CS203 Java Programming and Application
Fall, 2016

Assignment 1
Assigned Date: Thursday, September 22, 2016
Due Date: Midnight Wednesday, October 5, 2016

QUESTION 1 (20 MARKS)

Implement the following method to sort the columns in a two dimensional array. A new array is returned and the original array is intact.

public static double[ ][ ] sortColumns(double[ ][ ] m)

Write a test program that prompts the user to enter a 3 * 3 matrix of double values and displays a new column-sorted matrix. **Here is a sample run**:

Enter a 3-by-3 matrix row by row:
0.15 0.875 0.375
0.55 0.005 0.225
0.30 0.12   0.4
The column-sorted array is
0.15 0.0050 0.225
0.3   0.12   0.375
0.55 0.875   0.4

QUESTION 2 (10 MARKS)

*2.19 (*Geometry: area of a triangle*) Write a program that prompts the user to enter three points (x1, y1), (x2, y2), (x3, y3) of a triangle and displays its area. The formula for computing the area of a triangle is

$$s = (side1 + side2 + side3)/2;$$

$$area = \sqrt{s(s - side1)(s - side2)(s - side3)}$$

Here is a sample run:

```
Enter three points for a triangle: 1.5 -3.4 4.6 5 9.5 -3.4  ↵Enter
The area of the triangle is 33.6
```

QUESTION 3 (10 MARKS)

Show the output of the following statements.
(a) System.out.printf("amount is %f %e\n", 32.32, 32.32);
(b) System.out.printf("amount is %5.2%% %5.4e\n", 32.327, 32.32);
(c) System.out.printf("%6b\n", (1 > 2));
(d) System.out.printf("%6s\n", "Java");
(e) System.out.printf("%-6b%s\n", (1 > 2), "Java");

Write your answer as the two examples given below:

```
System.out.printf("%8d%8s%8.1f\n", 1234, "Java", 5.63);
System.out.printf("%-8d%-8s%-8.1f \n", 1234, "Java", 5.63);
```

display

where the square box (□) denotes a blank space.

QUESTION 4 (10 MARKS)

Write a Java program to input integers as command line arguments and display the sum of the integers input. User can arbitrary input any number of integers.
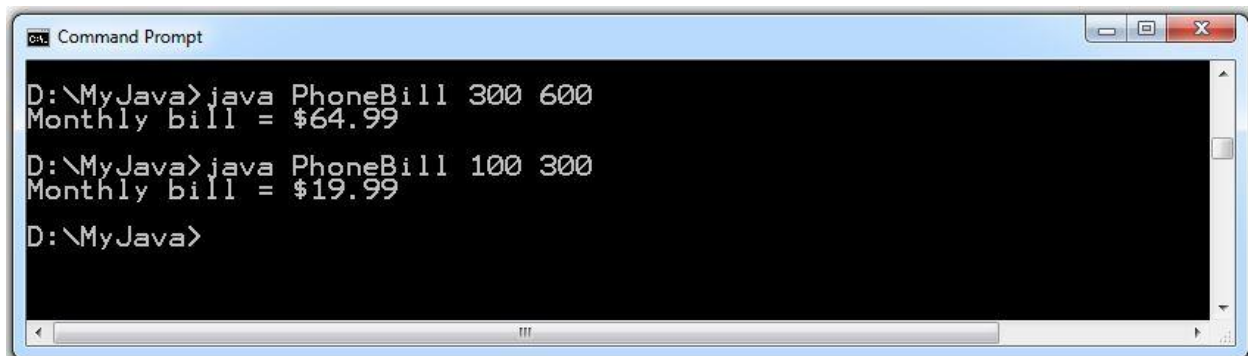

QUESTION 5 (10 MARKS)

Repeat question 4 above using Scanner class to input arbitrary numbers of integers and find the sum.

QUESTION 6 (15 MARKS)

Write a Java program to calculate your cell phone bill given the number of minutes used. Customers pay a basic of $19.99 a month. The basic includes 200 peak minutes and 500 evening minutes. The charge for going over the peak is $0.30/minute and the evening minutes is $0.15/minute. Your program should input the peak minutes and evening minutes used from the command-line arguments.

A sample run of the program is as follow:


```
Command Prompt

D:\MyJava>java PhoneBill 300 600
Monthly bill = $64.99

D:\MyJava>java PhoneBill 100 300
Monthly bill = $19.99

D:\MyJava>
```

QUESTION 7 (25 MARKS)

Write a Java program to print the income statistics for a company. A consumer products company pays its part time sale representatives a basic of $200 biweekly and 8% of gross sales. For example, a sales representative who makes $6000 sales will receive a total of $680 in two weeks. The income statistics should show the number of sale representatives earn in each salaries range. The salaries range is as follow:

a. $200-299
b. $300-399
c. $400-499
d. $500-599
e. $600-699
f. $700-799
g. $800-899
h. $900-999
i. $1000 and over

The salaries range is truncated to integer. Print the income statistics in a tabular format. Your program should use a loop structure and a Scanner class to read in arbitrary numbers of salaries and printf( ) method to formulate the tabular output.

A sample output is as follow:

```
C:\Windows\system32\cmd.exe                                      _ ▢ X

Enter gross sales or enter a negative value to terminate the program: 33.33
Enter gross sales or enter a negative value to terminate the program: 55.25
Enter gross sales or enter a negative value to terminate the program: 77.88
Enter gross sales or enter a negative value to terminate the program: 123.89
Enter gross sales or enter a negative value to terminate the program: 356.78
Enter gross sales or enter a negative value to terminate the program: 338.73
Enter gross sales or enter a negative value to terminate the program: 3256.88
Enter gross sales or enter a negative value to terminate the program: 6765
Enter gross sales or enter a negative value to terminate the program: 7763.66
Enter gross sales or enter a negative value to terminate the program: 76587.99
Enter gross sales or enter a negative value to terminate the program: 23567.99
Enter gross sales or enter a negative value to terminate the program: 88899.66
Enter gross sales or enter a negative value to terminate the program: -9

IncomeRange              Number

$200 - $299              6
$300 - $399              0
$400 - $499              1
$500 - $599              0
$600 - $699              0
$700 - $799              1
$800 - $899              1
$900 - $999              0

$1000 and over           3
Press any key to continue . . .
```

Marking Scheme: Please read the marking scheme in the UR Courses before you do the assignment