Instructions

This is a sample exam which shows what typical questions look like. A real exam would have about 100 points; for example: 15 T/F questions = 15 pts; 10 short answer = 50 points; 3 longer answer = 35 points. A one hour and a half exam might thus run to 6 pages total, but note that a lot of the space is for answers.

A. Basic knowledge—true or false

1. Variables of primitive type (like integers) must be initialized with the new command.

2. Once an array is created, its size may never change.

3. A loop counter in a for loop may count up, but never down.

4. Every variable declared in a Java program must have a type.

Etc., for about 15 questions’ worth

B. Basic knowledge—multiple choice and short answer

1. How many lines will the following loop print when it is run?

   ```java
   int i = 0;
   while (i<=6)
     System.out.println("i is now " + (i++));
   ```

2. Which of the following best describes this Java code fragment?

   ```java
   s += "another"
   ```

   (a) the string s is being assigned the value "another"
   (b) the two strings s and "another" are being compared
   (c) the lengths of the strings s and "another" are being added together
   (d) the variable s is set to refer to a new string built from the old s and "another"

Etc., for about 10 questions’ worth

(well, really only 2 on the sample exam)
2. Consider the following pieces of an application program for geometric objects: it contains class definitions for both rectangles and squares, with squares extending rectangles and with the understanding that squares should always have sides of equal length. We need to fill in the code for the two methods named stretch in the two classes: each method takes an integer representing a multiplicative factor by which the shape should be stretched (e.g., twice as big = factor 2): in the case of Rectangle, the stretching only applies to the x-dimension—in the case of the squares, it applies in both dimensions.

Write code to fill in the boxes below, thus implementing the constructors and these methods.

```java
public class Rectangle {
    int x;
    int y;
    int height;
    int width;

    public Rectangle(int nuX, int nuY, int h, int w) {
        // Your code here
    }

    public void stretch(int xfactor) {
        // Your code here
    }
}

public class Square extends Rectangle {
    public Square(int nuX, int nuY, int size) {
        // Your code here
    }

    public void stretch(int factor) {
        // Your code here
    }
}
```

Etc., for about 3 questions’ worth