

Introduction to Computers

Chapter 1



ITBIS105
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Topics Covered



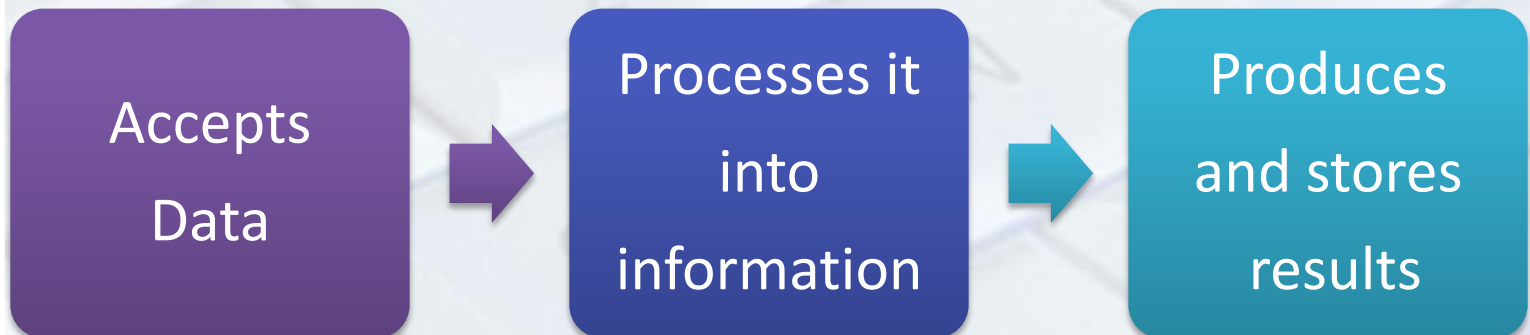
- Computer definition and main parts
- Computer Hardware
- Computer Software
- Computer Strengths
- Categories of Computers
- Computer Applications in Society
- Networks

What is a Computer?



Definition:

An Electronic device operating under the control of instructions stored in its own memory



Input and Output



Input

- Data entered to a computer system for processing
- From people or machines to computers

Output

- The presentation of results of processing
- From computer to humans or other machines

Data and Information



DATA

- Lettuce \$1.99 per gallon
- Napkins \$1.89 each
- Milk \$2.99 per jar
- Lana \$1.89 a head
- Spaghetti Sauce

PROCESSES

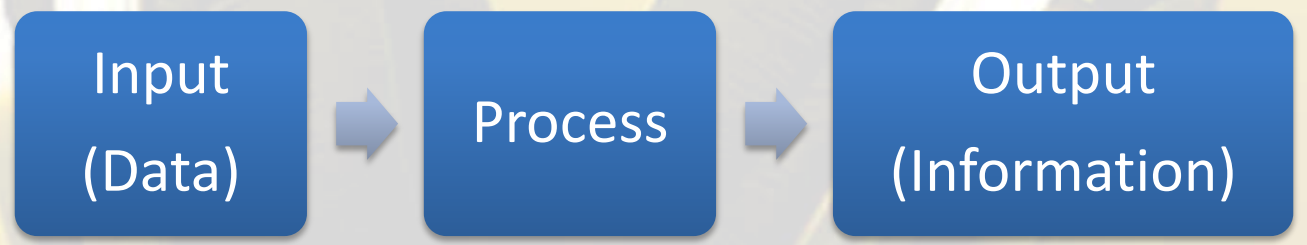
- Adds each item cost together
- Organizes data
- Computes sales tax
- Computes total due

INFORMATION

Customer Location: ...
Item: ...
Price: ...
Total: ...

Data Raw facts or unprocessed items such as text, numbers, images, audio and video

Information Data that is organized, meaningful, and useful



Hardware and Software



- **Hardware**

Physical parts of the computer that you can touch, feel and weigh

- **Software**

Non physical parts of the computer – the instructions or programs that tell the hardware how to behave

The Components of a Computer



Hardware

The electric, electronic and mechanical components of the computer – hardware:

1. Input devices
2. Output devices
3. System unit
4. Storage devices
5. Communication devices



The Components of a Computer



What is an input device?

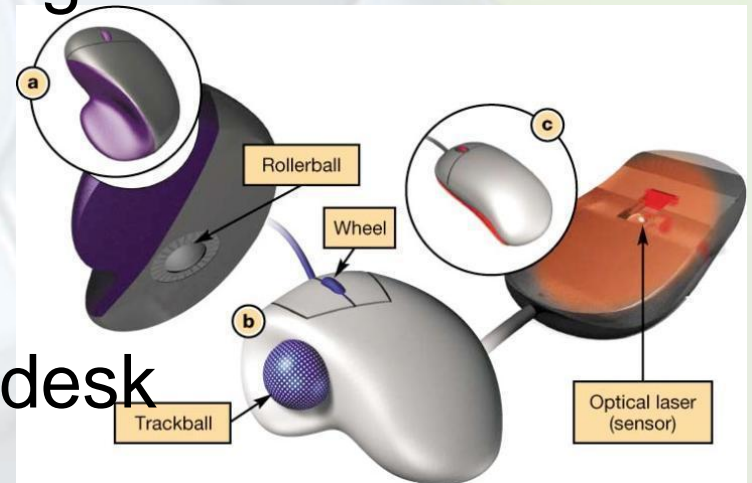
Hardware used to enter data and instructions into a computer



Mice



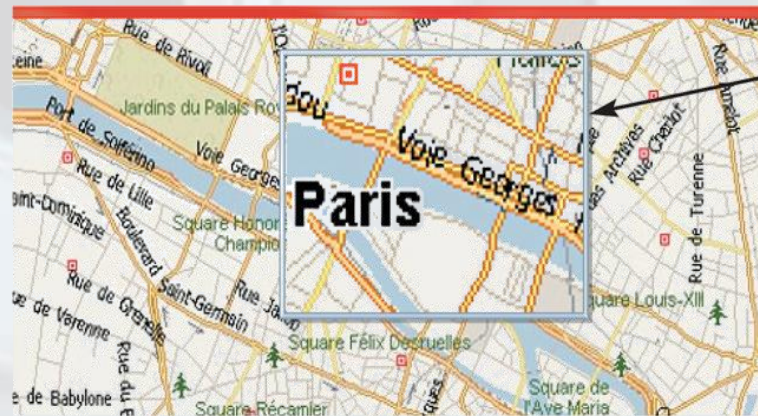
- **Optical mouse**
 - Needs no mouse pad
 - Doesn't need cleaning
 - Is more expensive
- **Trackball**
 - Easier on wrists
 - Stays stationary on desk
- **Wireless**
 - Uses radio or light waves



New Mouse Features



- Instant viewer
- Magnifier
- Customizable buttons
- Web search



Window provides magnified view

Inputting Sound



- **Microphones** are used for:
 - Podcasts
 - Video-conferencing
 - Internet phone calls
 - Speech recognition



Other Input Devices



- EPOS Digital Pen
- Webcam
 - Live video



Input Devices for the Physically Challenged



- **Visual impairments**
 - Voice recognition
 - Keyboards with large keys
 - On-screen keyboards
- **Motor control issues**
 - Special trackballs
 - Head-mounted devices

The Components of a Computer



- What is an output device?

