer hardware is the collection of physical elements that constitutes a computer system. Computer hardware refers to the physical parts or components of a computer such as the monitor, mouse, keyboard, computer data storage, hard drive disk (HDD), system unit (graphic cards, sound cards, memory, motherboard and chips), etc. all of which are physical objects that can be touched.

Input Devices - Keyboard

- Most commonly used input device
- Ergonomic - fit natural hand placement
- Special keys
  - » Enter, Function, Ctrl, Alt, Num Lock, Esc

Input Devices - Mouse

- Controls cursor on screen
- May be mechanical or optical
- Most models have a “wheel” for scrolling



Input Devices - Other

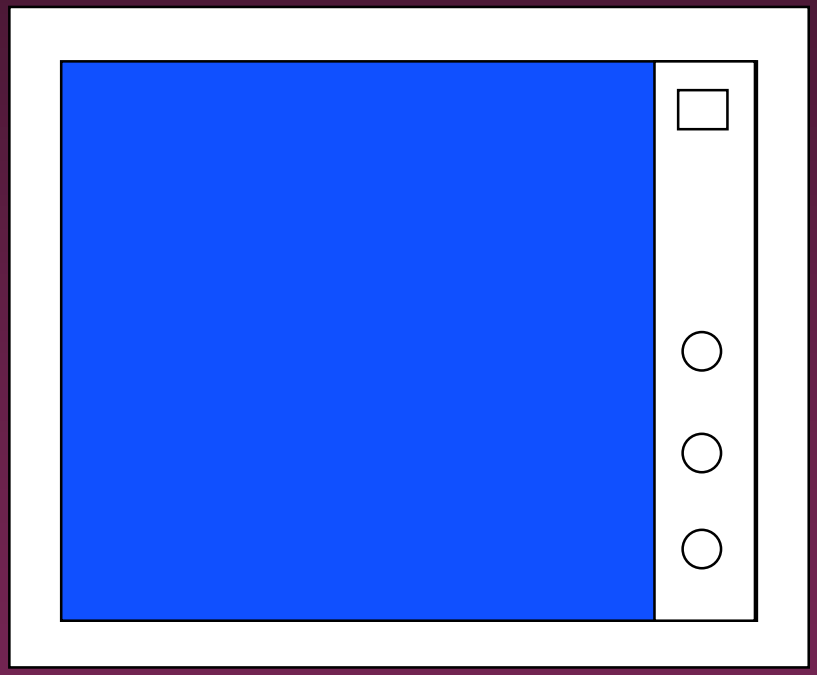
- Pointers (replaces mouse on notepads)
  - » Track point, track ball, touch pad
- Scanner
- Digital camera
- Touch screen
- Voice

Output Devices

- Monitor
- Printer
- Disk Drive
  - » Can also be input device
- Modem
  - » Can also be input device

Monitors

- Made up of tiny elements called **pixels**
- Each row of pixels is called a **scan line**
- Picture is displayed by an electronic beam lighting up certain pixels



Monitors - Resolution

- Resolution is how sharp and clear the picture is
- How many scan lines on the screen
  - 640 x 480 is low resolution
  - 1600 x 1200 is high resolution

Monitors - Dot Pitch

- Measures the distance between pixels
- Commonly seen on monitors advertised
  - .49 (not very good)
  - .28 (much better)
  - .26 or lower (excellent)

Monitors - Sizes

- Screen measured diagonally
  - » May also measure actual viewing area
- 14” or 15” on bargain systems
- 17” has become the standard
- 19 and 21” available but are more expensive.

Monitors - LCD

- Liquid Crystal Display
- Similar to digital watch
- Used for notebook computers
  - » Should be an Active Matrix Screen
- Also used in flat screen monitors
  - » Much thinner than regular CRT monitor
  - » More expensive than regular CRT monitor

Monitors - Video Card

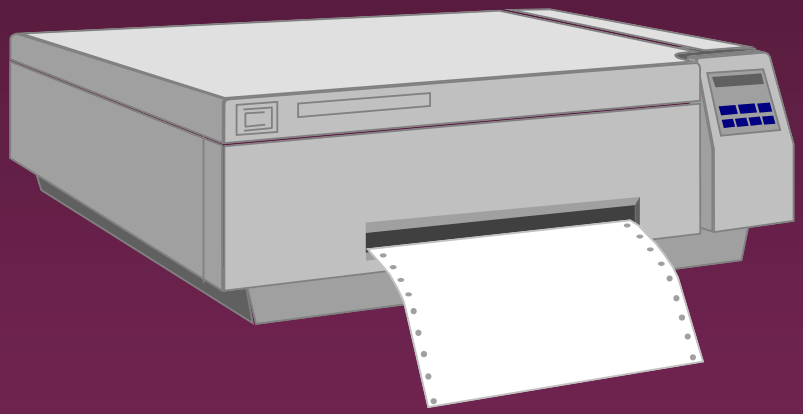
- Processes info to send to monitor
- Amount of video memory may speed up graphic intensive programs
  - » 32 megs –general purpose
  - » 128 or more megs – graphic intensive use
- AGP port can speed up graphics
- 3D accelerator card improves graphics

