Notes CS-420

# 8/17/2023

## Intro Notes:

* Read Turing’s Cathedral (for fun)
* The Man from the Future, a Biography and History of John Van Neumann
* Questions for this class:
  + What is a computer?
    - What does it do?
      * Processes Data
        + Having input, executing operations on that input, and having output
      * Computes
    - How is it organized?
      * Has a kernel
      * Silicon
      * Transistors
        + Gates, latches, memory, etc.
        + Electricity
      * Switch:
        + Has 2 states
  + What is an operating system?
    - Why is an OS?
    - What does an OS do?
* Abstraction:
  + The act of removing unimportant details or attributes of objects to construct more general and less complex objects.
  + Computers are stacked abstractions.
* In this class, we are going to start with the notion that we are programmers and look down the levels of abstractions to understand the innerworkings of the operating system.

## Earliest Electronic Computers

* Problems:
  + Calculating artillery tables (even earlier mechanical computers)
  + Atomic bomb calculations
    - Criticality simulations
  + IFF (Identify Friend or Foe) systems
  + Weather Predictions
* ENIAC: Electronic Numerical Integrator and Computer (1945)
* The world’s first:
  + Electronic
  + General purpose
  + Digital
  + Programmable
* John von Neumann
  + Von Neumann Architecture
    - Everything is bits
  + IAS Machine: built by von Neumann
    - Stored program – stores program instructions in electronically accessible memory
    - Implementing predefined instruction sets (operations)
      * Each given code: Opcode – an ID number stored in binary.
    - There is no code or programming languages (even assembly)
    - No IDEs
    - Coding is all done in binary.
* Notional Machine
  + Variables
  + Operations/operators
  + Memory locations/addresses
  + None of these were in the old days
  + These are ALL abstractions.
    - How are they defined and how are they supported?

## What are Operating Systems?

* Examples:
  + MacOS
  + Windows
  + RedHat (Fedora)  
    Kali Linux
  + Ubuntu
  + Arch
  + BSD
* We will not be learning about specific OS’s
  + We will more be answering what is, why is, what do they do?

## Class Chores

* Course is on Canvas
* Syllabus
* zyBook
  + Reading
* Will be some programming
  + System programming