➤ Hardware that conveys information to a user



Monitor Types



CRT (Cathode-Ray Tube)

- Less expensive
- Uses much more space
- Uses more energy
- Offers better viewing angles
- Legacy technology

a



LCD (Liquid Crystal Display)

- More expensive
- Uses far less space
- More energy efficient
- Less viewable from an angle

b



Computer Outputs



Softcopy output

- Output on monitor or sounds from the speakers which are temporary

Hardcopy output

- The output from printers, or printed output that can be physically handled, folded

The Components of a Computer



- What is the system unit?

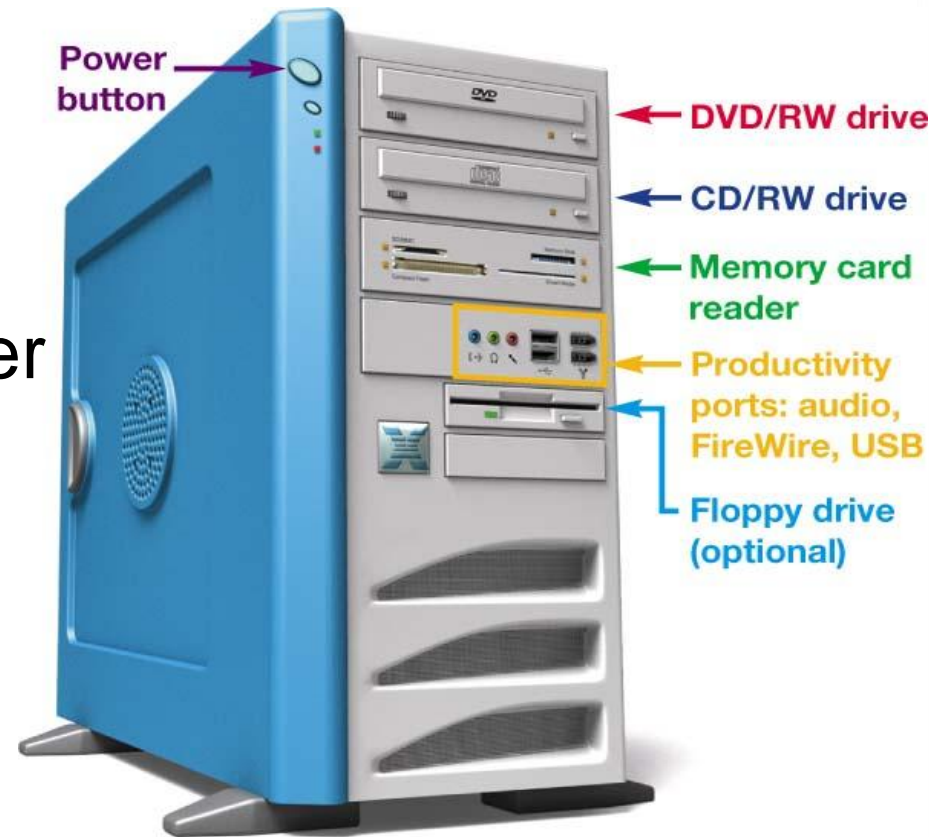
➤ Box-like case containing electronic components used to process data



The Front Panel



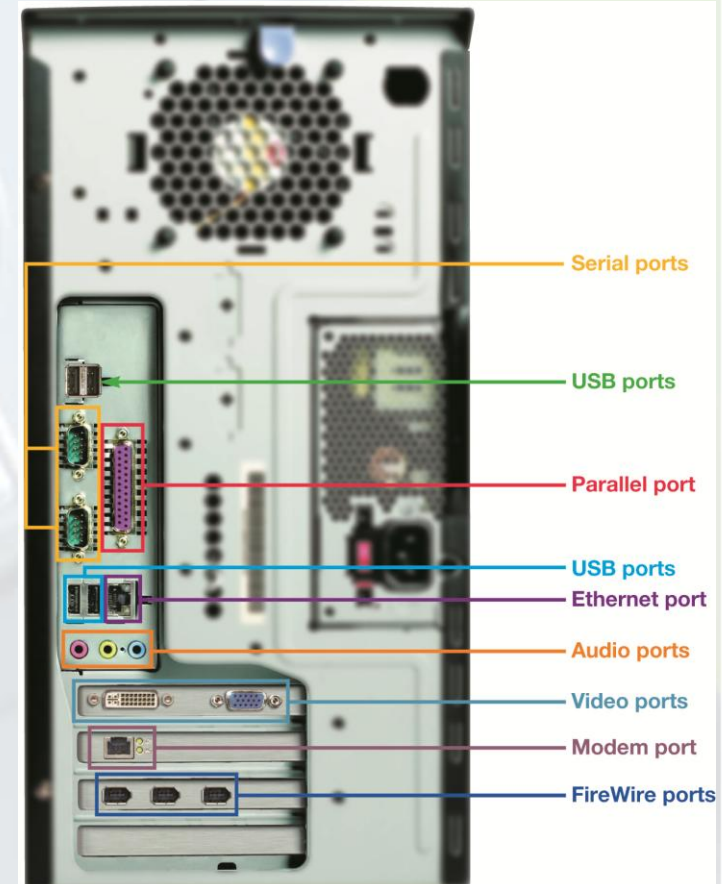
- Power control
- Drive bays
- Memory card reader
- Productivity ports



On the Back



- Ports for peripherals
- Types of ports:
 - Serial and parallel
 - Audio and video
 - USB
 - FireWire
 - Connectivity
 - Ethernet
 - Modem