Monitor - Buying Hints

- 17” or larger
- .28 dot pitch or better
- 32 or more megs of memory on video card

Printers

- Laser
- Ink Jet
- Dot Matrix



Printers - Laser

- Works similar to a copy machine
  - » Color printers available but more expensive
- Fast, quite, with excellent quality
- More expensive to buy and operate
- Some units scan, photocopy, and print

Printers - Ink Jet

- Squirts small jet of ink onto paper to form characters
- Replaced dot matrix
- Quiet
- Does good job on color
- Good quality and reliability

Printers - Dot Matrix

- Strikes pins against ribbon to print
- Comes in 9 and 24 pin
- Once very popular
- Now replaced by ink jet and laser

Printers - Speed

- Measured in pages per minute (PPM)
- Laser printers range from 20-45 ppm
  - » Color printing is slower

Printers - Quality of Print

- One measure is dots per inch (DPI)
  - 300 dpi for general purpose uses
  - 600 dpi for higher quality
  - 1200 dpi for photo quality
- May have different vertical and horizontal resolution
  - 600 x 300
- Other factors can affect quality

Basic Processing Cycle

How Information Is Stored

- Memory consist of switches which can be either on or off - Off=0 On=1
- Each on/off switch is called a **bit**
- Eight bits make up a **byte**
- It takes one byte to store a character
  - » Character can be letter, space, punctuation, etc.
  - » ASCII code used

Other Memory Terms

- **Byte** is eight bits
- **Kilobyte** (KB) is approx. 1,000 bytes
- **Megabyte** (MB) is approx. 1million bytes
- **Gigabyte** (GB) is approx. 1 billion bytes

Central Processing Unit

- Also called CPU, processor or microprocessor
- Is the “brains” of the computer
- Performs all computer operations

CPU - IBM COMPATIBLES

- Many made by company called Intel
- Also made by AMD

Pentium class processors

- Needed to run most current software
- Intel – Celeron or Pentium IV
- AMD

CPU - Clock Speed

- Number of “cycles” per second computer can operate
- Measured in megahertz (MHz)
- One MHz = 1 million cycles per second
- One gigahertz(GHz)=1 billion cycles
- Current speeds 2-4 GHz

CPU - Misc.

- Performance also affected by speed of data bus
  - » 400-800 MHz on most current systems
- Cache can increase speed
  - » Stores data you will likely need next in an area that has faster access
  - » Both memory cache and disk cache used
  - » Should be 512 K or better

CPU - Buying Hints

- Minimum of Pentium IV or AMD Athlon
- Minimum of 2 GHz clock speed
- Minimum of 512K of cache

Internal Memory - RAM

- RAM - Random Access Memory
  - » CPU can access any location as quickly as any other
- Can not only read current info but also write new info
- Very important in determining capabilities of the computer system
- Computer should have at least 256 megs - 512 preferred (can add to later)

Internal Memory - ROM

- ROM - Read Only Memory
  - » Can read info Stored in ROM
  - » Can not write new info into ROM
- Used for “internal workings” of computer
- Buyer is not very concerned with ROM

External Memory

Floppy Drives

- Comes in 5 1/4” and 3 1/2”
  - » All systems now only have 3 1/2”
- HD - High density - comes on all current systems
  - » 3 1/2” - 1.44 megs

Hard Drives

- Built into machine
- Made up of stack of platters
- Can store much more than floppy drives
  - 40 gigabytes should be minimum
- Can access info much faster than floppy drive

CD ROM

- Same as music CDs
- Are read only
- Can store over 650 megs
- All programs now only sold on CD
- Make multimedia possible
- Come in different speeds - 20x, - 50x

DVD-ROM

- Digital Video Disk
- Can store up to 17 GB
- Can store full-length movies
- Can also read CD-ROM disk

CD-RW & DVD-RW DRIVES

- Allows you to write to disk
- Useful for
  - » Data backup
  - » Storage of large files
  - » Recording music and other multimedia files
- DVD-RW
  - » Allows you to write to both CD and DVD disk
  - » Still somewhat expensive

Storage Devices - Other

- USB drive
  - » Very popular – 64-512 MB
- Tape drive
  - » Similar to cassette tape
  - » Used for backup
- Zip drive
  - » 100 MB to 2 GB capacity
  - » Everyday use and backup

