

# BASIC COMPUTER CONCEPTS

# Hardware vs. Software

---

- Hardware
  - » The computer equipment
  - » Includes printers, monitors, disk drives, etc.
- Software
  - » Programs which tell the computer what to do
  - » Examples - word processing, gradebook, tutorials, games, etc.

# HARDWARE

# 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

---

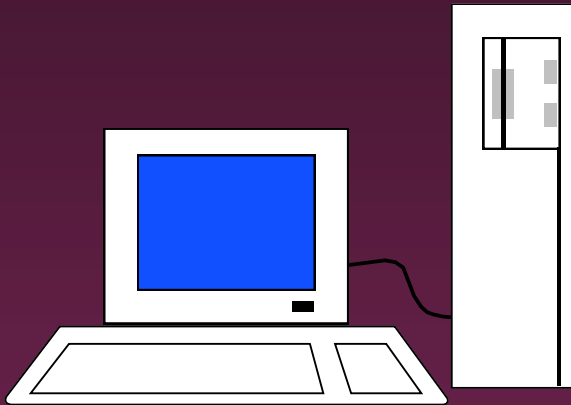
- Apple
  - » First sold in late 1970's
  - » Developed by Jobs and Wozniak
- IBM Personal Computers
  - » First sold in 1981
  - » Was quickly accepted by businesses
  - » IBM compatibles soon developed

# Computer - Social Impact

---

- Threat to privacy
- Reduce personal interactions
- Displace workers and change workplace
  - » Create two tiered society
- Computer failures cause great damage
- Artificial Intelligence
  - » Create a “new life form”
  - » Machines smarter than their creators

