

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

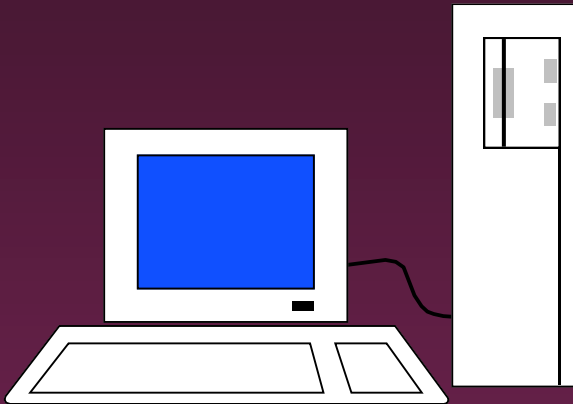
□ IBM Personal Computers

- » 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

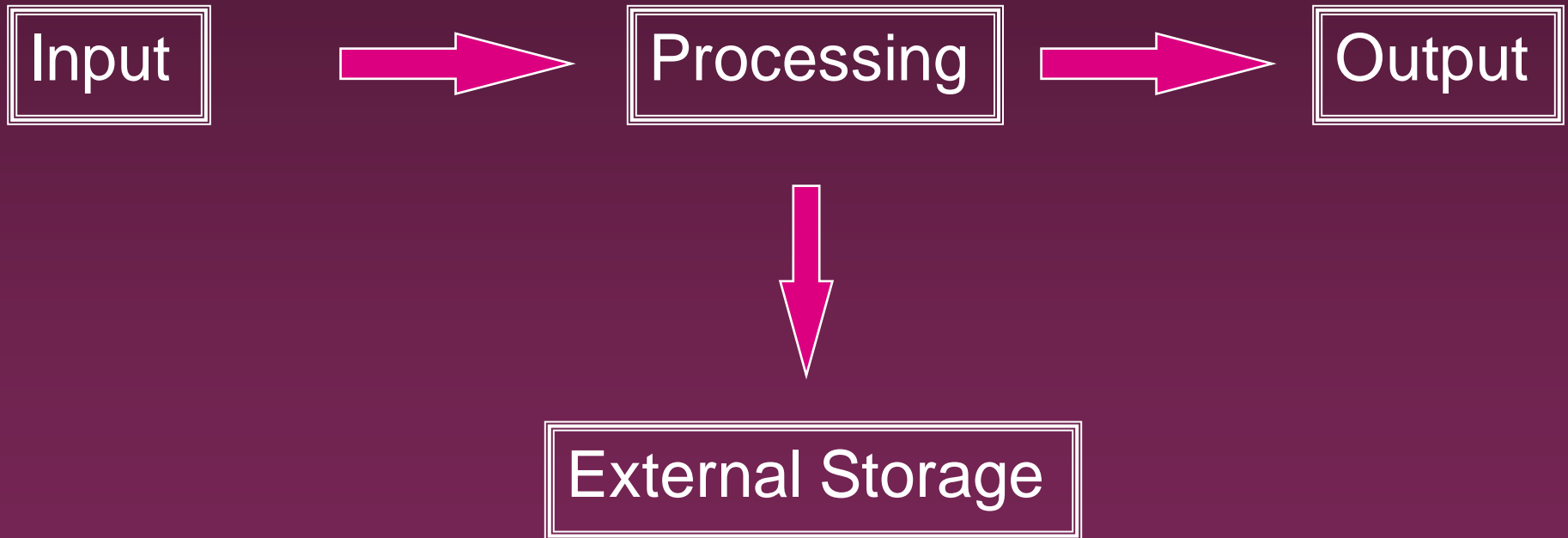
Types of Computers - Mainframes

- 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

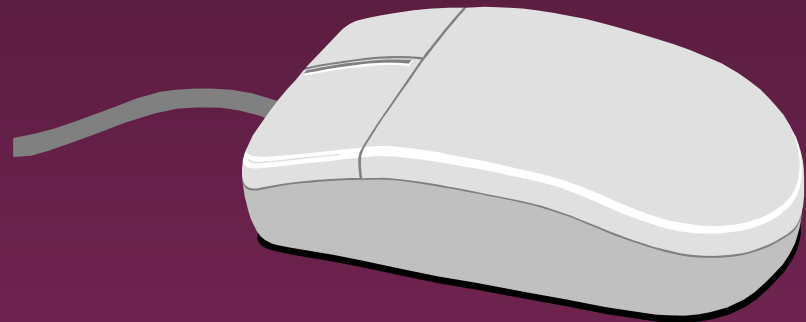


Input Devices - Keyboard

- 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

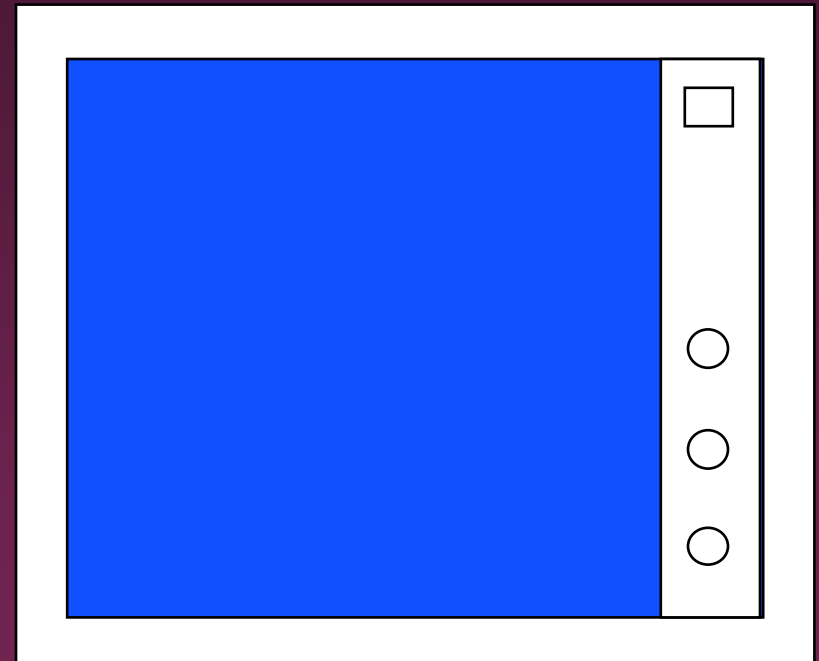
