Chapter 6

Moore's Law: pace at which CPU's the "brains" of the computer improve.

- Co founder of CPU Chip Manufacturer Intel
- The number of transistors inside a CPU will increase so fast the CPU capacity will double every 18 months
- By 2020 CPU chips will be manufactured a totally different way

What is your ideal computer?
How do I know what my ideal system is?
Where do I get the training I need?
Choosing either a desktop or a notebook system?
System out of the box: PC DeCrapifieer
How long will a notebook be useful to me?
- Interal Hard Drives
- External SATA: (eSATA) or USB 3.0 : fast transport port, can add external hard drive for more storage space
- Express Card Slot – Express card: add solid-state drive SSD
- Compact Flash, memory sticks, Secure Digital Cards
- New USB 3.0 manufactured in Express card formats

System Evaluation:

1. CPU subsytem
2. Memory Subsystem (RAM)
3. Storage Subsystem (hard drive)
4. Video Subsystem (videocard and monitor)
5. Audio Subsystem (sound card and speakers)
6. Ports

CPU: processes the instructions, performs calculations, and manages the flow of information, turning raw data into valuable information's through processing operations

- Located in the motherboard, the primary circuit board of the computer
- Intel Processors: Core family- i7,i5, i3 Centrino line
- AMD Processors: Althlona nd Phenom
- I7 is most advanced desktop CPU

How it works

- 2 Units
  1. Control Unit: coordinates the activities of all other computer components
  2. Arithmetic Logic Unit (ALU): all the arithmetic calculations (addition, subtraction, comparing like less than equal to)

  Everytme the CPU goes through steps- **Machine Cycle**
  1. Fetches required piece of data from RAM the temp storage location
  2. Decodes the instruction into something the computer can understand once its decoded it executes the instruction and stores the result to RAM before fetching next instruction.

  Different? (Design of the CPU in terms of # of cores)
  1. Core: complete processing section from a CPU embedded into one physical chip
  2. Clock Speed: how quickly the processor can work

3. Cache Memory: amount of immediate access memory the CPU has

Hyper threading: quicker process of information by enabling a new set of instructions to start executing before the previous set has finished

-Most recent- use of multiple cores on one CPU chip

- Two or more processors reside on the same chip allows 2 sets of instructions
- Running behind the scenes like Virus protection allows iTunes to run faster
- With multiple cores each program had the full attention of its own processing one
- Allows 2 different programs to be processed at one time, but they are sharing the computing resources' of the chip
- Faster processing and smoother multitasking
- IT IS POSSBIBLE to have multiple cores and hyper threading

Cache Memory: form of random access memory that is more accessible to the CPU than the regular RAM

- The chips proximity to the CPU
  1. Level 1 is block of memory that is built into the CPU chip for storage of data or commands that have just been used
  2. Level 2: is located on the CPU chip but is farther away from CPU, longer to access
  3. Level 3: More storage than 1 &2 but father away

FSB Front Side Bus: connects the CPU to the system memory, the wider it is the more info can go through faster. The faster the FSB is the faster you can get data to your processor. In MHz

Benchmarks: measurements used to compare CPU performance between processors

- Notebooks INTEL AND AMD make processors for notebooks, with low power consumption and more flexible wireless connectivity ports

CPU usage: the percentage of time that your CPU is working

- Upgrading your CPU will only affect the processing portion, not how quickly data can move to or from the CPU. Insufficient RAM or hard drive capacity

RAM: computers temporary storage space, short-term memory

Volatile storage: when the computer is off the RAM is cleared

Nonvolatile storage: permanent storage when the computer is powered off, like Hard drives

- Million times faster for CPU to retrieve data from RAM than hard drive nanoseconds vs. milliseconds
- Double Data Rate 2, Double Data Rate 3 (DDR2, DDR3)
- Older systems: DRAM, SRAM, SDRAM

Memory mofules or memory cards: small circuit boards that hold a series of RAM chips and fit into special slots on the motherboard

- Dual Inline Memory Modules (DIMM's)
- RAM resellers Crucial.com

Physical Memory: the amt of RAM that is actually sitting on memory mofules in your computer

Kernel Memory: the memory that your operating system uses, at minimum the system needs enough RAM to run the operating system

At least 2GB of RAM, BUY how much you can afford and no more than your system will handle

Hard Drive: largest storage capacity, TB tera bytes,

Access time: time it takes a storage decide to locate its stored data and make it available for processing, is faster than that of other permanent storage devices, like optical drives (Miliseconds ms)

Solid State Drive: same kind of memory as flash drive but they can only reach 1/10 of time as flash drives, no noise, little heat, little power. NOTEBOOKS

Data Transfer Rate:speed at which it can transfer data to other computer components such as RAM. In Megabits or megabytes

- Hard drive is composed of several coated round think plates of metal stacked on a spindle
- Each plate is called a **Platter:** when datas saved to a hard drive, a pattern of magnetized spots is created on the iron oxide coating of each platter, when aligned in one direction its 1 and in other direction 0. (**Binary digits**) smallest bit of data the computer can understand

GB or TB

Integrated Drive Electronics IDE: Para ell Advanced Technology Attachment PATA

Serial Advanced Technology Attachment: Serial ATA : hard drives use much thinner cables, and can transfer data more quickly than IDE drives

Huge drives or several smaller ones?

- Speed or security
- 2 smaller ones with RAID- redundant array of independent disks
- RAID 1: all data written to one is perfectly mirrored and written on second drive, instant by instant backup of your work
- RAID 0: every time data is written on hard drive it's actually spread across 2 physical drives. 2x as fast, one starts then jumps to second. "Performance"

Optical Storage: laser to store and read data

Blue Ray Disc: BD's within established tracks and sectors, just like on a hard drive. Store tiny **pits** that are burned onto the disc by high-speed laser

Nonpits: lands, translating into the 1's and 0's of the binary code computers understand. BLUE

DVD-ROM and BD-ROM: read only optical discs (movies)

CD-R, DVD-R, BD-R: written or saved or burned to them

CD-RW, DVD-RW, BD-RW: read/writeable

- CD drives cannot read DVD
- Most players are backward compatible

DVD-R/RW: DVD DASH

DVD+R/RW: DVD PLUS

DVD-RAM: record, erase, rewrite

"Format wars" the HD-DVD and HD discs, but they were retired in 2008

How the mechanical Hard drive works:

Track, sector, read/write head, seek time, latency, head crash