University of AL-Mustansiriyah
College Of Pharmacy

Chapter3
Computer Hardware

Present by

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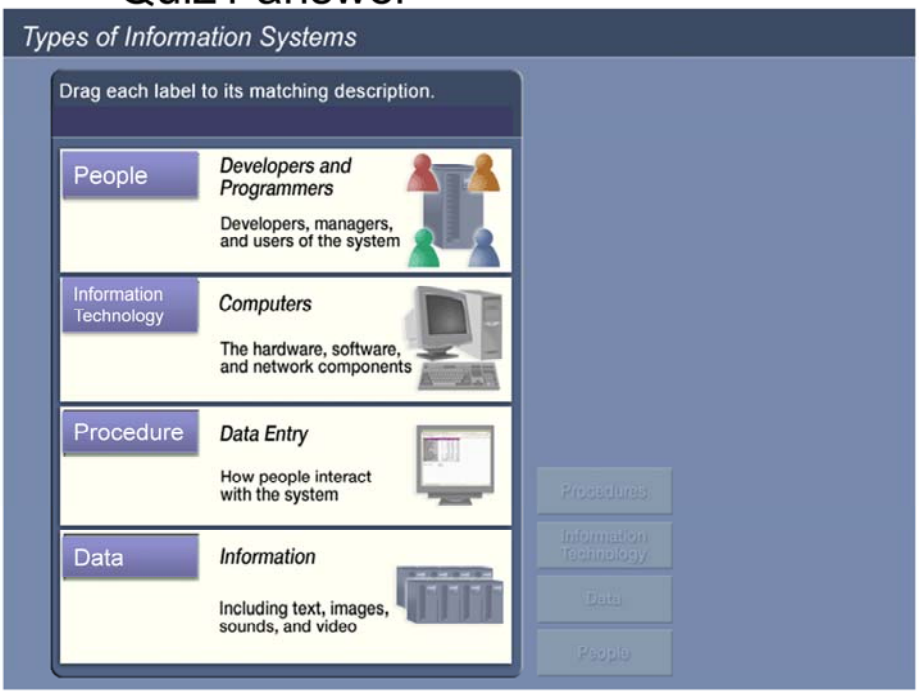
Quiz1 answer



Pre-Computer Calculations

- Counting on fingers and toes
- Stone or bead abacus
  - Calculate comes from calculus, the Latin word for stone
- 1642: first mechanical adding machine
  - Invented by Blaise Pascal
  - Wheels moved counters
  - Modified in 1674 by Von Leibnitz
- Age of industrialization
  - Mechanical loomed used punch cards

Early Computing

- 19th Century
  - Charles Babbage proposed the Analytical Engine, which could calculate, store values in memory, perform logical comparisons
  - Never built because of lack of electronics
- 1880s
  - Hollerith's punched cards used to record census data using On/Off patterns
  - The holes turned sensors On or Off when run through tabulating machine
  - This company became the foundation for IBM

Electronic Computers

- 1946 - First Generation Computer
  - ENIAC
  - Programmable
  - 5000 calculations per second
  - Used vacuum tubes
  - Drawbacks were size and processing ability
- 1950s
  - ENIAC replaced by UNIVAC 1, then the IBM 704
  - Calculations jumped to 100,000 per second

Waves of Computing

- Late 1950s - Second Generation
  - Transistors replaced vacuum tubes
  - 200,000 to 250,000 calculations per second
- Mid-1960s - Third Generation
  - Integrated circuitry and miniaturization
- 1971 - Fourth Generation
  - Further miniaturization
  - Multiprogramming and virtual storage
- 1980s - Fifth Generation
  - Millions of calculations per second

Microcomputers

- 1975
  - ALTAIR flicking switches
- 1977
  - Commodore and Radio Shack produce personal computers
- 1979
  - Apple computer, the fastest selling PC thus far
- 1982
  - IBM introduced the PC, which changed the market

Learning Objectives

- Identify the major types and uses of microcomputer, midrange, and mainframe computer systems.
- Identify the components and functions of a computer system and Computer Processing Speeds.

Section I

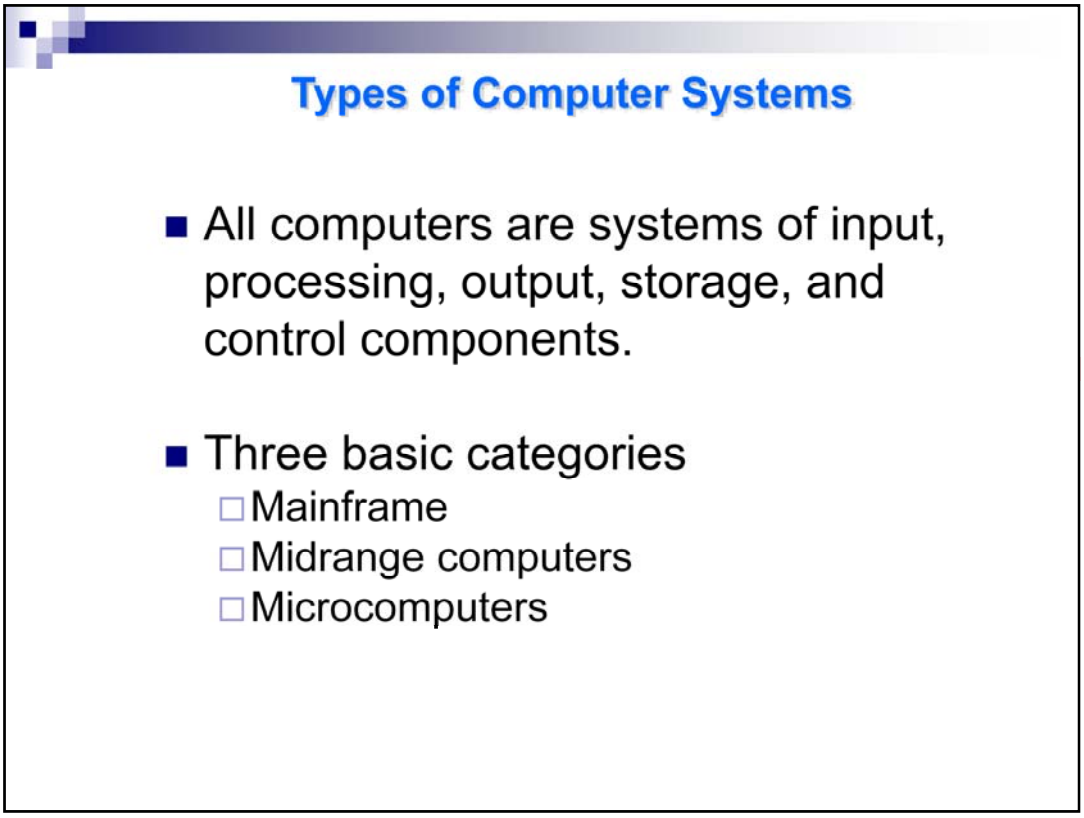
- Computer Systems: End User and Enterprise Computing