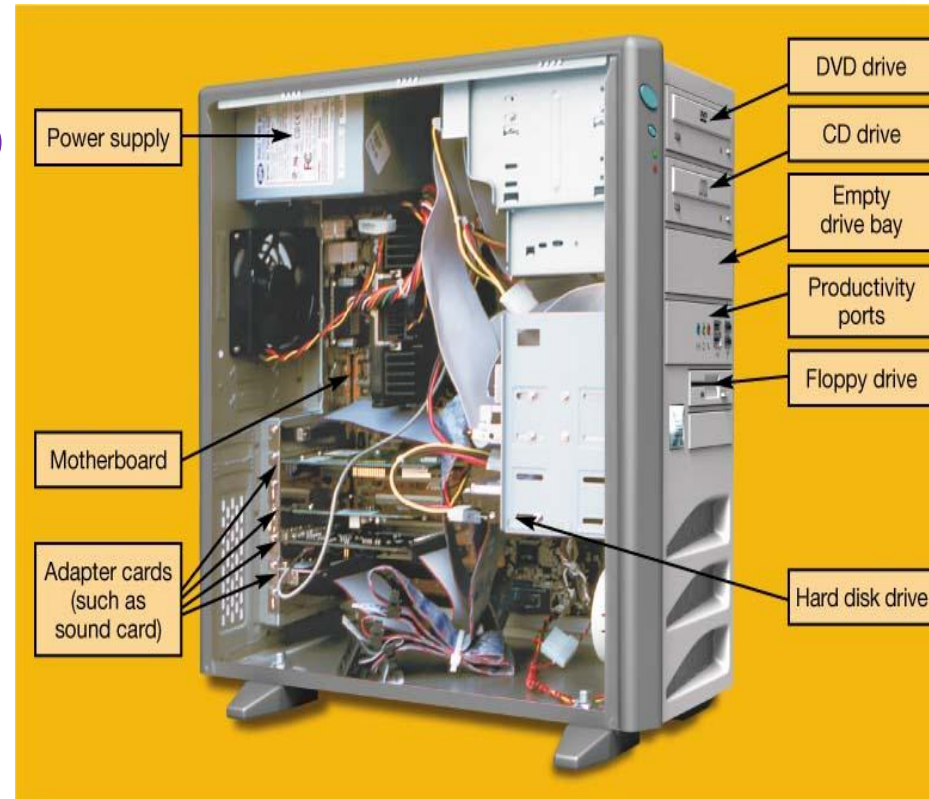
Inside the System Unit



- Essential electronic components used to process data

- Types:

- Power supply
- Hard disk drive
- Motherboard
- CPU
- Expansion cards



Power Controls

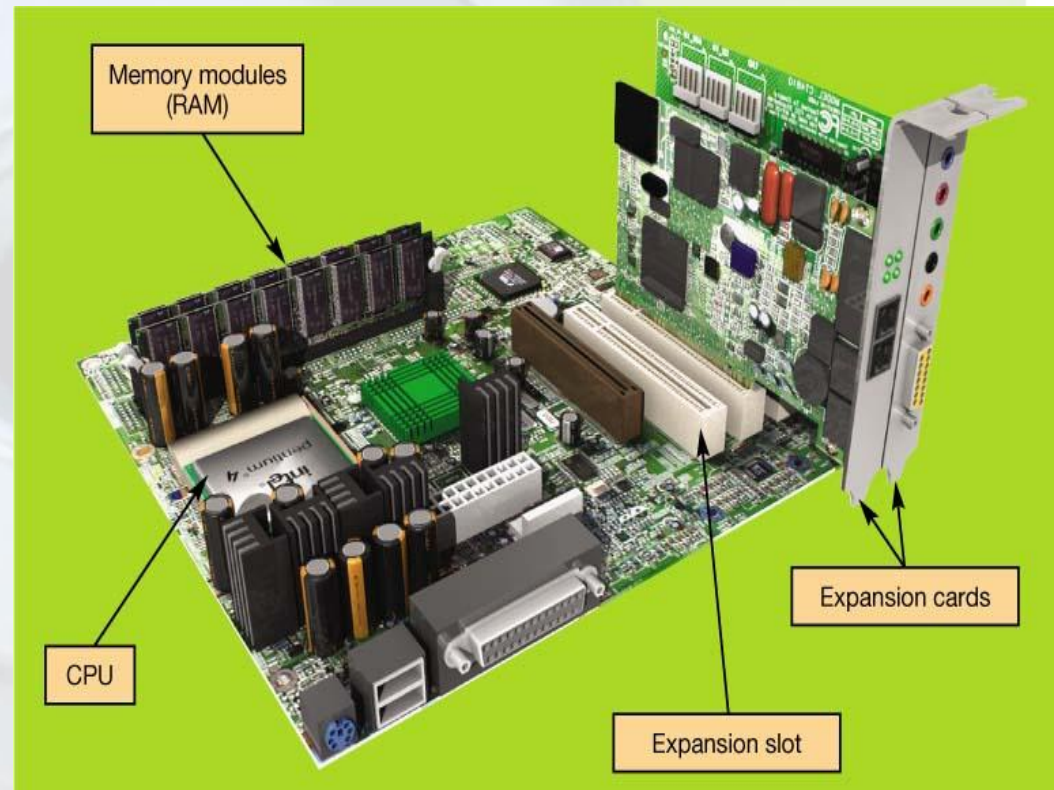


- Power-on button: Turns on system, should not be used to turn it off
- Other options:
 - Sleep mode
 - Hibernation
 - Warm boot

The Motherboard



- CPU
- RAM
- Expansion cards and slots
- Built-in components



Memory Module



- Random access memory (RAM)
- Stores instructions and data
- Temporary (volatile) storage
- Operates in nanoseconds



The Components of a Computer



- What is storage?
- Holds data, instructions, and information for future use



Storage Media Capabilities



STORAGE MEDIUM	CAPABILITIES	STORAGE CAPACITY
Hard Drive	Read and write	External: as much as 2 terabytes (TB) Internal: as much as 750 GB
CD CD-RW CD+RW	Read only Read and write	700 MB
DVD DVD-RW DVD+RW	Read only Read and write	4.7 GB (for single-side, single-layer DVDs) 9.4 GB (for single-side, dual-layer DVDs)
Blu-ray (BD)	Read and write	27 GB (for single-layer discs) 50 GB (for dual-layer discs)
Flash memory cards	Read and write	16 GB or more
Flash drive	Read and write	16 GB or more

The Components of a Computer



What is communication device?

- Hardware component that enables a computer to send and receive data, instructions and information to and from one or more computers.
- A widely used communication device is the **modem**, which is used to connect your computer to the Internet through telephone line.

Computer Software



What is **software**?

Set of programs / instructions that tells the computer what to do and how to do it

- **System software**
- **Application software**

Computer Software



What is **system software**?

- Programs that control or maintain the operations of the computer and its devices

Operating System (OS)

- set of programs that coordinates all the activities of a computer.
- provides the interface between the user and the computer's hardware. Examples are Microsoft DOS, Microsoft Windows 95, 98, 2000, XP, Window7, UNIX, LINUX...

Utility Programs

allow the users to perform functions such as printing file, copying file, listing file names etc...

Computer Software

What is **application software**?

