CS 231: Introduction to Programming • Sample Exam

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Name *(please print):* _____

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 pt. each]

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 [5 pts. each]

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

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

2. Which of the following best describes this Java code fragment?
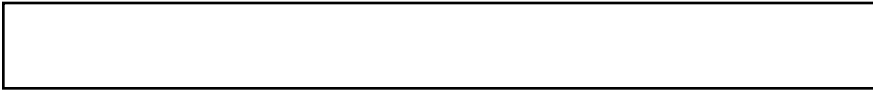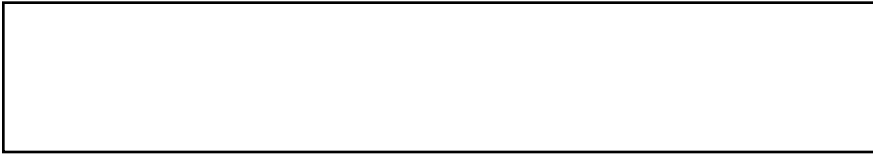
```
s += "another"
```

   (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

C. Longer answer [12 pts. each]

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.

```
public class Rectangle {

      int x;
      int y;
      int height;
      int width;

      public Rectangle(int nuX, int nuY, int h, int w) {

      ┌──────────────────────────────────────────────┐
      │                                              │
      │                                              │
      │                                              │
      │                                              │
      └──────────────────────────────────────────────┘

      }

      public void stretch(int xfactor) {

      ┌──────────────────────────────────────────────┐
      │                                              │
      │                                              │
      │                                              │
      └──────────────────────────────────────────────┘

      }
}

public class Square extends Rectangle {

      public Square(int nuX, int nuY, int size) {

      ┌──────────────────────────────────────────────┐
      │                                              │
      │                                              │
      │                                              │
      │                                              │
      └──────────────────────────────────────────────┘

      }

      public void stretch(int factor) {

      ┌──────────────────────────────────────────────┐
      │                                              │
      │                                              │
      │                                              │
      │                                              │
      └──────────────────────────────────────────────┘

      }
}
```

Etc., for about 3 questions' worth

(well, really only 2 on the sample exam)