Progressive Insurance and UniFirst Corp: The Case for Mobile Computing Systems

Use IRV (Immediate Response Vehicle) to give him a competitive edge in providing fast claims service

Benefits would include:

- **A competitive edge in providing fast claims service.**
- **Improved customer relations.**
- **More productive claims reps.**
- **Claims settled in less time.**



Computer systems are typically classified as microcomputers, midrange computers, and mainframe computers. These distinctions are not so clear as they once were. Improvements in technology make microcomputers more powerful than ever and both minis and mainframes have lower and higher end versions. Within these parameters, the following are generally true:

Microcomputers. These are the smallest computer systems, ranging in size from handheld personal digital assistants (PDAs) to laptops to desktop personal computers. Most microcomputer are designed for single-user application but can be linked via telecommunications to network servers.

Midrange. Midrange or minicomputers are larger and more powerful that most microcomputers but smaller and less powerful than most large mainframes. Midrange systems are often used in business and scientific research. They are especially well suited for specialized tasks, usually so as to dedicate computing power to a specific function (such as back room order processing) without having to share time on an organization's larger mainframe. Of course, many small and medium-sized organizations use such computer for their whole operations.

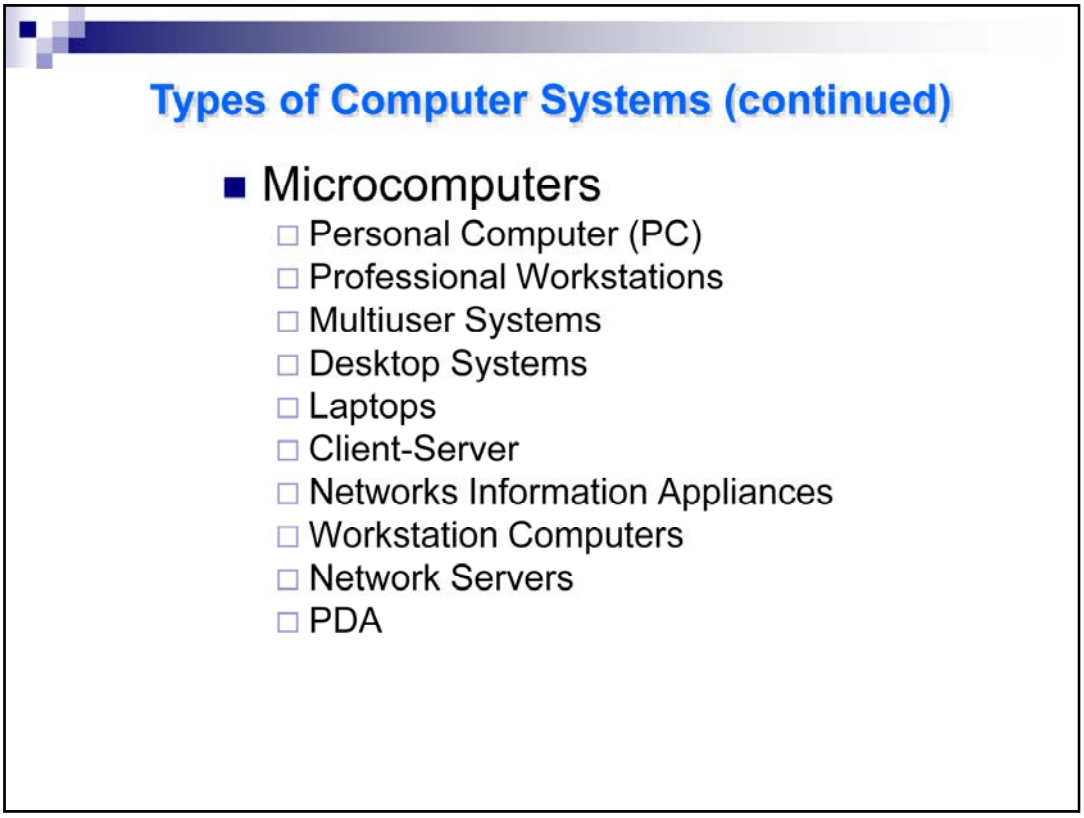
Mainframes. These are large, powerful computers (often filling an entire room) with very large primary storage capacities (from 64 megabytes to several gigabytes of RAM). This feature helps mainframes process information very quickly (at 10 to 200 million instructions per second - MIPS).