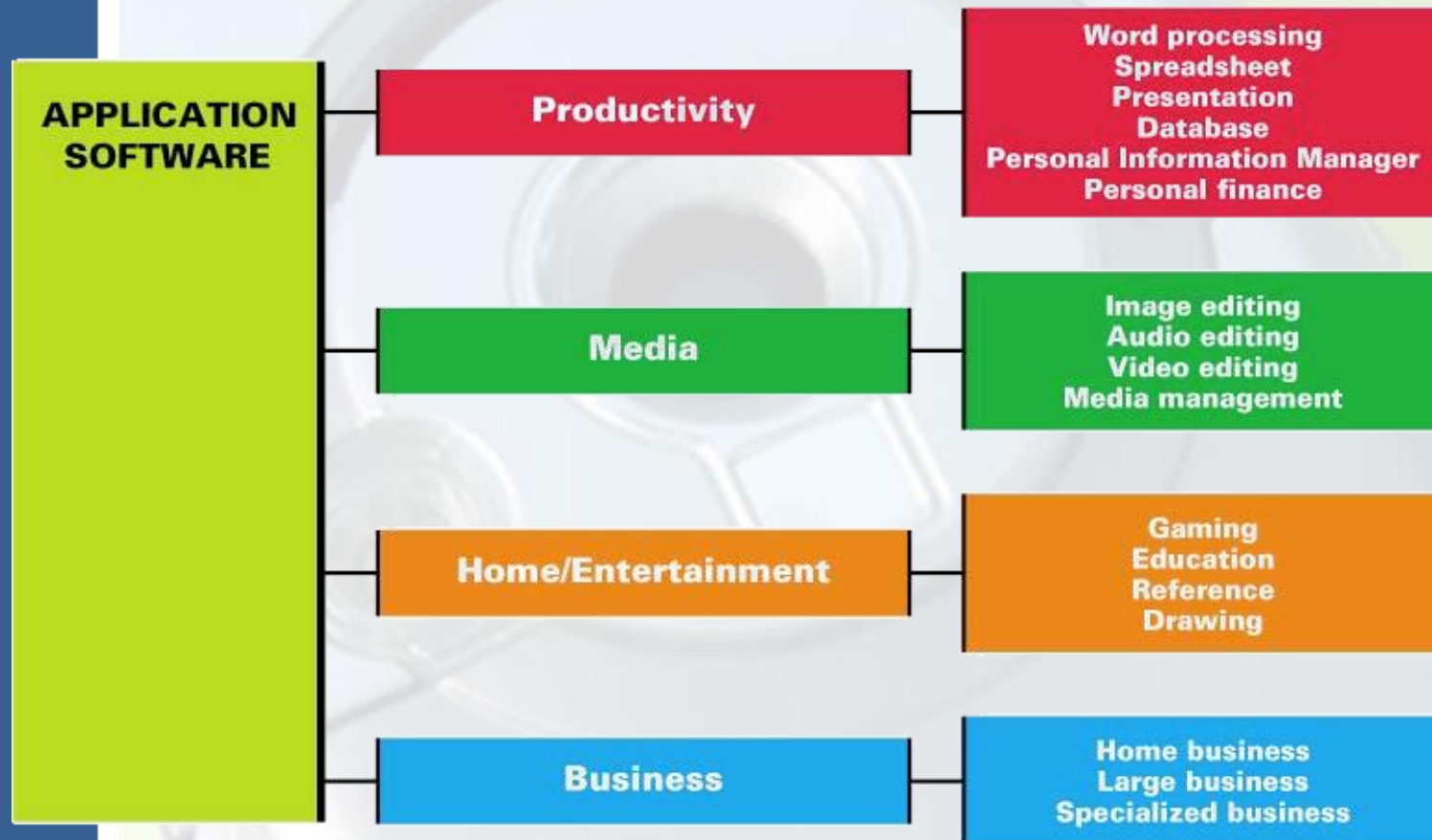
Programs that perform specific tasks for users

- **Software Suite**

Popular software applications bundled together as a single unit



Application Software



Buying Software



- Software may be purchased
 - Through retail stores
 - Online
 - At computer shows
 - Through catalogs
- Preinstalled software
- Web-based application software
 - Hosted on a Web site
 - Requires no installation on your computer
- Discounted software

Freeware and Shareware



- **Freeware:**

Copyrighted software you can get free

- **Beta versions:**

Programs still under development

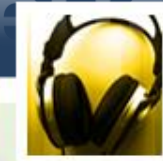
- **Shareware:** Software that allows users to run it for a limited time free of charge

- **Open source:** free to use

A screenshot of a software download page from Download.com. The page title is "MediaMonkey 2.5.5". It features a "Download Now" button, a "Add to my Watch list" button, and a "Send this to a friend" button. The page displays an editor's rating of 5 stars, an average user rating of 4.5 stars (based on 434 votes), and 1,823,035 downloads. The publisher is listed as "Ventis Media" and the date added is "January 30, 2007". The license is "Free". The limitations are "Automation features disabled". The requirements are "Windows 98/Me/NT/2000/XP". The file size is "4.82MB". There are also buttons for "PUBLISHER'S DESCRIPTION", "EDITOR'S REVIEW", "USER REVIEWS", "SUBMIT YOUR REVIEW", and "SCREENSHOTS".

Editor's rating	★★★★★	License	Free
Average user rating	★★★★☆ (434 votes) Rate It!	Limitations	Automation features disabled
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Why Is a Computer So Powerful?



The computer's strengths



Categories of Computers



Personal computers

Mobile computers

Midrange servers

Mainframe computers

Supercomputers

Personal Computers



Most popular personal computers are either desktop or notebook PCs

- What is a **desktop computer**?
 - Designed so all of the components fit on or under a desk or table



Personal Computers



- What is a **notebook computer**?
 - Also called a **laptop**
 - Portable, small enough to fit on your lap
 - Generally more expensive than a desktop computer
 - Can operate on batteries or a power supply or both



Mobile Computers



- What is a **tablet PC**?
 - Resembles a letter-sized slate
 - Allows you to write on the screen using a stylus
 - Smaller version is the modular computer



Handheld Computers



- What is a **handheld computer**?

**Small
enough to fit
in your
hand**

**Used
by mobile employees
such as meter
readers and delivery
people**

Handheld Computers



What is a **personal digital assistant (PDA)**?



➤ **Provides personal organizer functions**

- Calendar
- Appointment book
- Address book
- Calculator
- Notepad



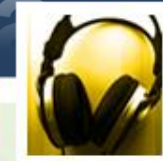
Handheld Computers



- What are **Smart phones**?
 - Web-enabled telephone
 - Allow you to check e-mail and access the Internet



Categories of Computers



Midrange server

- greater processing power, storage capacity and reliability than personal computers
- Typically supports several hundred and sometimes up to a few thousand connected computers.
- Known as **minicomputers** in the past.



