Lecture 12

Charles babbage - helped start computer, made tools for it

Data Hierachy

* Top is file (we used structures to represent records)
* Hierachy of data (GET) model - once what you get from manager to develop problem, data- binary representative ##, can flip the pyrmaid
* Programming language, we are thinking one way, its an abstraction between machine and high-level is assembly language, close to machine language

A Step towards assembly

* Computers can do one operation per steps,

Assembly Languages

* You can choose languages to solve different problems
* Problems solved only with assembly languages
* Each processor has only assembly language

Principles of Computer Organization Archeticture

* CPU- central processing unit
  + Motherboard allow all units to connect to each other
  + RAM - random access memory, what CPU uses to do stuff, can be accessed randomly
  + Motherboard wires- represents processors size of data works with
  + When computer starts a program, RAM receives an electrical signal from the CPU first, then RAM sends instructuion,
  + CPU processes it and does this
  + Is CPU needs to save stuff, sends data and turn on set wire and RAM will rewrite it
  + Binary representation is arbitrary
  + Processors have instruction in order to do task
* Two most important things about computer speed and power
* Only 3 types of processors, no compatiblity because of the different types of instructions
* How many combinations can use 8 bits 28 = 256 , initially ASCII used 27 for parity checks, because people thought bits would be lost
* People had to make different languages with different coding system, and caused confusion,
* Computer now use UNICODE 16 bits represent
* Inside the CPU
  + Control Unit
  + ARM arithmetic logic unit - responsible for math, has two inputs, when bus is used uses input to help it to do things
    - ALU outputs answer use flags to help control unit know wht to do next
  + Register- stores number temporaility, inside RAM
    - Number does not save, unless CPU has set wire
    - Enable wire used for register to output number
  + Bus - easily moves number between componets, can hold one # at a time
  + Instruction register - outputs to control unit who outputs to ALU what type of operation to perform
  + 4 flags, A flag is 1st one is true, 2nd flag for equal, 3rd flag if B is true designer have to take this into account. Saves flags to register to help CPU know what to do
  + Memory address wire send wire to RAM
  + Enable RAM wire , from CPU - to RAM
* Modern CPU process billions of instruction per second,