# 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

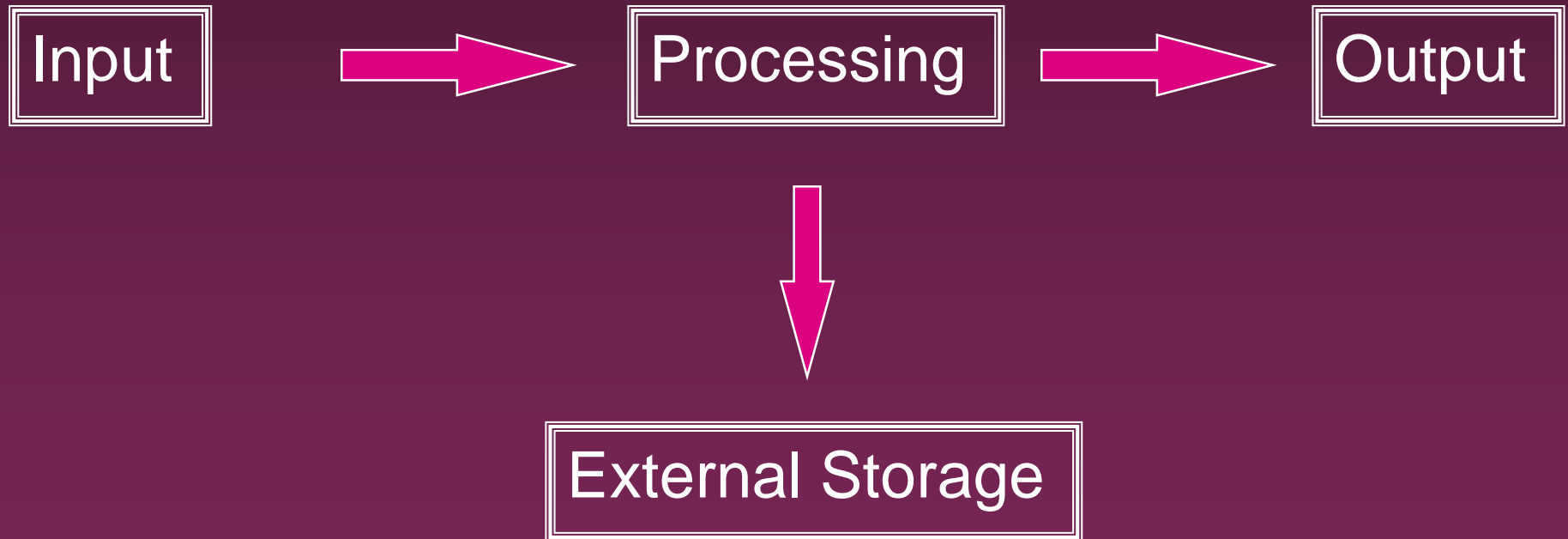
# Types of Computers- Supercomputers

---

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

# Computer Operations

---



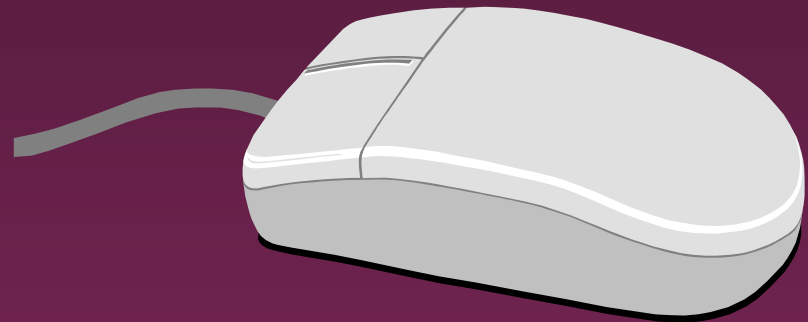
# Input Devices - Keyboard

---

- 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

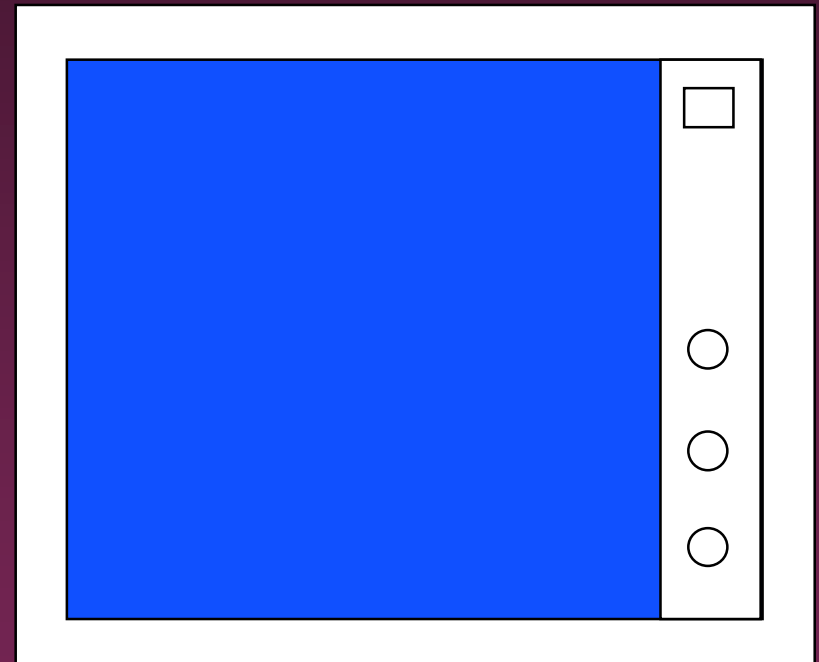
# Output Devices

---

- 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

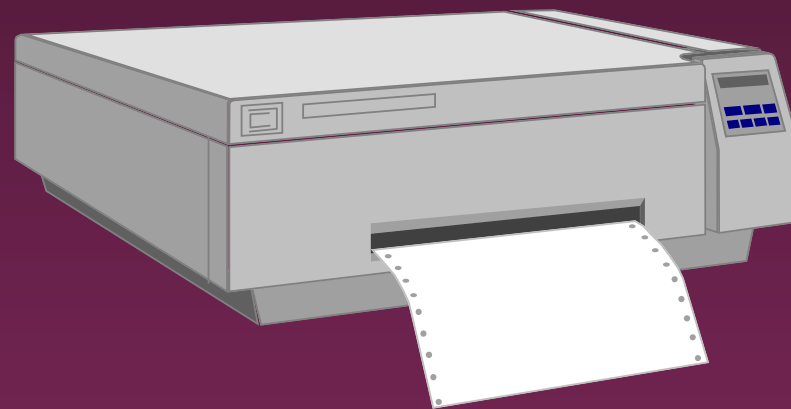
# Monitor - Buying Hints

---

- 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

---

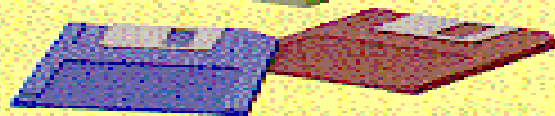