Categories of Computers



Mainframe

- Large, expensive, very powerful, computer that can handle 100s or 1000s of connected computers
- Large storage capacity
- Used in large organizations

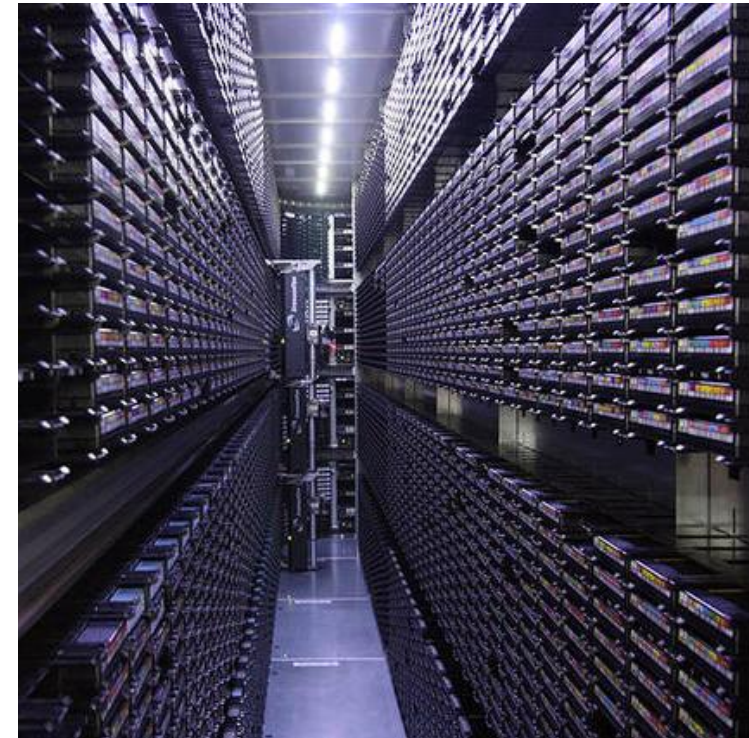


Categories of Computers



Supercomputer

- The fastest, most powerful and expensive computer.
- Used for applications requiring complex mathematical calculations such as medicine, aerospace, automotive design, online banking, weather forecasting, nuclear energy research & petroleum exploration



Computer Applications in Society



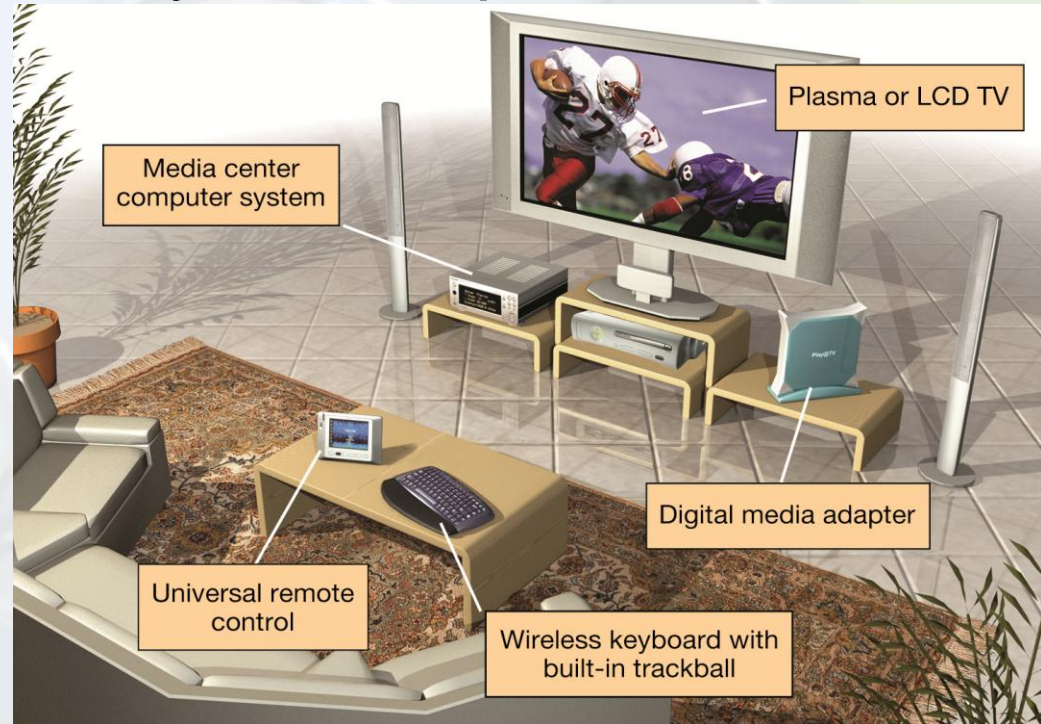
What are some examples of computer applications in society?

- Education
- Finance
- Government
- Healthcare
- Science
- Publishing
- Travel
- Industry

Digital Home



- In a digital home, you can control home systems from your computer and via the Internet.



Digital Home - Components



- Media computer with:
 - TV tuner
 - Radio tuner
 - Media software
 - Blu-ray, DVD, and/or CD
 - Network adapter
 - A network
 - A digital television
 - A digital media adapter
 - A universal remote

Networks

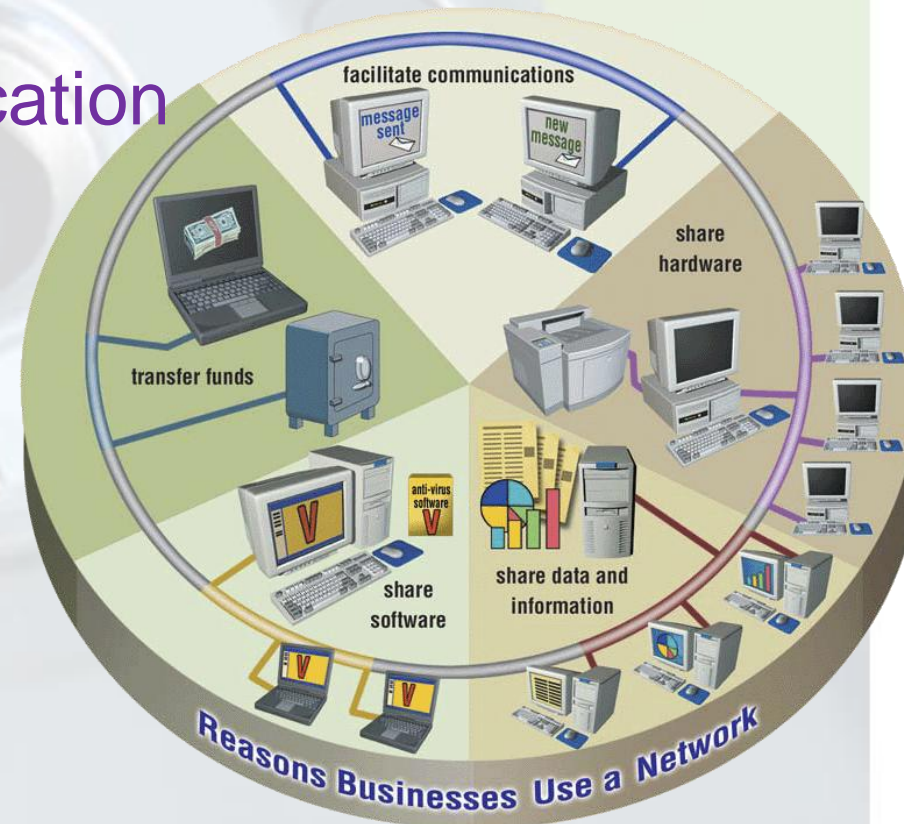


- What is a **network**?
 - Collection of computers and devices connected via communications devices and transmission media
 - Each computer or device connected to a the network is called a node.