Types of Computer Systems (continued)

- Mainframe
  - Enterprise systems
  - Superservers
  - Transaction processors
  - Supercomputers

Types of Computer Systems (continued)

- Midrange
  - Network servers
  - Minicomputers
  - Web servers
  - Multi-user systems



A personal computer, or PC, or microcomputer is much more than a small computer for use by an individual. The computing power of microcomputers now exceeds that of the mainframes of previous computer generations at a fraction of their cost. Thus, they have become powerful networked professional workstations for business professionals.

•**Notebook computer** - A computer that is designed for those who want a small portable PC for their work activities.

•**Desktop computer** - A computer that is designed to fit on an office desk.

•**Workstation** - (1) A computer system designed to support the work of one person. (2) a high-powered computer to support the work of professionals in engineering, science, and other areas that require extensive computing power and graphics capabilities.

•**Network Servers** - These powerful microcomputers are used to coordinate telecommunications and resource sharing in small local area networks and Internet and intranet websites.

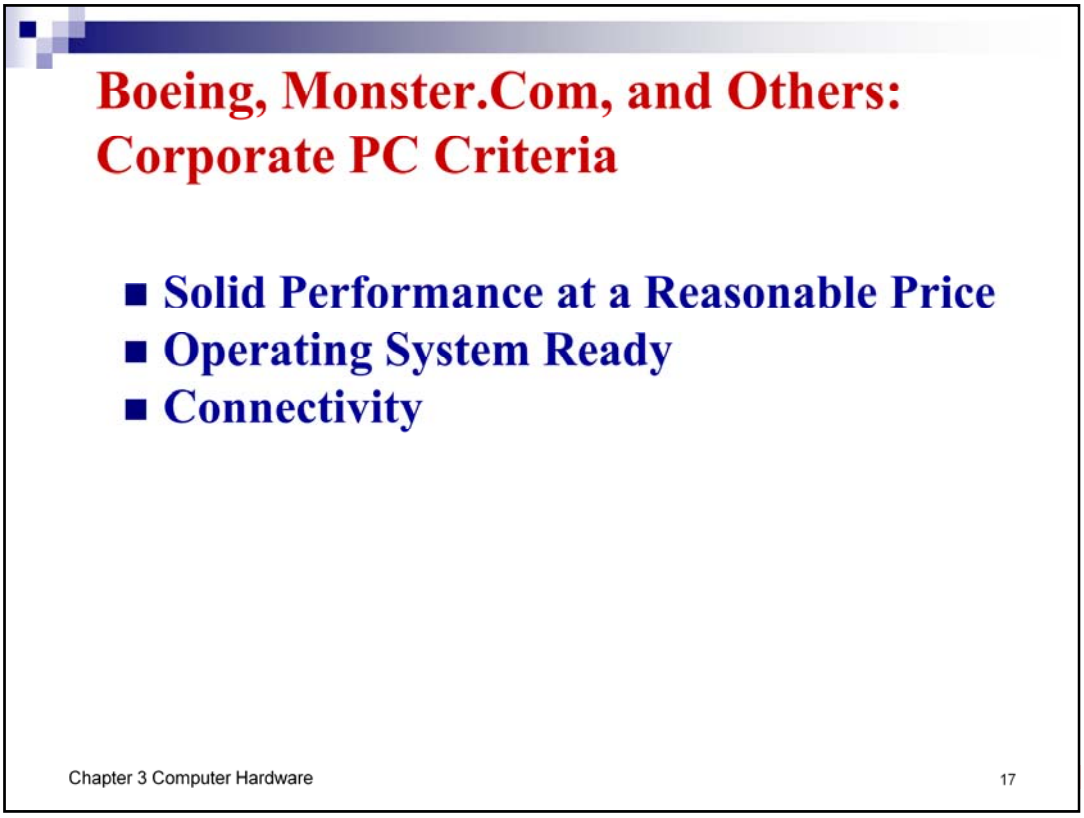
Recommended features for PC

Business Pro	Multimedia Heavy	Newcomer
To track your products, customers, and performance, you'll need more than just a fast machine:	Media pros and dedicated amateurs will want at least a Mac G4 or a 2–3GHz Intel chip, and:	Save money with a Celeron processor in the 1–2GHz range. Also look for:
• 2–3 Gigahertz processor • 512MB RAM • 80GB hard drive • 18-inch flat-panel display • CD–RW/DVD drive or portable hard drives for backup • Network interface card (NIC)	• 512MB RAM • 120GB hard drive or more • 18-inch or larger CRT, flat-panel LCD, or plasma display • High-end color printer • CD–RW/DVD+RW drive • Deluxe speaker system	• 256MB RAM • 40GB hard drive • Internal 56K modem • CD–RW/DVD drive • 17-inch CRT or 15-inch flat panel LCD • Basic inkjet printer

