**Computer Systems Notes**

Lecture 1:

Layers of Abstraction:

Software:

* Actual Writing of Code

Hardware:

* CPU
* Instructions and Set Architecture (and I/O interfaces)
* Microarchitecture
* Circuits
* Devices

Turning Machine- Model of device that can perform any computation

Description of Each Level

**Problem Statement**

* Stated using “natural language”

**Algorithm**

* Step-by-step procedure, guaranteed to finish

**Program**

* Express the algorithm using a computer language
* High-level language, low-level language

**Instruction Set Architecture (ISA)**

* Specifies the set of instructions the computer can perform data types, addressing mode

**Microarchitecture**

* Detailed organization of a processor implementation
* Different implementation of a single ISA

**Logic Circuits**

* Combine basic operations to realize microarchitecture
* Many ways to implement a single function (e.g., addition)

**Devices**

* Properties of material, manufacturability

**Lecture 2: Chapter 2: Bits, Data Types, and Operations**

* At the lowest level a computer is an electronic machine that works by controlling the follow of electrons

A computer is a binary (base two) digital system, that has two states: 0 and 1

* A basic unit of information is the binary digit or bit

A collation of two bits has four possible states: 00, 01, 10, 11

**What kinds of data do we need to represent?**

* Numbers, Text, Images, Sounds, Logical (true or false), instructions

A data type is the *representation* and *operations* within the computer

**Lecture 3: Digital Logic Structures**

* Leave me alone