Networks



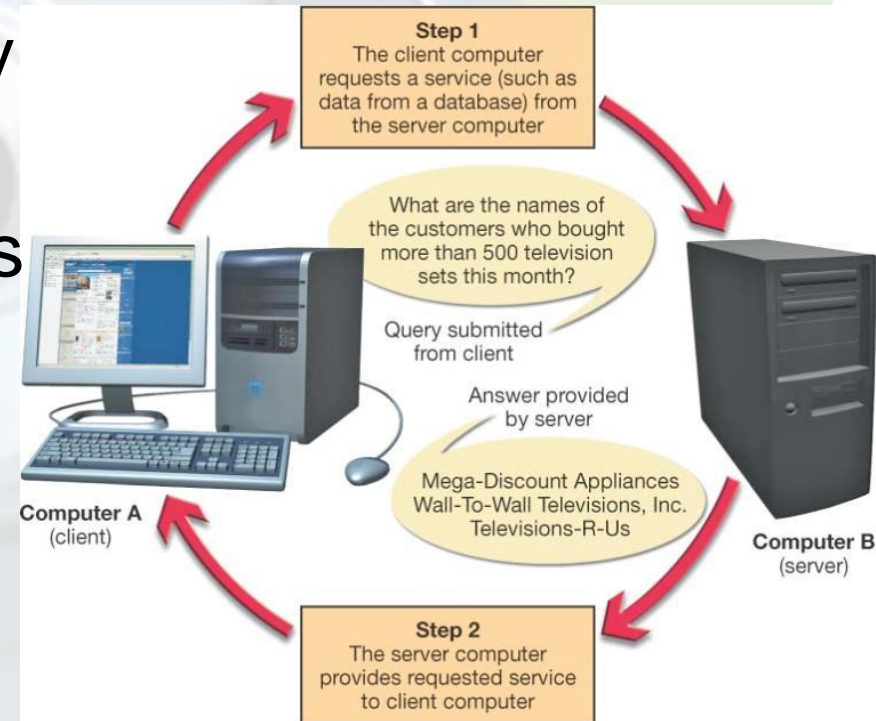
- What are the advantages of using a network?
 - Facilitate communication
 - Share hardware
 - Share software
 - Share data and information
 - Transfer funds



Client/Server Networks



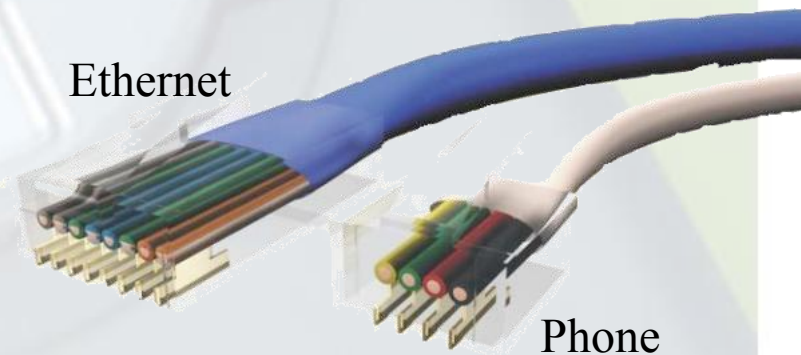
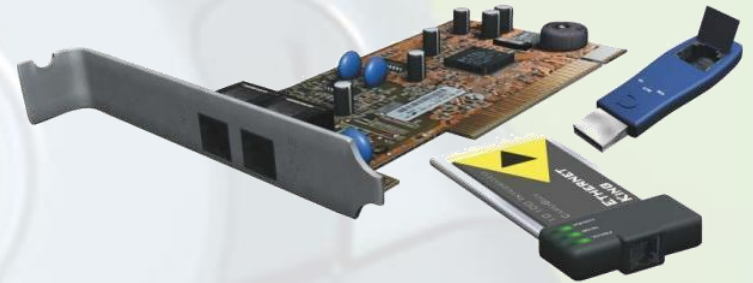
- Server-based network
 - Clients and servers
- Data flows efficiently
- Servers respond to requests from clients
- Servers perform specific tasks
- Scalable
- Centralized



Wired Ethernet Networks



- Ethernet network adapters are used to connect nodes
 - NIC card
 - PC card
 - USB adapter
- Computers are connected to each other using unshielded twisted pair cable

