i206 Spring 2012

Exam 1 Review Topics

Boolean

- Be able to convert between Boolean expressions and logic gates and truth tables and Venn diagrams.

- Be able to use deMorgan’s laws to convert Boolean expressions.

Binary

- Be able to
  - Do the basics of binary arithmetic
  - Convert among binary, decimal, and hexadecimal
- Understand the relationship between binary numbers and truth tables.
- Understand the relationship between binary numbers and powers of 2.
- Understand how information that isn’t numerical can nonetheless be represented by binary numbers.

Machine Instruction Sets and Assembly Language

- Understand the relationship between computer instructions and binary numbers.

- Understand the relationship between machine instructions and assembly language instructions and be able to convert between them. Understand the language from lecture, also found here:
  http://courses.cs.vt.edu/~csonline/MachineArchitecture/Lesson

- Understand the meaning of a sequence of computer instructions and describe what that sequence of instructions does.

CPU, Circuits and Memory

- Understand the roles and behavior of the major circuits that comprise the CPU, including:
  - Registers
  - ALU
  - RAM
- Understand the difference between loading/ storing a numerical value vs. a memory reference (address) of a numerical value.
- Understand the basic functioning of a CPU.

Math

- Be able express sums (and differences) of sequences of numbers in sigma notation and with python code.

- Understand the graphed shapes of and relative size differences between different kinds of functions
  - E.g., linear, polynomial, exponential, log

Analysis of Algorithms

- Be able to analyze pseudocode or python code to determine the number of steps required to execute that code in the general case (for any value of n)
- Be able to analyze algorithms in terms of their big-O running time.

Sorting Algorithms

- Understand the basics of how the main ones work.
- Know the running times of the main ones.