Introduction to Computer Science
Test I Review

Chapters covered: 1 – 6

You should expect an exam composed of short answer and problem questions. I do not give multiple choice questions, so there will be none on the test. I want to see what you know, so I will ask you to write and to solve problems. On question not requiring the writing of code or the tracing of a method, you must answer using complete sentences. One word answers will not suffice.

I will try and time the test so that you can get it done in 50 minutes, if you know the material. If you are only familiar with the material, do not have it at your finger tips as they say, then you will find the test too long. If you know the following material you will be in good shape for the test.

Chapter 1:
- What is an algorithm? How does an algorithm and a program differ?
- Why are computers binary machines? What is ASCII and how does it illustrate the concept of encoding information?

Chapter 2
- What is a class? What is an object? How is an object related to a class?
- What are the math operators in Java? Pay particular attention to the % operator.
- How do you declare a variable in Java?
- Know the following basic types and how to use them.
  - double
  - float
  - int
  - long
  - short
  - byte
  - char
  - String
  - boolean
- How do you print a value from Java?
- Know how to determine the type of an arithmetic operation in Java.
- What is the difference in a String and a char variable?
- How does what a variable of a primitive Java type (int, double, boolean, … ) store differ from what an object variable stores?
- What does the new operator do?

Chapter 3
- What is a program?
- What is the syntax for a basic Java program with a main method?
- What is a method? Know how to use methods and how to define methods?
Test 1 Review

- What does it mean to say that a method has a return type other than void?
- What is a parameter? What is a formal parameter? What is an actual parameter? How do they differ?

Chapter 4
- What is a pixel?
- What is an array? How do you declare and use a one dimensional array in Java?
- How do you declare and use a two dimensional array in Java?
- Know how we represent color in a picture? Include the color models of RGB, HSV, and CMYK.
- What is 24 bit color? What is 32 bit color?
- Know how to manipulate pictures in Java.
- Know how to write and use for-each loops, while loops, and for loops.
- Know how to re-write one type of loop as one of the other. For example, how to rewrite a for-each loop as for loop.
- Study the image manipulation algorithms in chapter 4.

Chapter 5
- Know how to use nested loops to manipulate an image pixel by pixel.
- Know the algorithm for copying a picture.
- Know how to return a value from a method.
- Know the algorithm to scale an image down by a half or up by a factor of 2.
- Know the algorithm to mirror an image either vertically or horizontally.

Chapter 6
- What is the domain of the boolean type in Java? (ie. What values are legal to assign to a boolean variable?)
- Know why to use an if statement.
- Know how to write an if statement in Java.
- Know how a block statement (ie. a series of statements enclosed between braces) is used in Java with if statements and loops.
- Know the relational operations that may be used in Java.
- Know how to use the relational operators in an if statement or a loop.
- Know how to use nested if statements and how to write them in Java.

Miscellaneous
- Know how to write a simple Java class which has a main method. This means that you will need to know the signature for the main method and how to match up braces.
- Know how to write Javadoc comments and what is required for a method.
- Know how to write code using comments and proper grouping of lines.