Study guide for first CS160 midterm exam

By now, you should be able to interpret or write a Java program that uses any of the items shown below. In addition you should know the function of basic computer components (processor, main memory, auxiliary memory, I/O devices) and be able to differentiate source code and byte code and discuss the roles of the Java compiler and virtual machine.

1) Java programs
   a. Writing a class with main method
   b. Importing packages
   c. Declaring and initializing variables
   d. Assignment statements
   e. Numeric, character, and string literals

2) Data types (and size in bits)
   a. Public versus private
   b. byte, short, int, long
   c. float, double
   d. boolean, char, String

3) Expressions
   a. Primitive operators: *, /, +, -, %, ++, --
   b. Relational operators: ==,!>,<=,>=
   c. Boolean operators: &&, ||, ^, !
   d. Order of operations, parentheses
   e. Mixed types and type casting

4) String functions
   a. length, charAt, indexOf, substring
   b. String concatenation: concat, +
   c. String comparison: equals (== doesn’t work!)

5) Writing to the console
   a. Using System.out.print/println/printf
      ✓ Differences between them
      ✓ Formatters: %f,%d,%c,%s
      ✓ Special Characters: ‘n’,‘\t’
   b. Combining literals and variables

6) Reading from the console
   a. Declaring and use a Scanner
   b. Reading strings that are single tokens: next
   c. Reading strings that are lines of text: nextLine
   d. Reading integers and doubles: nextInt, nextDouble

7) Conditionals
   a. if, if-else, and else statements
   b. switch statements

8) Sets
   a. Set Notation, Set Membership, Set Cardinality
   b. Subset and Proper Subset, Empty Set
   c. Set Union, Intersection, Difference, Complement
   d. Set Identities
   e. Cartesian Product, Power Sets
   f. Set Builder Notation, Venn Diagrams
   g. Common Sets (N, Z, Z+, R, R+)

9) Functions:
   a. Domain, Codomain, Range
   b. 1:1 Functions
   c. (Strictly) Increasing Functions

10) Propositional Logic
    a. Logical operations (∨,∧,¬,⊕,→,↔)
    b. Truth Tables
    c. Logical Equivalences
    d. Tautology, Contradiction, Contingency