Check www.dell.com and www.gateway.com for the latest PC features available

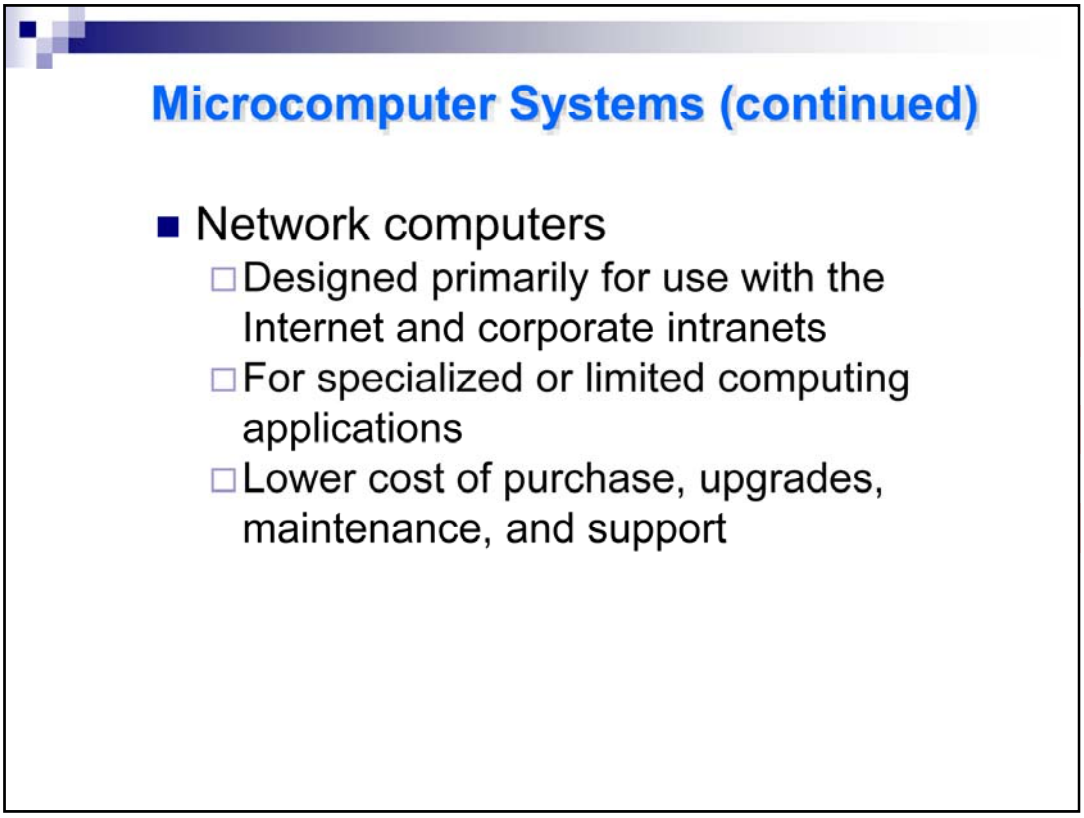
Microcomputer Systems

- The most important category of computers
  - Desktop
  - Laptop
- Workstation computers
- Network servers



The Boeing, Monster.com, and others Case demonstrates how a standardized criteria for PC purchases can lead to solid performance at reasonable prices

The emphasis was based upon an operating system that was ready to go and effective network connectivity



Network computers and terminals are emerging as the serious business-computing platform.

Network Computers. Network computers (NC) are a microcomputer category designed primarily for use with the Internet and corporate Intranets by clerical workers, operational employees, and knowledge workers. NCs are low cost, sealed networked microcomputers with no or minimal disk storage. As a result they depend on Internet and Intranet servers for their operating system and web-browser, Java-enabled application software, and data access and storage.

NC benefits include:

- Lower purchase cost
- Easier maintenance
- Easier software distribution and licensing
- Computer platform standardization
- Reduced end user support requirements
- Improved manageability

Microcomputer Systems (continued)

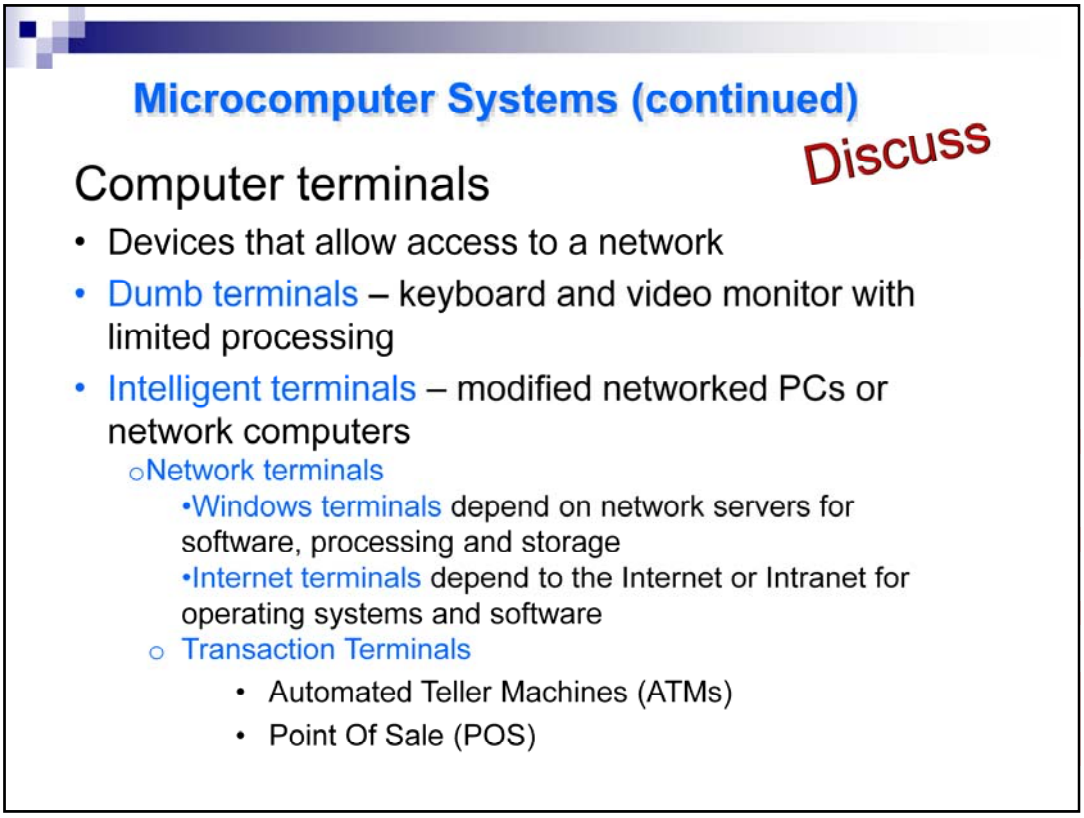
- Network computers (continued)
  - Other benefits
    - Ease of software distribution and licensing
    - Computing platform standardization
    - Reduced end user requirements
    - Improved manageability

