

**CS 1713 Exam 1 — Spring 2008**

This is a closed book exam. Answer all questions on these sheets. If you need more room, use the back of the last sheet. Do not spend too much time on any one problem. You do not have to do the problems in order.

1) (12 points) Suppose we have:

```
int x = 13;  
int y = 4;  
double z = 13.0;  
double w = 5.0;
```

Evaluate each of the following expressions. Write your answer in a simplified form. Do not use improper fractions. (An improper fraction is one in which the numerator is greater or equal to the denominator.) Use two decimal places for numbers with a fractional part.

a)  $x/y$

b)  $x/w$

c)  $(x + z)/y$

d)  $(x * w)/y$

e)  $x \% y$

f)  $x/(y-2)+z/(y-2)$

- 2) (10 points) The cost of producing a book depends on the number of pages in the the book. The cost is made up of three parts, the printing of the cover, the printing of the pages, and the binding of the book. It costs \$1.10 to print the cover, independent of the number of pages in the book. Each page of the book costs \$.02 to print. Binding costs \$1.00 for books of under 200 pages and \$2.00 for books of 200 pages or over. Write a program segment that sets the **cost** from the number of **pages**.
- 3) (10 points) Suppose that **frog** is an instance of **Frog**. The class **Frog** has a public method **hop** that takes an integer parameter, the number of hops to make. It also has a **getPosition** method that takes no parameters and returns the frog's position, an integer. Write a program segment using a **do - while** loop that calls **frog's hop** with parameter 1 until the position is 5.

4) (10 points) Assume that **a** is an array of integers.

a) Write a program segment that prints the elements of **a** on a single line with the elements separated by blanks.

b) Write a program segment that prints the elements of **a** on a single line with the elements separated by a comma and a blank. If the elements are 2, 10, 3 and 5, the line should be:

**2, 10, 3, 5**

5) (8 points) Write a method that has an array of doubles as a parameter and returns position of the smallest element in the array. If the array has no elements, return -1.

- 6) (7 points) Suppose a **RationalNumber** has a numerator and a denominator. The constructor for the **RationalNumber** class has two parameters representing the numerator and the denominator (in this order). The **RationalNumber** class has an **add** method that takes a **RationalNumber** parameter and returns a new **RationalNumber**. Write a program segment that declares and instantiates two **RationalNumber** objects corresponding to the values  $\frac{3}{4}$  and  $\frac{1}{6}$ . Then use the **add** method to create a new **RationalNumber** that represents the sum of these.
- 7) (5 points) Write a method that takes a **String** parameter and a **char** parameter and returns **true** if the second parameter is in the first parameter. It returns **false** otherwise.

- 8) (10 points) Suppose **s1** and **s2** are strings. Each one has length 2 and each contains only the characters '**0**' through '**9**'. Each string represents a 2-digit decimal number. Write a program segment that sets the **String s3** to the **String** that represents the integer that is the sum of these two values.  
(If you cannot figure out how to do this problem, for reduced credit you may assume there is a method **stringToValue** that takes a **String** parameter and returns the corresponding integer value.)

9) (12 points) Suppose we have the following declaration:

```
String s = "Java programming is fun.";
```

Find the value of each of the following:

a) **s.charAt(2);**

b) **s.indexOf("gram");**

c) **s.indexOf("Program");**

d) **s.length();**

e) **s.substring(10);**

f) **s.substring(6,10);**

10) (4 points) Draw an accurate schematic of the program variables showing the execution of the program.

```
double a = 3.0;
```

```
double b = 4.0;
```

```
double c = 5.0;
```

```
c = a;
```

```
b = c;
```

```
a = 7.1;
```

- 11) (6 points) Suppose **Rectangle** is a class that has been appropriately written. Draw an accurate schematic of the program variables showing the execution of the program.

```
double len;  
double wid;  
double area;  
Rectangle rect1;  
Rectangle rect2;  
len = 5;  
wid = 7;  
rect1 = new Rectangle(wid, len);  
area = rect1.getArea();  
rect2 = rect1;  
rect1.setWidth(4);  
area = rect2.getArea();
```

- 12) (6 points) Draw an accurate schematic of the program variables showing the execution of the program.

```
int[] a = {2, 4, 6, 8};  
int[] b = {1, 3};  
int[] c;  
c = b;  
c[1] = 9;  
c = a;  
c[1] = 5;  
b = a;  
a[0] = 0;
```



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Seat \_\_\_\_\_