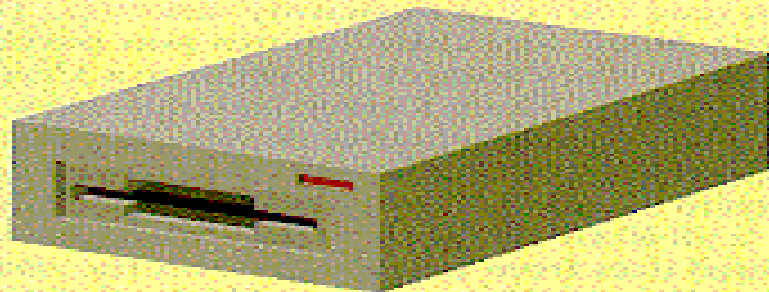
- RAM - Random Access Memory
  - » CPU can access any location as quickly as any other
- Can not only read current info but also write new info
- Very important in determining capabilities of the computer system
- Computer should have at least 256 megs - 512 preferred (can add to later)

# Internal Memory - ROM

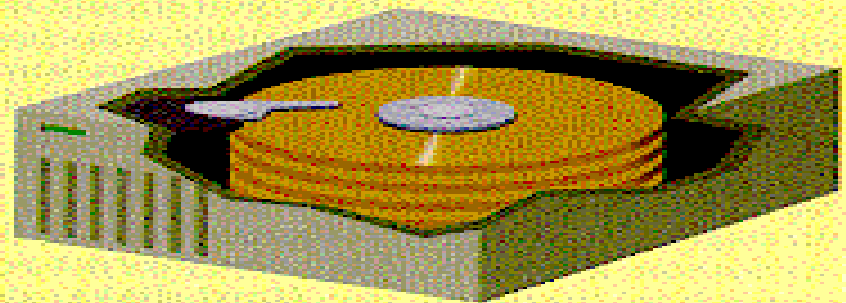
---

- 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

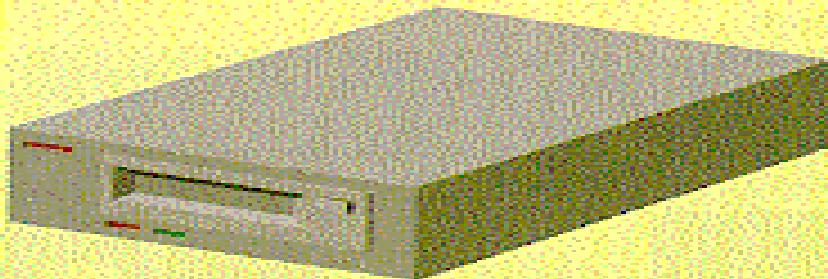
# External Memory



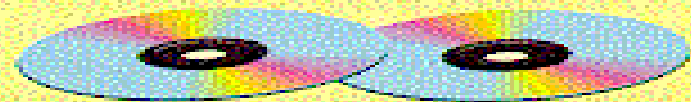
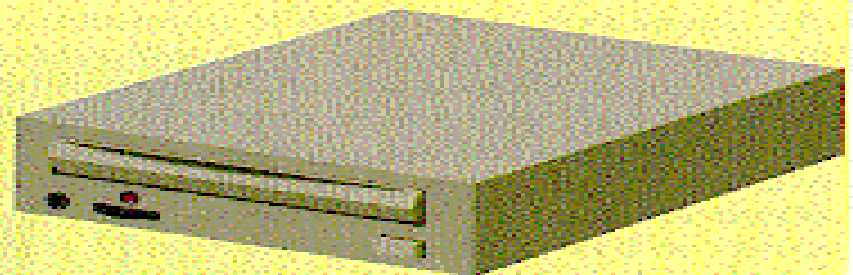
Diskette drive with removable diskettes



