

## Understanding Essential Computer Concepts

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## Defining Computers

- A high-speed idiot
  - must be told exactly what to do by humans and programs
  - step-by-step instructions
- An electronic device that accepts input, processes data, stores data, and produces output
- Information Processing Cycle
  - Input
  - Process
  - Output
  - Storage
- Example: Payroll

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## Defining Computers

- Data
- Information
- Some Advantages of Using
  - speed
  - accuracy
  - large storage capacity
  - multipurpose

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## Defining Computers

- Computer System
  - Hardware
    - Architecture/Configuration
    - Specifications
    - Input Devices
    - Output Devices
    - Processing Devices
    - Peripheral Devices
  - Software
    - executable step-by-step instructions
    - provides versatility
  - Users (nib)
- Computer System = Hardware + Software + Users

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## Investigating Types of Computers

- Personal Computer
  - Desktop
  - Laptop
  - Tablet PC
- Hand-held Computer
  - PDA
- Mainframe
- Supercomputer

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## Examining Input Devices

- Keyboard
- Pointing Devices
  - Mouse
  - Trackball
  - Touchpad/Trackpoint
  - Wireless pointer
- Joystick (nib)
- Scanners (nib)
- Microphone (nib)
- Digital camera (nib)

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## Examining Output Devices

- Monitor
  - CRT vs. LCD flat panel
  - Resolution
    - pixel
    - Resolution
      - VGA (640x480)
      - SVGA (800x600, 1024x768)
  - Graphics card/display adapter
- Printers
  - laser
  - ink jet
  - dot matrix

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## System Unit (nib)

- The computer case
- Main components inside it:
  - motherboard (pg 19)
    - microprocessor
    - RAM & ROM chips
    - expansion slots
    - graphics card
    - network interface card
    - sound card
  - disk drives
  - fan(s)
  - power supply

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## Warm Up... Thousands

Numeric Value	Word	Zeros	Prefix
1	one		
1,000	thousand	3	kilo
1,000,000	million	6	mega
1,000,000,000	billion	9	giga
1,000,000,000,000	trillion	12	tera

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## Measuring RAM and Storage

- bit
  - essentially a switch; 2-positions... on and off
- byte
  - a grouping of 8 bits; 256 possible combinations
  - ASCII representations pg 11
  - capacity to store 1 character, symbol or digit (or certain types of numbers)
- kilobyte
  - one thousand bytes (actually... 1,024 bytes)
- megabyte
  - one million bytes (1,048,576) = approx 1,000 kilobytes
- gigabyte
  - one billion bytes (1,073,741,824) = approx 1,000 megabytes
- terabyte (tib)
  - one trillion bytes (1,099,511,627,776) = approx 1,000 gigabytes

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## Investigating Data Processing

- File
  - program file (executable)
  - data file
- Microprocessor
  - aka processor, central processor unit, CPU
  - the "brains" of the computer
  - 2 components (nib)
    - control unit: where program instructions are interpreted and executed
    - arithmetic/logic unit: where arithmetic & logical comparisons performed
- Clock Speed
  - indicates the processor's internal processing speed
  - Megahertz = one million cycles per second
  - Gigahertz = one billion cycles per second
  - our classroom and lab PC's run at 3GHz = 3,500 MHz
- Word Size
  - number of bits the processor can manipulate at a time
  - 32 bit vs 64 bit

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## Understanding Memory

- Random Access Memory (RAM)
  - holds the programs you're running and the data being processed
  - volatile
  - a cost effective way to "speed up" your computer
- Cache RAM
  - high-speed memory embedded on the processor chip
- Virtual Memory
  - using hard disk space to simulate RAM (pg 13)
- Read Only Memory (ROM)
  - chips containing programs/device info that has been factory programmed
  - not volatile
  - used extensively in calculators and other devices such as laser printers, whose fonts are often stored in ROMs
- CMOS Memory
  - stores system configuration settings and essential program code
  - non volatile... battery backup

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## Understanding Magnetic Storage Devices