Microcomputer Systems (continued)

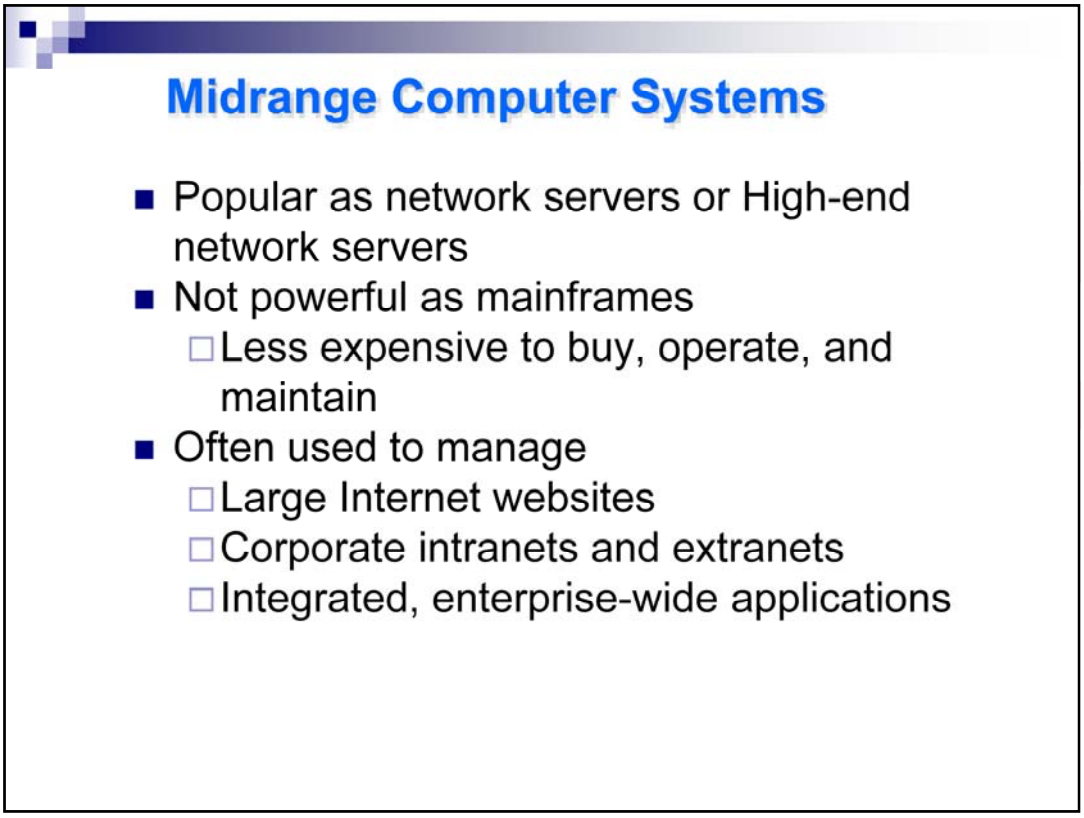
- Information appliances
  - Personal Digital Assistants (PDAs)
  - Set-top boxes and video-game consoles
  - Wireless PDAs
  - Cellular and PCS phones

•**Smart Gadgets** - Small Web-enabled microcomputer devices with specialized functions, such as hand-held PDAs, games, cellular phones and pagers, and other Web-enabled home appliances.

•**PDA** - is a hand-held microcomputer device that enable you to manage information such as appointments, to-do lists, and sales contacts, send and receive E-mail, access the Web, and exchange such information with your desktop PC or network server.



Give examples of the above computer terminal types and cite the advantages each play in their respective uses