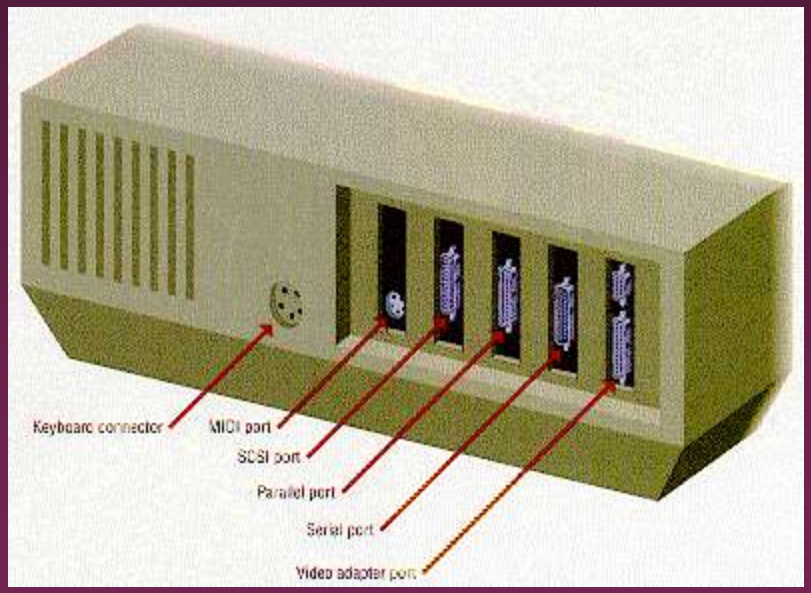
Drives - Buying Advice

- 40 gigabyte hard drive
- One 3 1/2” high density floppy drive
- CD-RW drive
- DVD not yet essential but useful

Expansion Slots

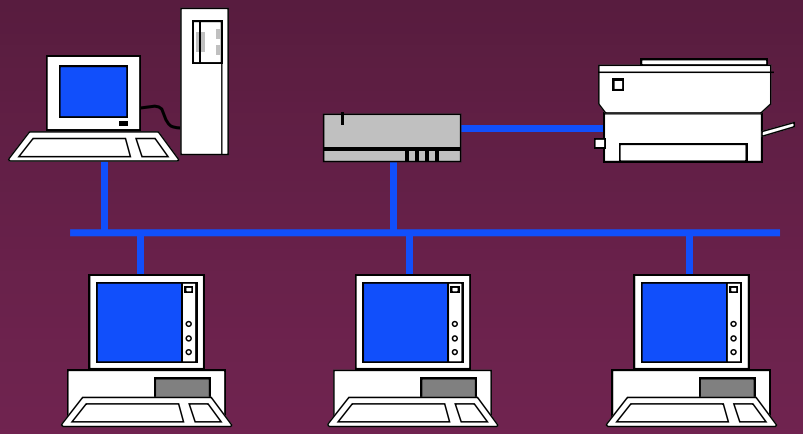
- Allows you to add capabilities
- Example of cards you can add
  - Network card
  - Modem

Ports



- Connects computer to another device
- Parallel port
  - » Used primarily by printers
- Serial ports
  - » Modem, mouse, etc.
- SCSI - chain devices
- USB –may be needed for
  - » Digital Cameras
  - » Mp3 players
  - » Other devices