- Pointers (replaces mouse on notepads)
 - » Track point, track ball, touch pad
- Scanner
- Digital camera
- Touch screen
- Voice

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

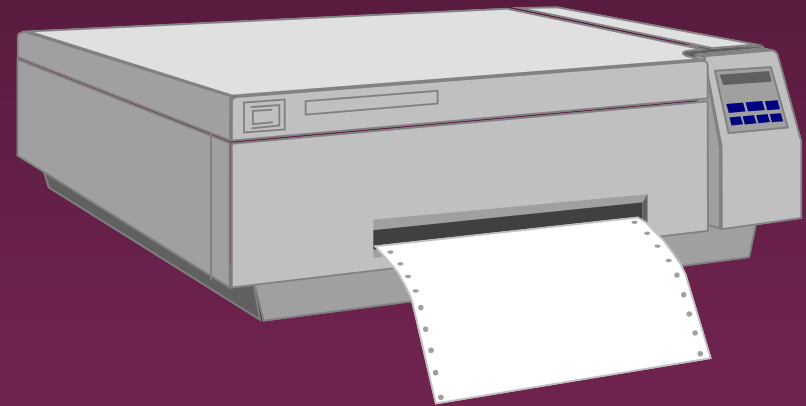
- 17" or larger
- .28 dot pitch or better
- 32 or more megs of memory on video card

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

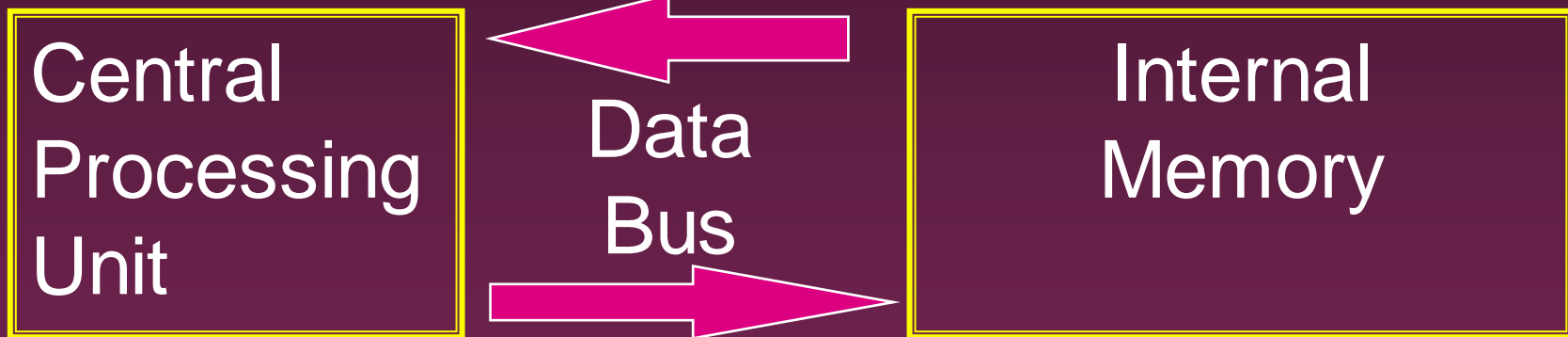
Printers - Speed

- 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)

