

## CS 1713 Exam 2 — Spring 2012

This is a closed book exam. Answer all questions on these sheets if you can. If you need additional space, you may request some blank sheets of paper. Put your name and seat number at the top of the first and last sheet and on any additional pages you submit. Do not spend too much time on any one problem. You have 75 minutes to complete this exam.

- 1) (12 points) Suppose we have the following declaration:

```
String s = "Intro to Programming";
```

Find the value of each of the following:

a) `s.charAt(3);`

b) `s.indexOf("ro");`

c) `s.indexOf("prog");`

d) `s.length();`

e) `s.substring(10);`

f) `s.substring(10,14);`

- 2) (5 points) Write a method that takes a **String** as a parameter and return a new **String** which is the parameter with any leading blanks removed.

3) (5 points) Write a method that takes an array of **double** as a parameter and prints the values in reverse order, all on one line, separated by commas.

4) (5 points) Write a method that has two integer parameters, **low** and **high** and returns a random integer between **low** and **high**, inclusive.

5) (10 points) For each of the terms on the left, write the letter of the expression on the right that best matches it. Each expression on the right should be used exactly once.

- |                             |  |
|-----------------------------|--|
| _____ a) class              | A) A blueprint for creating an object  |
| _____ b) constructor        | B) A collection of constants and abstract methods  |
| _____ c) extends            | C) A Java key word that indicates that the class has a certain collection of public methods available. |
| _____ d) implements         | D) A special method used to initialize an object   |
| _____ e) interface          | E) A Java key word that is used to indicate that the class inherits properties of another class.       |
| _____ f) object             | F) Determine the behavior of an object   |
| _____ g) private attributes | G) Determine the state of an object  |
| _____ h) private methods    | H) Has state and behavior  |
| _____ i) public attributes  | I) Methods that can only be accessed inside of the class in which they have been defined.              |
| _____ j) public methods     | J) Something that you never declare in CS 1713   |

6) (5 points) Assume that **Triangle** is a class whose constructor has three double parameters representing the sides of a triangle. Only assume that the class has appropriate accessor methods for the sides of the triangle. Write a method that takes a single **Triangle** as a parameter and returns true for isosceles triangles and false for all others. (An isosceles triangle is one which has at least two sides are equal.)

- 7) (25 points) Design a class to represent an student. A student has a last name, a first name, a social security number, a major, and a number of credits completed. All of these may be accessed and all except the first name and social security number may be changed. The constructor will set the major to **"undeclared"** and the number of credits completed to 0. Have the class implement **Comparable** based on the major, with ties broken by the last name and then the first name if necessary. Write a **toString()** method that can be used to print the entire state of a student object in an easily identifiable format with one item per line. Also write a method called **getFullName** that returns the name of the student in the form of the last name followed by a comma and space and then the first name. You should write all of the code necessary so that it could be typed into eclipse as written and compile without errors. Continue on the next page if necessary.

7) (continued)

8) (5 points) Draw an accurate schematic of the program variables showing the execution of the code segment.

```
int x = 5;  
int y = 10;  
int z;  
z = x;  
x = y - 3;  
z = 17;
```

9) (5 points) Draw an accurate schematic of the program variables showing the execution of the code segment.

```
int[] x = {1, 3, 5, 7};  
int[] y = {2, 4, 6};  
int[] z;  
z = new int[2];  
z[0] = x[1];  
z[1] = y[2];  
y[0] = z[0] + z[1];  
z = x;  
z[1] = y[0];
```

- 10) (8 points) Write a method that takes one integer parameter, **n**. It simulates throwing 2 dice until the value **n** is thrown, and returns that number of throws. If **n** is a value that cannot be obtained by throwing 2 dice, return -1.

- 11) (10 points) Suppose **Rectangle** is a class that has been appropriately written. It has a constructor with 2 double parameters, a width and length in this order. Write a method that takes an array of **Rectangle** as a parameter and returns the width of a **Rectangle** with the largest area. For extra credit, return the smallest width of all rectangles with the largest area.

- 12) (5 points) Suppose **Rectangle** is a class that has been appropriately written. It has a constructor with 2 double parameters, a width and length in this order. Draw an accurate schematic diagram of the program variables showing the execution of the program.

```
double w = 2;
double x = 5;
double y = 7;
Rectangle r1;
Rectangle r2;
Rectangle r3;
r1 = new Rectangle(w, x);
r2 = new Rectangle(y, w);
r3 = r2;
x = r1.getWidth();
y = r3.getLength();
r2 = r1;
r2.setWidth(15);
w = r1.getWidth();
r3 = r1;
y = r3.getLength();
x = r1.getWidth();
```

\_\_\_\_\_ Seat Number

Name \_\_\_\_\_