- Why do we need them?
- Diskettes
  - 3½" DS/HD disks can store 1.44MB
  - physical components
  - write protect switch (nib)
- Hard Disk
  - physical components
  - our classroom PC 's have 80GB hard disks
  - tracks and sectors
  - access time
  - advantages over diskettes
- Tape Drive
  - inexpensive cost/MB
  - frequently used as a backup medium
  - relatively slow... not random access

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## Understanding Optical and Flash Storage



- Optical Storage Devices
  - use lasers to read from/burn to polycarbonate platters (pg 17)
  - CD-ROM, CD-RW, CD+RW
    - 700MB capacity
  - DVD
    - 9.4GB capacity
  - advantages
  - disadvantages
- Flash Storage
  - non-volatile mobile storage of programs and data
  - contains rewritable read-only memory (EEPROM)
  - USB Flash drive included with text has 256 MB capacity

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## Storage Devices

- Each storage device has its own identifying letter
- Our classroom and lab PC 's:
  - A: 3½" diskette drive (1.44 MB)
  - C: local hard disk drive (80 GB)
  - E: USB Flash drive (256 MB) (may map to a different letter)
  - F: read-only area on a network hard disk for original class files
  - H: your private home area on a network hard disk (10 MB quota)

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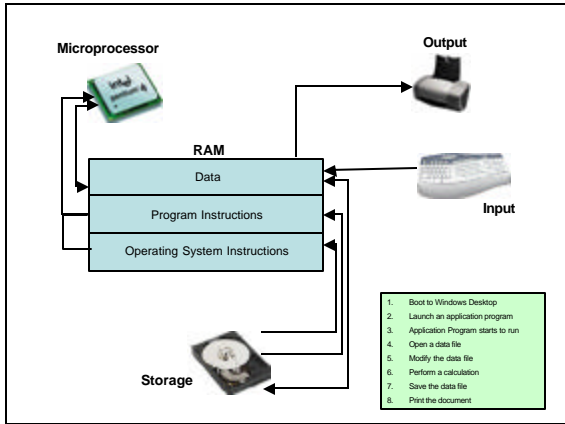
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## Data Communications

- Data Communications
  - transmission of data from one computer to another or to a peripheral device
  - sender
  - channel
  - receiver
  - protocol
  - driver
- Ports (pg 19)
  - an opening to plug in to connect to a peripheral device
  - serial: 1 bit at a time
  - parallel: 8 bits at a time
  - Universal Serial Bus (USB): 8-64 bits at a time
    - bus transmits data and power
    - up to 127 devices: hot swappable

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## Learning About Networks

- Network
  - a collection of computers & other devices interconnected via communications media
    - cables, phone lines, modems, wireless
  - why are computers networked?
  - LAN
  - Client/Server vs. Peer-to-Peer network configuration
  - Network Server
  - standalone computer
- SCC's network
  - logon
  - to share printers, programs, data files, Internet connection
  - network drives F: and H:
  - network interface card & blue cables (Ethernet)
  - WiFi access

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## Computer Software

- Review
  - computers are idiots
  - software = computer program = detailed step-by-step instructions
- A program must be located on a storage device and then loaded into RAM before the processor can execute it
- 2 major types of software:
  - applications software
  - operating system software
- Default Values (nib)

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## Understanding Application Software

- The reason people buy computers!
- Examples:
  - **word processing**
    - Microsoft Word
  - **spreadsheet**
    - Microsoft Excel
  - **database management**
    - Microsoft Access
  - **presentation graphics**
    - Microsoft PowerPoint
  - communications
  - e-mail

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## Understanding System Software

- Programs which:
  - manage system resources
  - allow us to launch application programs
  - provide services to application programs
  - enable us to manage files stored on disks
- Booting
- Examples
  - Windows, DOS, Mac OS, Linux
- GUI
- Multitasking

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## Practice Safe Computing!

- Regularly backup your data files
- Take advantage of Windows Update
  - Start | Help and Support | Windows Update
- Install antivirus software (pg 23)
  - eg: Norton Antivirus
- Install a firewall
  - eg: ZoneAlarm, Norton Personal Firewall
- Install antispymware software
  - eg: SpyBot Search & Destroy
- Beware of unsolicited e-mail attachments
- Use strong passwords and change periodically

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## On The Horizon

- Your first exam is on the horizon
- Start roughing out a a crib sheet now so you can later type and print it for test

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