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.