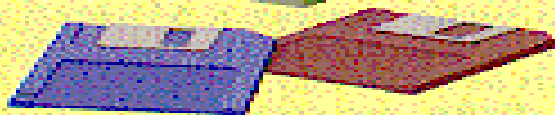
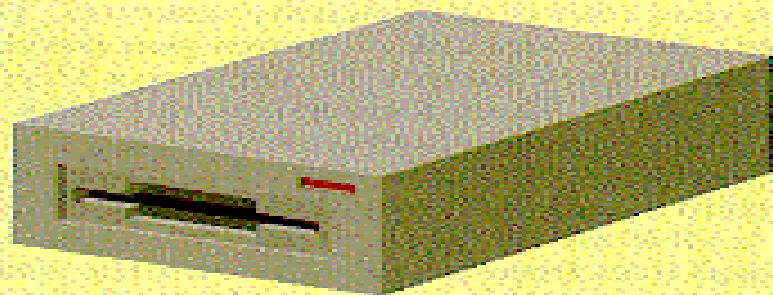
Internal Memory - ROM

- ROM - Read Only Memory
 - » Can read info Stored in ROM
 - » Can not write new info into ROM

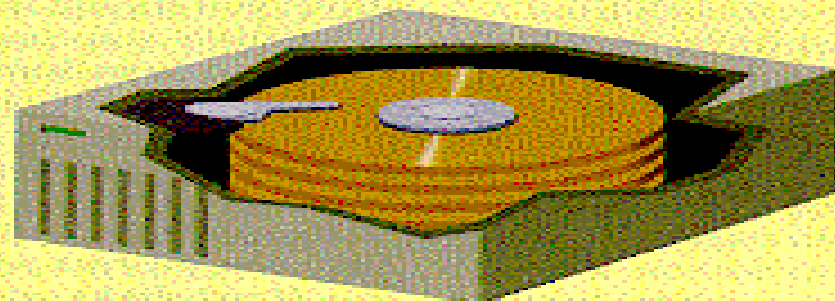
- Used for “internal workings” of computer

- Buyer is not very concerned with ROM

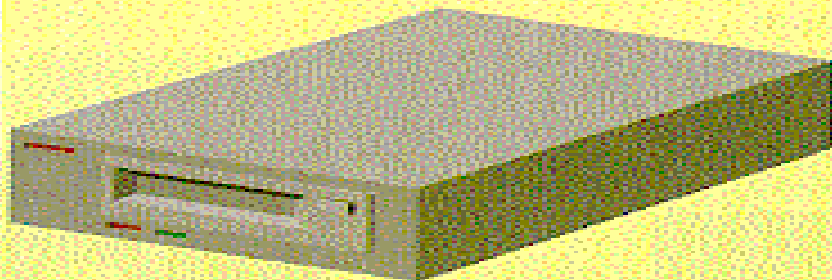
External Memory



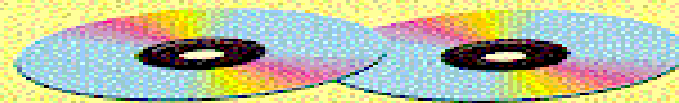
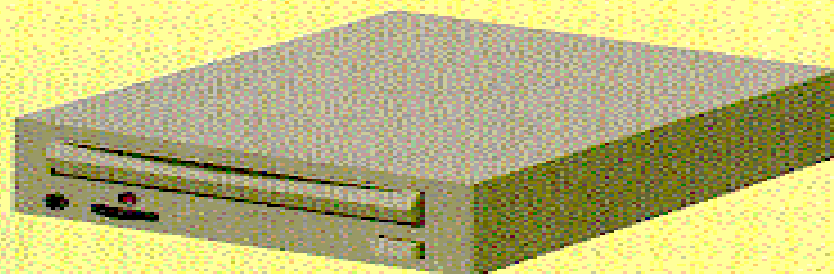
Diskette drive with removable diskettes