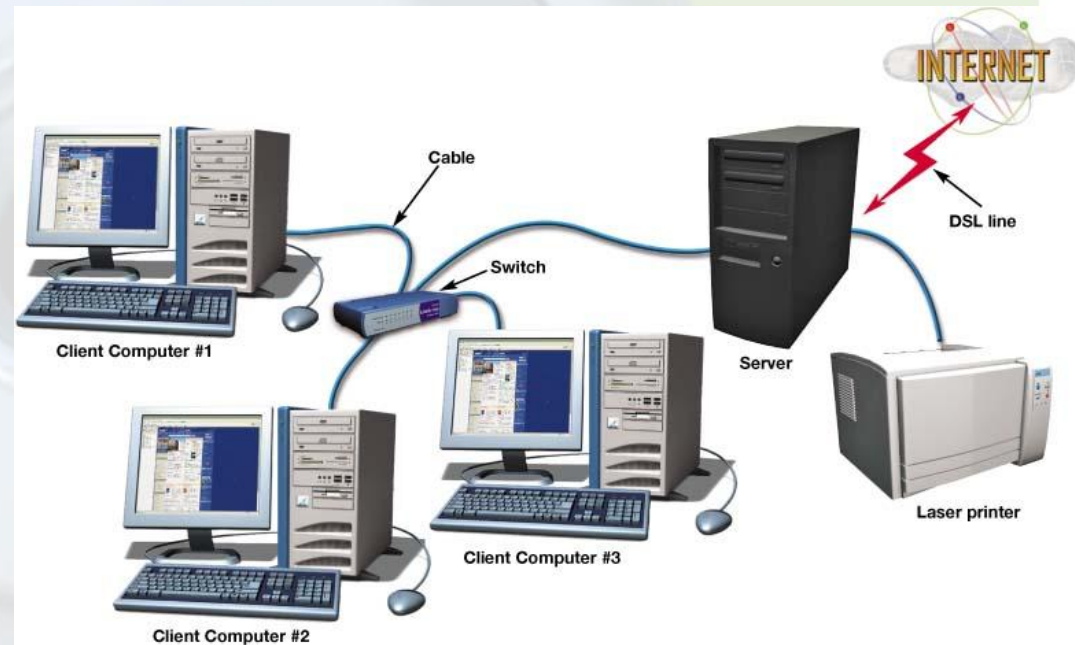


Classifications of Client/Server Networks



- LAN

- Local area network
- Computers linked over a small geographic region



Classifications of Client/Server Networks

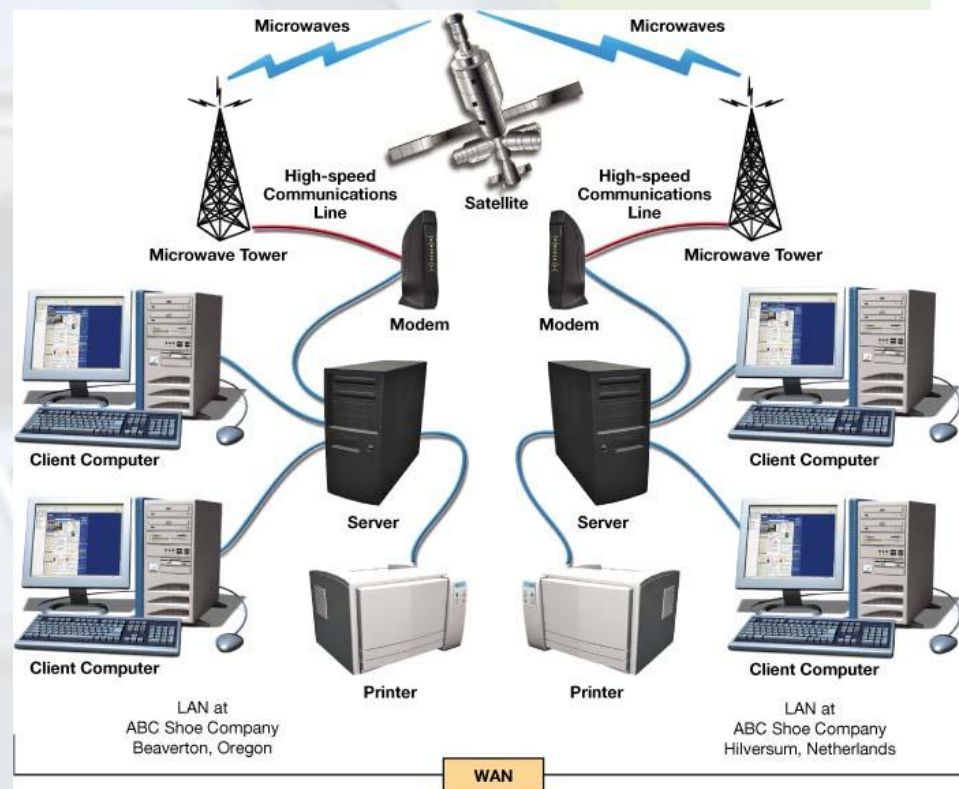


- **WAN**

- Wide area network
- Computers linked over large geographic locations

- **MAN**

- Metropolitan area network
- Computers linked within a city or county



Classifications of Client/Server Networks



- **PAN**
 - Personal area network
 - Wireless devices connected in close proximity to each other
- **Intranet**
 - Private corporate network
 - Protected by a firewall

Classifications of Client/Server Networks



- Extranets
 - Only certain corporations or individuals can access
 - Useful for enabling electronic data interchange
 - Use virtual private networks for security

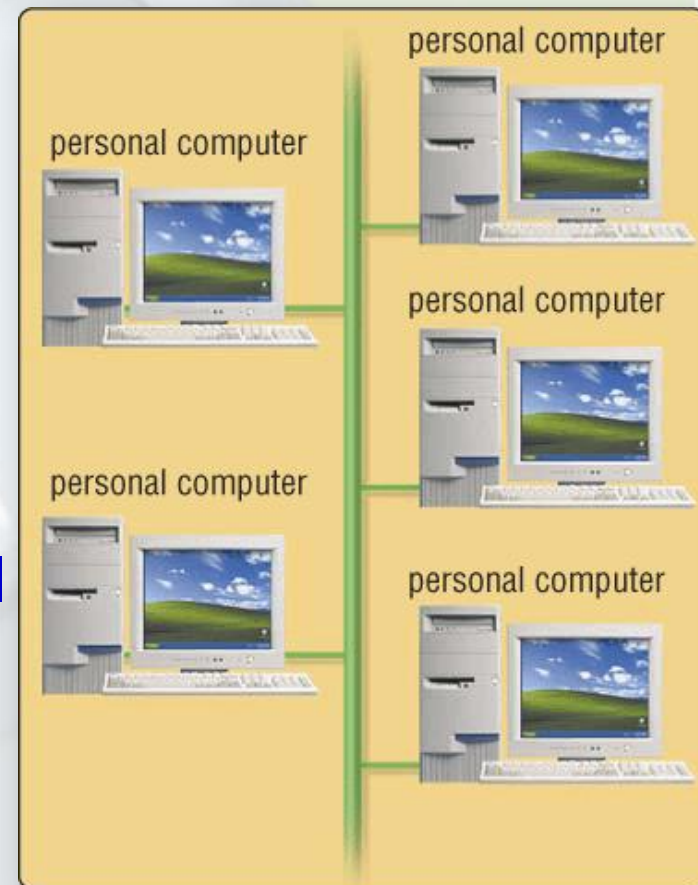
Network Topology



Layout of computers and devices in network.

Popular topologies are bus, ring, and star

- **Bus network**
- All computers and devices connect to central cable, or bus
- Inexpensive and easy to install
- Easy to add or delete devices from network
- Failure of one device does not affect the rest of the network



Network Topology



•Ring network

- Cable forms closed ring, or loop, with all computers and devices arranged along ring
- Data travels from device to device around entire ring, in one direction
- If a computer or device on a ring network fails, all devices before the failed device are unaffected, but those after the failed device cannot function.