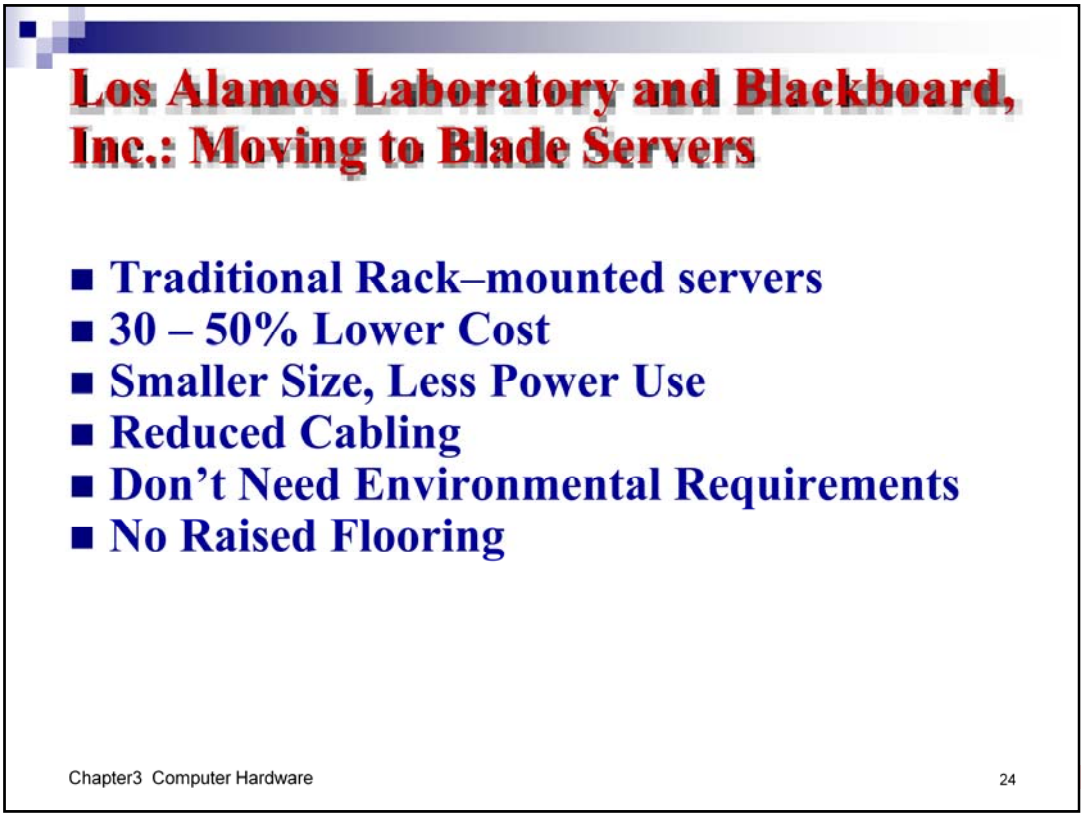


Give examples of midrange systems being used in the above settings

Emphasize any cost saving measures a midrange system provides in these applications

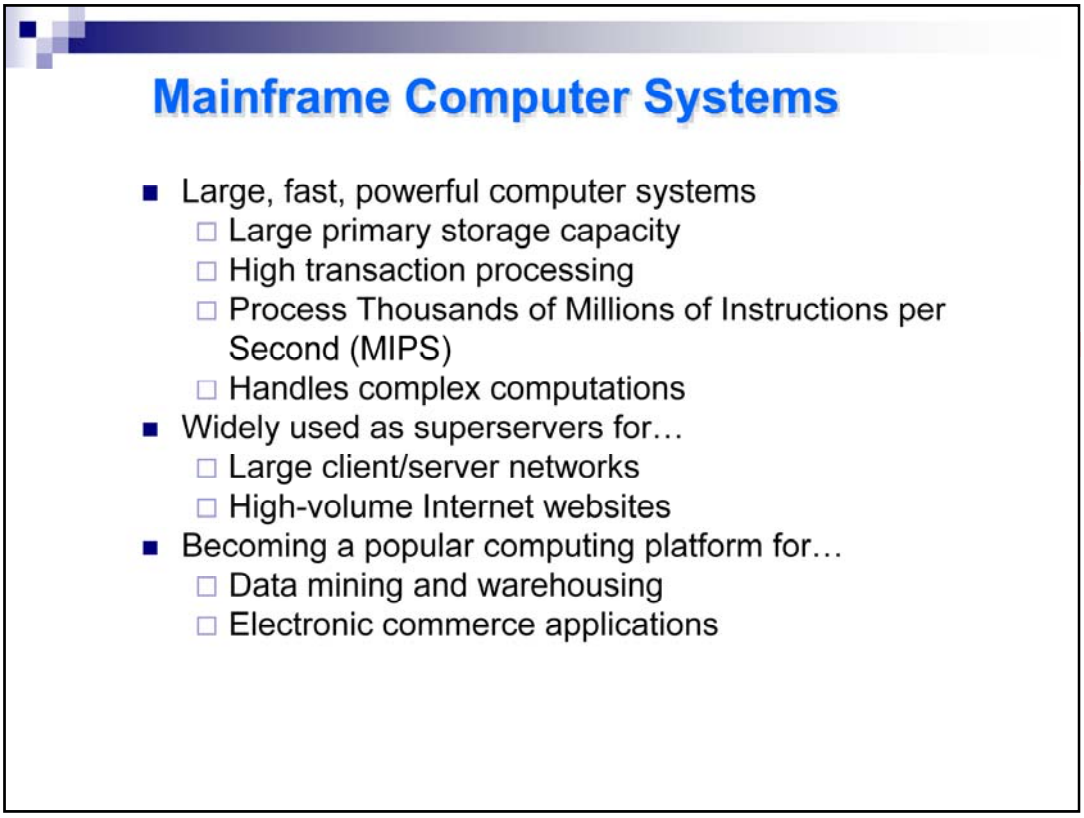
Midrange Computer Systems

- First became popular as **minicomputers** for:
  - Scientific Research, Engineering Analysis, Process Monitoring and Control.
- Play major role in computer aided manufacturing (CAM)
- Used as front-end servers to assist mainframes with telecommunications processing and networks management.