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

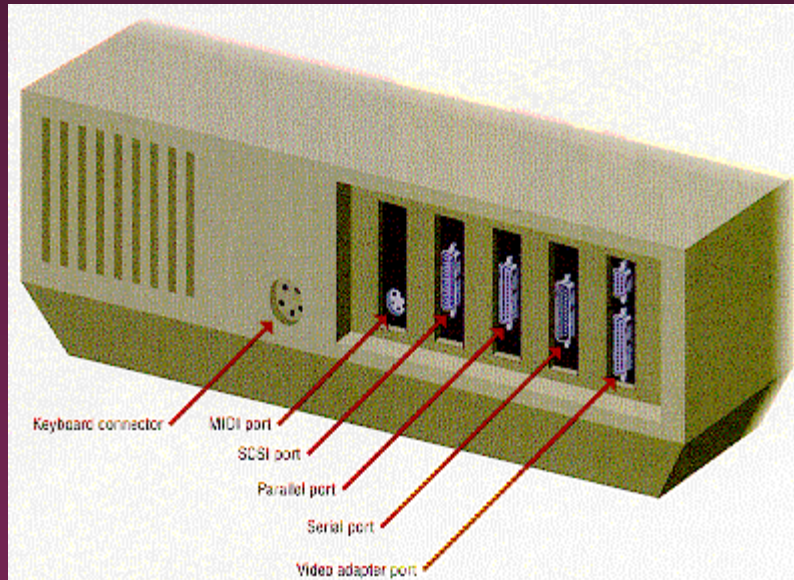
Drives - Buying Advice

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

Expansion Slots

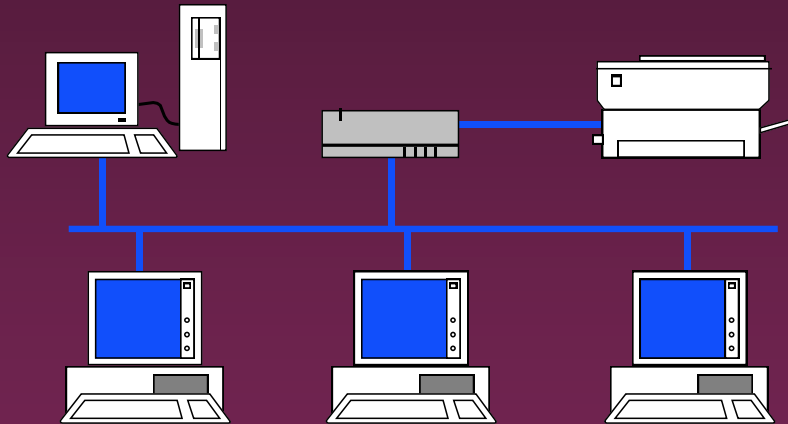
- Allows you to add capabilities
- Example of cards you can add
 - » Network card
 - » Modem

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

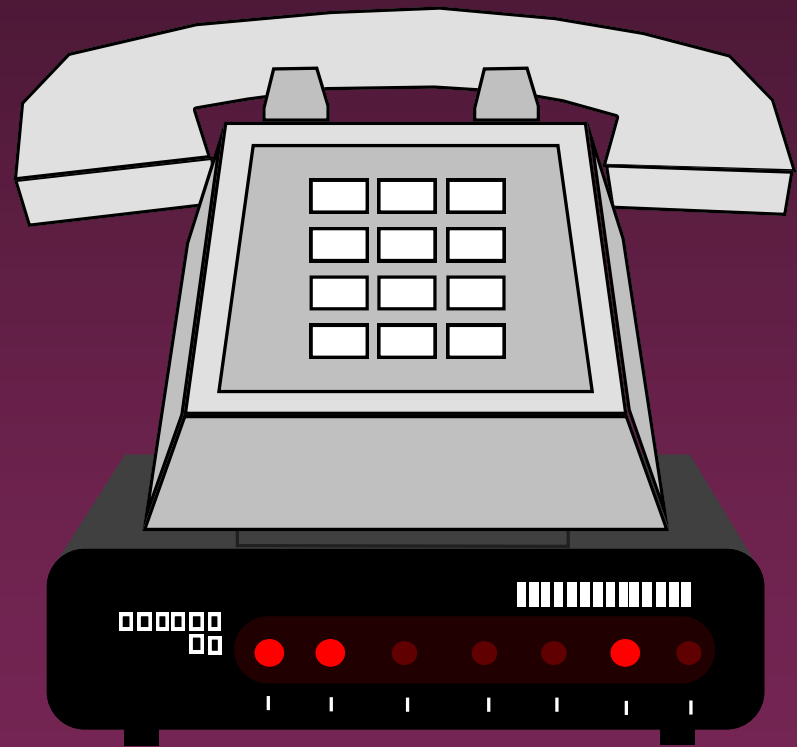
Networks



- 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

- 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