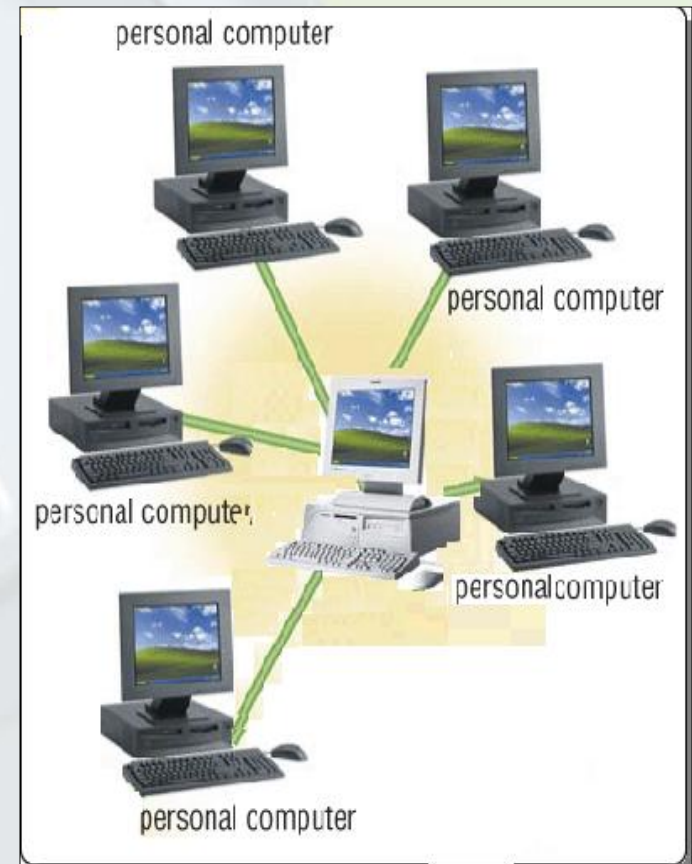


Network Topology

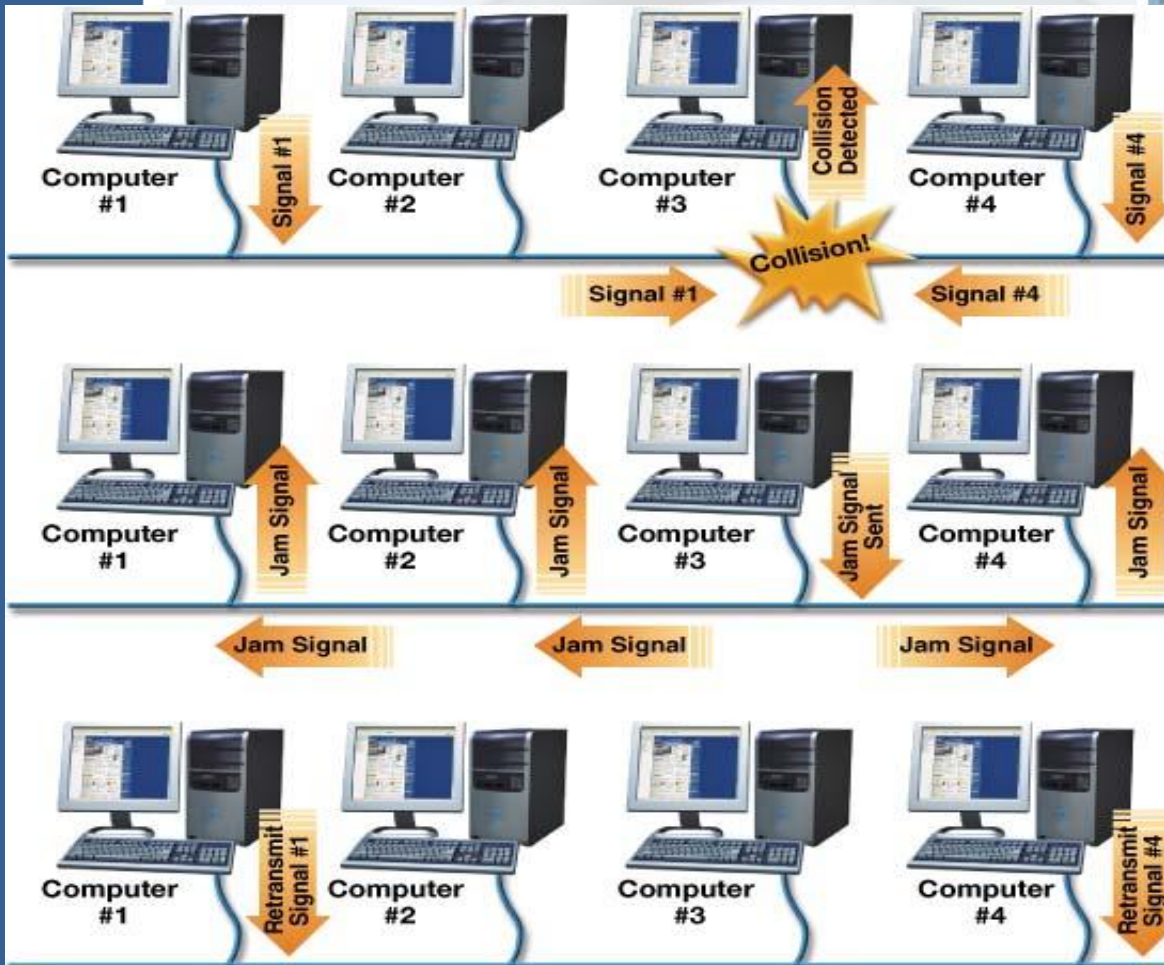


•Star network

- All devices connect to a central system
- All data transferred from one computer to another passes through the central system
- Needs only one control unit
- But if control unit fails, the whole network fails



Avoiding Data Collisions on an Ethernet Network



Step 1: Computer #1 and Computer #4 begin transmitting data signals at the same time. A data collision occurs, which is detected by Computer #3.

Step 2: Computer #3 sends a jam signal to all nodes on the network, informing them that a collision has occurred.

Step 3: Computer #1 and Computer #4 wait random amounts of time, then send their signals again. Since the signals are resent at different times, a second collision should not occur.

14 nanoseconds later

18 nanoseconds later

URLs



- URL:
 - Uniform Resource Locator
 - Unique Web site address

Domain name

http://www.nytimes.com/pages/cartoons

Protocol

Top-Level
Domain
(TLD)

Path or
Subdirectory

Internet Communications



- Instant messaging
- Podcasts
- Blogs and vlogs
- Webcasts
- Wikis
- Voice over Internet (VoIP)
- E-mail

Social Networks



- Social networks: online personal networks
 - MySpace.com and Facebook.com
- Members share common interests.
- Members communicate by voice, chat, IM, video, and blogs.
- Members create personalized profiles.
- Growth has been explosive.
- Risks must be recognized and reduced.

Group Communication



- Internet social networks
- Multiplayer online game services
- Chat rooms
- Newsgroups
- Listservs

Being a Savvy Computer User and Consumer



- Avoid hackers and viruses
- Protect your privacy
- Understand the real privacy and security risks
- Use the Internet wisely
- Avoid online annoyances
- Maintain your computer
- Make good purchase decisions
- Integrate the latest technology

How Computers Are Attacked



- Trojan horse
- Backdoor program
 - Zombies
- Denial of service attacks (DoS)
- Distributed denial of service attacks (DDoS)