Hard disk drive with fixed metal platters



Tape drive with tape cartridges



CD-ROM drive with compact discs



# 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

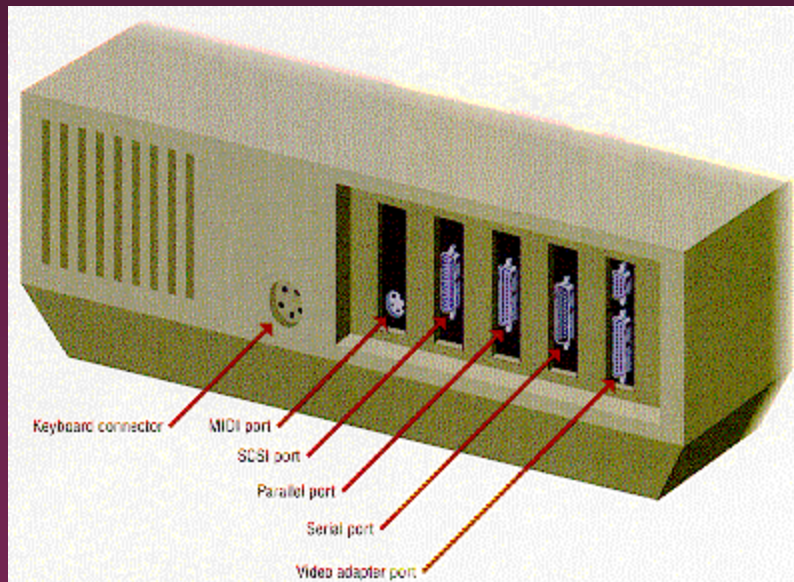
# Expansion Slots

---

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

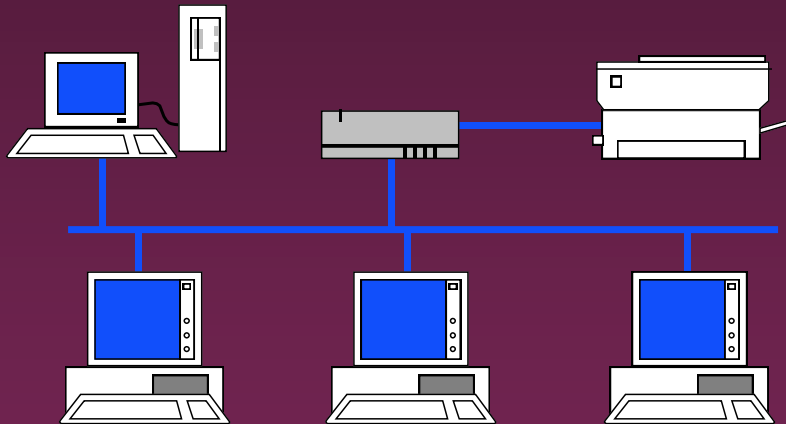


# Ports



- 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

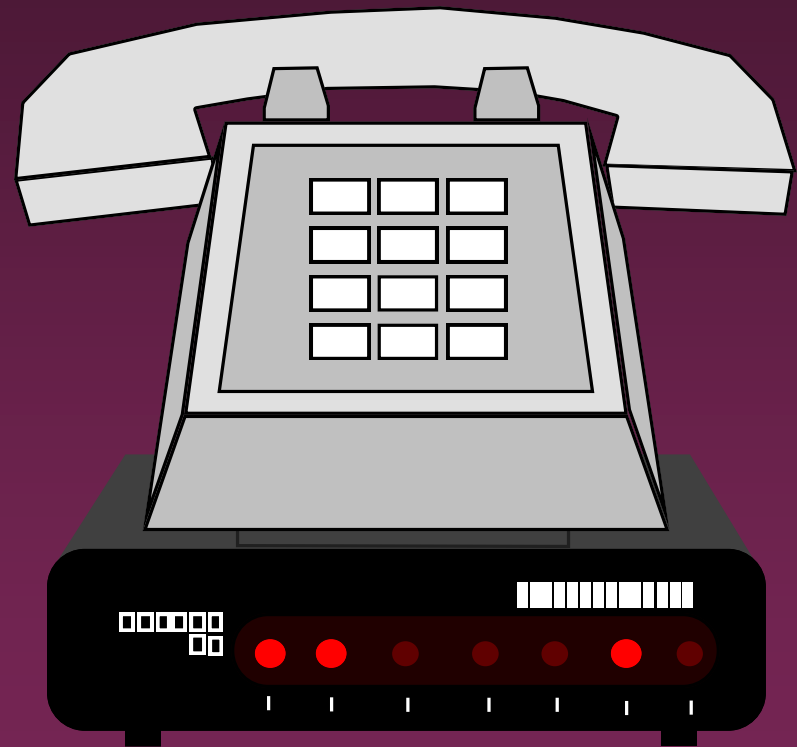
# Networks



- 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

---

53

- 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

# Buying Hints - Web Sites

---

- On-line computer stores
  - » C-Net Hardware – reviews and prices from many vendors
  - » Dell - <http://www.dell.com/>
  - » Gateway - <http://www.gateway.com/>



---

# 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 than 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

---

# BASIC COMPUTER CONCEPTS

End of Slide Show