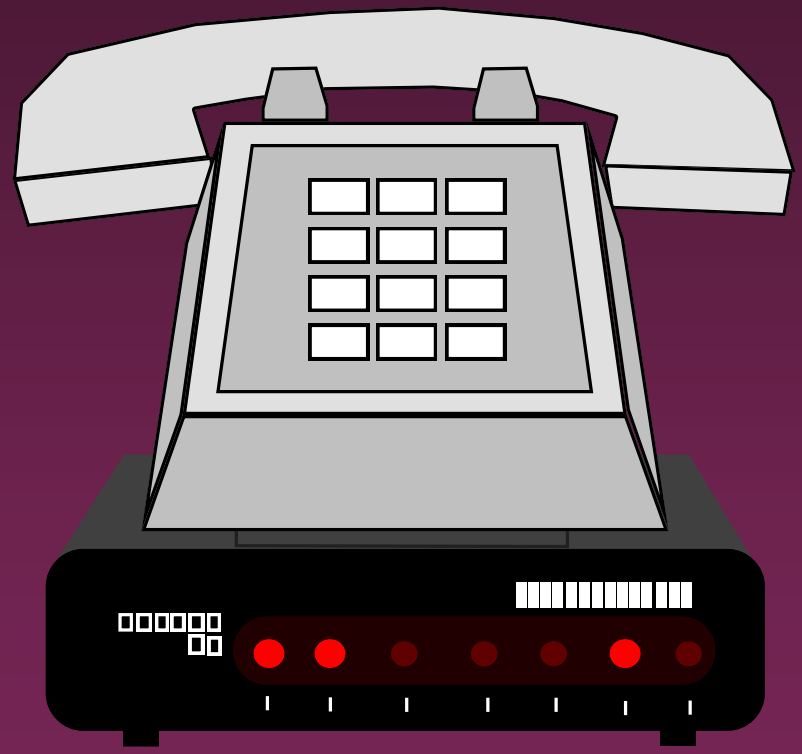
Networks



- Connects computers
- LAN - Local Area
- WAN - Wide Area
- Wireless
- Allows sharing of programs, files, printers, etc.
- Server is “main” computer

Modems - General

- Allows 2 computers to communicate over phone lines
- Can be internal or external
- Can also have fax capabilities



Modems

- Bits per second(bps) indicates speed
  - Old modems - 9,600, 14,400, 28,800, 33,600
  - 56,000 (56K) has becoming standard
- Ways of connecting to the Internet
  - Dial-up modem – used in most homes
  - Cable modem – uses TV cable lines
  - DSL – modified phone line
  - T1 line – used by schools, businesses, etc.

Buying Hints Summary - Min Hardware Requirements

- 2 GHz Pentium IV Class Processor
- 256 megabytes of RAM
- 17”, .28 dot pitch monitor with 32 meg card
- 40 gigabyte hard drive
- CD-RW
- 56k modem
- Ink jet or laser printer

Buying Hints - Software Bundles

- Many systems come with software included
- Productivity
  - » Microsoft Works
  - » Microsoft Office, Lotus SmartSuite, etc
  - » Quicken, Money, or other financial software
- Reference
  - » Microsoft Encarta or Compton's encyclopedia
- Games

Buying Hints - Service and Warranty

- Toll-free 24 hr 7 day support (800 #)
- 1 year warranty on parts and labor
- Optional extended warranty
- 30 day return policy

SOFTWARE

Programs

- Set of instructions to the computer
- Programming languages
  - » Machine language
  - » Assembly language
  - » Procedural languages
    - – Basic, Fortran, Cobol
  - » Object oriented languages
    - – Visual Basic, C++, C#, Java

Systems Software

- Run fundamental operations
  - Loading and running programs
  - Saving and retrieving data
  - Communicating with printers, modems, etc.
- Examples of systems software
  - DOS
  - Windows 3.1, 95, 98, Me, 2000, and XP
  - Unix
  - Linux

Applications Software

- Helps you to accomplish a certain task
- Examples
  - Word processing - memos, reports, etc.
  - Spreadsheets - budgets, etc.
  - Database - search, sort, select data
  - Educational - simulations, practice
  - Graphics - charts, diagrams
  - Desktop publishing - pamphlets, etc.

Software - Legal Issues

- Commercial software
  - » Can only make backup copies for yourself
  - » Can only use on one machine at a time
    - – Site license - use on more that one machine
- Shareware
  - » Can use - make copies and give to anyone
  - » Should pay if you continue to use
- Freeware – can copy and use indefinitely

Software Viruses

- Illegal code added to a program
- May spread to many computers
  - » Copy files from one computer to another
  - » Download files by modem
  - » E-mail attachments
- Virus may be relatively harmless
  - » Writes “You’ve been stoned” on screen
- Virus may also be very damaging
  - » Erases everything on hard drive
- Virus may activate on a certain date

Virus Protection

- Be careful where you copy files from
- Do not open e-mail attachments unless you are sure that it is safe
- Use virus protection program
  - » Detects and removes illegal code
  - » Should be updated often

Characteristics of Computer

- **Speed**: Computers are a high-speed electronic machine. They can carry around 3-4 million instruction per second. Even advanced computers can handle trillions of instructions per second, cutting down the time to perform any digital tasks.
- **Accuracy**: Computers are also known for their accurate performance. They can complete the given jobs at almost 100% accuracy. Although errors may occur in computers, they are usually caused by incorrect input, incorrect instructions, or bugs in chips. All of these are human errors.

Characteristics of Computer

- **Storage Capacity**: Computers can easily store a massive size of data. Modern computers come inbuilt with high storage features compared to older days. Additional data can be stored on secondary devices like external hard disks, or flash memory, etc. Due to incredible speed, data can be retrieved from storage in no time.
- **Reliability**: Computers are reliable and consistent; they can process the same tasks any number of times without throwing any error. Computers don't get tired like humans, so they are superior to perform rule-based, repetitive tasks.

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