COSC 1046 – Fall 2016 - Assignment 1

This assignment is designed to give you some practice and experience writing Java applications using variables, keyboard input and if-statements. Each question specifies the name that each file/application should have. Please follow this naming convention. When you have completed the assignment compress all of your files into a single archive using Windows (Right Click folder -> Send To -> Compressed Folder) or OS X (Right Click folder -> Compress). Using a 3rd party compression utility such as WinRAR or 7zip may render your files unreadable and un-markable. Submit a single compressed file to D2L. You can resubmit your files as many times as you would like up to the due date and time.

Be sure to include your name and a brief description of your program (as comments) at the top of each file. Pay attention to using good variable names. If you have any questions please check or post to the forum.

Submit solutions for these questions. Wherever applicable, do your best to reproduce my output exactly. In my sample **bold** indicates user-input.

If you work in partners, submit only one solution and make sure that both partners' names are in ALL files. If only one name appears, only one person will get the grade. No exceptions.

A word in general on assignment grading (for future assignments): If your program produces the displayed output and meets the criteria specified in the question you should expect to receive full marks. Deductions are taken when there are deviations in the output – small deductions for small deviations (calculation error, improper formatting, etc.) while larger deductions are taken for larger deviations (missing output, substantially incorrect values, etc.). Express your creativity in your code, not in your output. Also, deductions will be taken for:

- lack of comments
- poor variable names
- programs that don't run at all (large deduction), so make sure your program runs, even if it is not complete.

If you have any questions or concerns about the grading scheme before you submit an assignment please post to the forum and ask for clarification. If you have concerns about the grading you've received on an assignment, please email me and I will review the grading form.

Do all of the questions to ensure that you are practicing all concepts but submit solutions to questions 1 and 2 ONLY for grading. It is assumed that you are doing all of the questions and some of them may be referenced in future assignments. Solutions will be provided only for required questions.

Question 1. (`question1.java`) (12 marks) They say "A dollar doesn't go as far as it used to…" but they rarely mention that it depends on where you take that dollar. Below is a table of conversion rates. Write a program that uses variables and constants to print out the value of a converted amount of money for various countries. Use the last three digits of your student number as the value to convert. For example, my student number ends with 964 so the output of my program would be:

$1 Canadian (CAD) Buys:	
0.77	US Dollars (USD)
78.91	Japanese Yen (JPY)
5.13	Chinese Yuan (CNY)
51.39	Indian Rupees (INR)
0.68	Euros (EUR)

```
C:\Users\aaron\Desktop>java question1
$964.00 CAD buys:

USD: 742.28
JPY: 76069.23999999999
CNY: 4945.32
INR: 49539.96
EUR: 655.5200000000001
```

(3 marks) The output above is a bit messy, especially considering it's showing money to too many digits. Format your output as follows. Hint: Look up `printf()` in chapter 3:

```
C:\Users\aaron\Desktop>java question1
$964.00 CAD buys:

USD:    742.28
JPY:  76069.23
CNY:   4945.32
INR:  49539.96
EUR:    655.52
```

Question 2. (`question2.java`) (12 marks) Write a program that takes as input the price of a meal. The program then computes and displays the tax (13%) and the total for the bill. If the meal price is < 0, error and quit the program.

```
C:\Users\aaron\Desktop>java question2
Enter the price of your meal: $55

Tax: $7.15
Bill with tax: $62.15
```

(3 marks) Prompt the user for a second input, a service-quality integer, 1 for great service, 2 for good service and 3 for poor service. Compute an appropriate tip amount (great = 22%, good = 18%, poor = 10%) based on the before-tax meal cost and add it to the after-tax total. If the tip option is less than 1 or greater than 3 exit the program.

```
C:\Users\aaron\Desktop>java question2
Enter the price of your meal: $100
How was the service?  1=great, 2=good, 3=poor:1

Tax: $13.0
Bill with tax: $113.0
Tip: $22.0
Total bill (including tip): $135.0


C:\Users\aaron\Desktop>java question2
Enter the price of your meal: $100
How was the service?  1=great, 2=good, 3=poor:3

Tax: $13.0
Bill with tax: $113.0
Tip: $10.0
Total bill (including tip): $123.0
```

Do not submit

Question 3.

Collect two integer values from the user. Based on these values display the sum, difference, product, average, distance (absolute difference), maximum and minimum. Sample output is provided below:

```
C:\Users\aaron\Desktop>java question3
Enter two integers:
10
20

Sum:30
Difference:-10
Product:200
Average:15.0
Distance:10
Maximum:20
Minimum:10


C:\Users\aaron\Desktop>java question3
Enter two integers:
101 52

Sum:153
Difference:49
Product:5252
Average:76.5
Distance:49
Maximum:101
Minimum:52
```

Do the same work outlined above BUT have the output aligned in the following manner:

```
C:\Users\aaron\Desktop>java question3
Enter two integers:
101 52

Sum:               153
Difference:         49
Product:          5252
Average:            76.5
Distance:           49
Maximum:           101
Minimum:            52
```

Question 4

Write a program that reads a five-digit integer, such as 12345, and then displays it, one digit per line as shown below. There are two ways to do this – one is numerically and another using String methods. Your application should do it both ways.

```
C:\Users\aaron\Desktop>java question4
Enter a five-digit integer: 12345
Mathematical Solution:
1
2
3
4
5
String method solution:
1
2
3
4
5
```

Your prompt tells the user to enter a five-digit integer. If they enter in an integer that is not 5-digits in length, have the program end with an appropriate error message. (You'll need to wrap what you did in the first part in an if-statement here.)

```
C:\Users\aaron\Desktop>java question4
Enter a five-digit integer: 10
Sorry, incorrect number of digits.

C:\Users\aaron\Desktop>java question4
Enter a five-digit integer: 100000
Sorry, incorrect number of digits.

C:\Users\aaron\Desktop>java question4
Enter a five-digit integer: 31337
Mathematical Solution:
3
1
3
3
7
String method solution:
3
1
3
3
7
```

Question 5.

Write a program that prompts the user to enter three number grades. The program computes the average of the three grades and displays the letter grade for the three original grades and for the average. Letter grades are computed as follows:

- A+: 90-100
- A: 80-89
- B: 70-79
- C: 60-69
- D: 50-59
- F: < 50

Question 6.

Create a single Java application that evaluates the following mathematical expressions. Use literals in your expressions and use variables to store the result. Then print the values stored in those variables. Practice using comments to clearly mark each part of the question.

a) (2 marks) The product (multiplication) of the first 10 positive **integers**. Store your result as an int value. Do not use doubles or floats in your solution.

b) (2 marks) The product (multiplication) of the first 17 positive **integers**. Store your result as an int value. Do not use doubles or floats in your solution.

c) (2 marks) $z = 5x^2 + y^2(\frac{1}{1+x^2})^{\frac{1}{2}}$, for x = 7.5 and y = -9

d) (2 marks) $w = \left(\frac{1}{a}\right) * a$ where a = 0.000000001 (take note of your result here).

Sample output from my solution is shown below. Note that I have hidden the output from two parts so as not to give away the surprises. Your solution should show the proper result.

```
C:\Users\aaron\Desktop>java question6
a)3628800
b)Hidden
c)291.95526132737245
d)Hidden
```