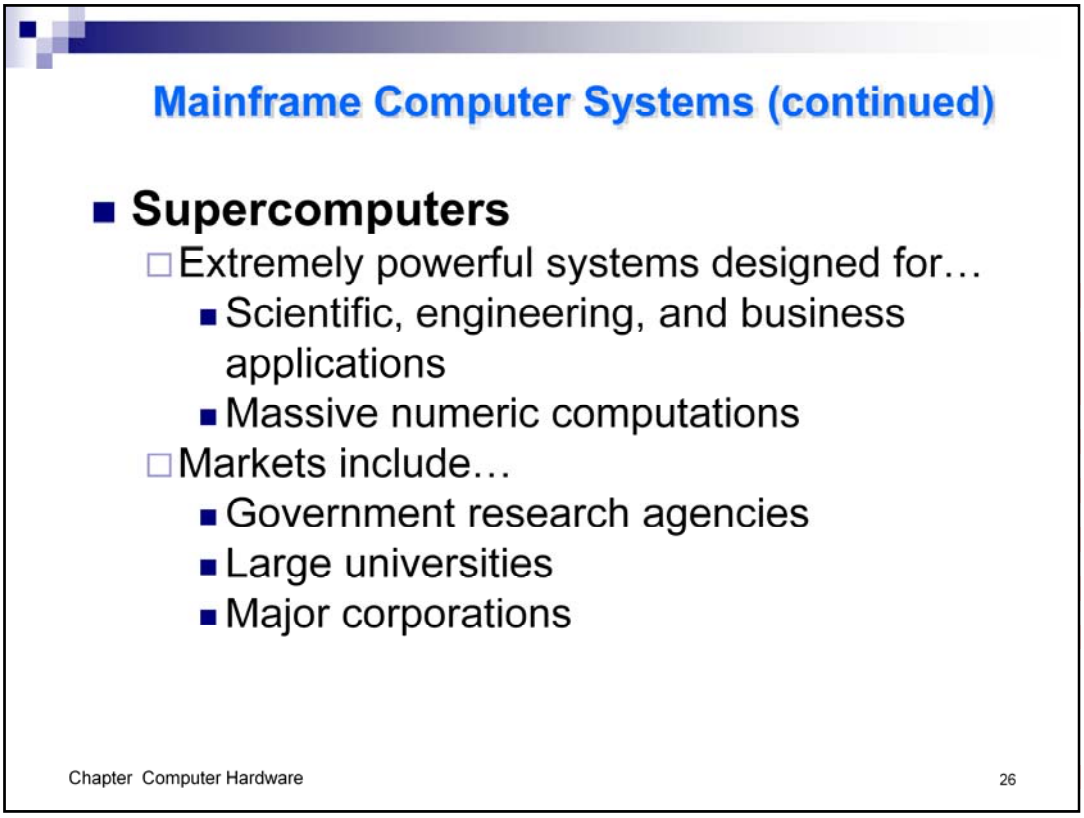
The Los Alamos Laboratory and Blackboard, Inc. Case demonstrates how newer technological change makes possible the use of hardware that out performs older methods at a fraction of the cost.

They moved to Blade Servers-a rack system of slide-ins that were substantially less expensive and made less infrastructure demands.



Explain how large-scale systems would be needed to manage very large client-server networks.

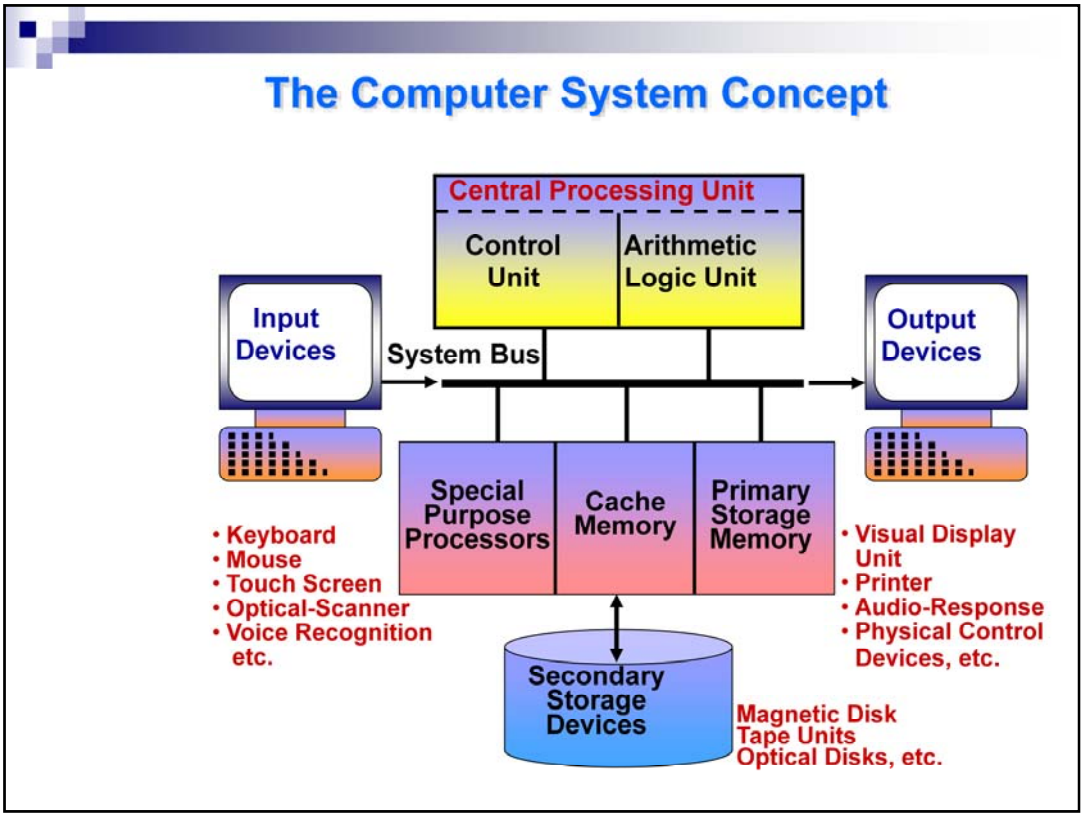
Get examples of the huge volume output requirements for mainframe systems that do significant data warehousing and mining operations.



Give real world examples of the use of supercomputers in actual practice for example, scientific research, graphic modeling, and quantum physics

Mainframe Computer Systems (continued)

- Uses parallel processing
  - Billions to trillions of operations per second (gigaflops and teraflops)
  - Massively parallel processing (MPP) designed of thousands of microprocessors
  - Costs $5 to $50 million
- Minisupercomputers use:
  - symmetric multiprocessing(SMP)
  - Distributed shared memory (DSM)
  - Prices hundred of thousands of dollars



PATIENTLY ALLOW TIME FOR ANIMATIONS TO WORK

A computer system is an interrelated combination of components performing specialized basic functions to provide end users with a powerful information processing tool. Key functions include:

Input. A wide variety of devices.

Processing. The *central processing unit* (CPU) is the main processing component of a computer system. A key component of the CPU is the *arithmetic-logic unit* (ALU), which performs the arithmetic and logic functions required in computer processing.

Output. Output devices convert the electronic information produced by the computer system into human-intelligible form for presentation to end users. Output devices include video display units, printers, audio response units, and other peripheral hardware components specialized in this function.

Storage. Storage devices store data and programs instructions needed for processing. A computer's *primary storage* or memory is used to hold key information needed to run the computer while *secondary storage* hold larger parts of programs used less frequently and the content files created by end users.

Control. The control unit of the CPU interprets computer program instructions and transmits directions to the other components of the computer system.

The Computer System Concept

- Computers are organized according to the following system functions:
  - Input
    - Keyboards
    - Touch screens
    - Pens
    - Electronic mice
    - Optical scanners
    - Convert data into electronic form

The Computer System Concept (continued)

- Processing
  - Central Processing Unit (CPU)
    - Two subunits
      - Arithmetic-Logic Unit (ALU)
      - Control Unit (registry)

The Computer System Concept (continued)

- Output
  - Video display units
  - Printers
  - Audio response units

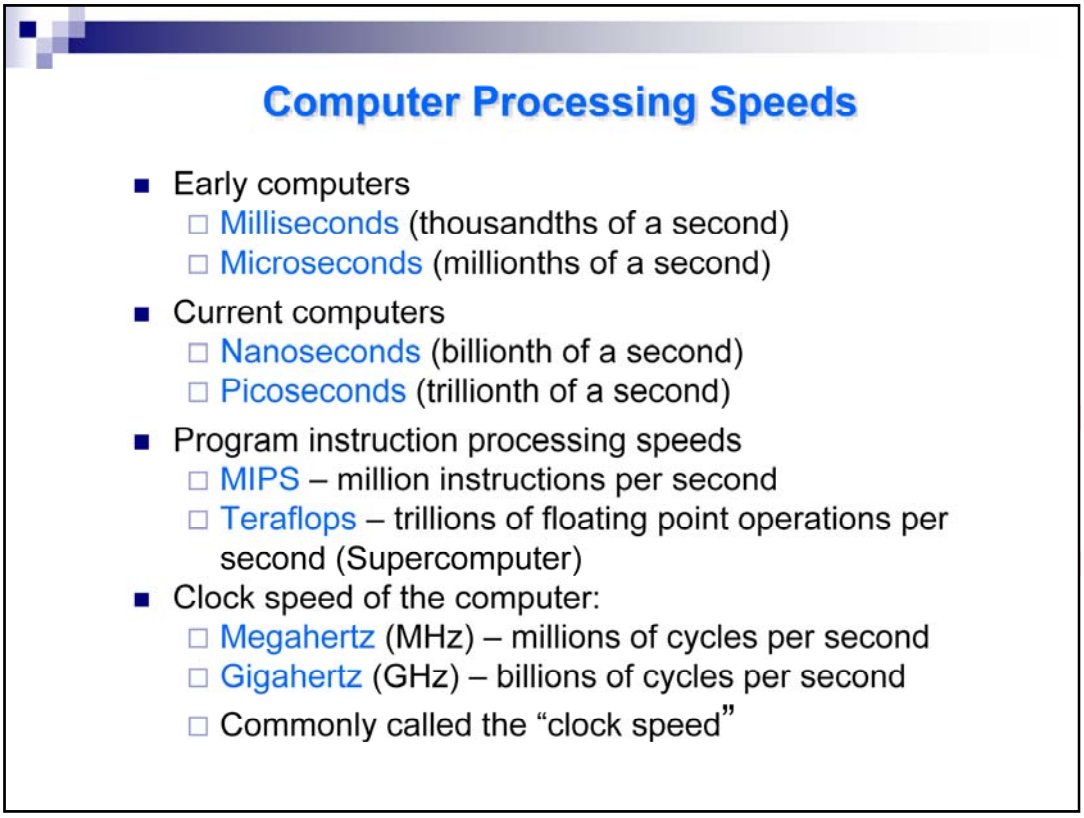
  - Convert electronic information into human-intelligible form

The Computer System Concept (continued)

- Storage
  - Store data and software instructions
  - Primary storage unit (memory) store data and instructions during processing
  - Secondary storage store data and software instructions needed for processing
    - Magnetic disks
    - Optical disk drives
  - May also include cache memory

The Computer System Concept (continued)

- Control
  - The registers and other circuits of the control unit interpret software instructions and transmit directions to the other components of the computer system



Explain why extremely fast internal clock speeds demands smaller fractions of time definitions for cycle measurement.

Explain the role of registers and caches and how they speed up the measure of output.

Computer Processing Speeds

- **Throughput**
  - The ability to perform useful computation or data processing assignments during a given period
- Speed is dependant on…
  - Size of circuitry paths (buses) that interconnect microprocessor components
  - Capacity of instruction processing registers
  - Use of high-speed cache memory
  - Use of specialized microprocessor, such as math coprocessor


Thanks
Chapter3 Computer Hardware
36