

CSC / CIS 175

Problem Solving and Programming - I

University of Michigan-Flint
Department of Computer Science, Engineering, and Physics (CSEP)



COLLEGE OF ARTS & SCIENCES

COMPUTER SCIENCE, ENGINEERING, & PHYSICS

Fall 2013

September 23, 2013

Homework 3

(100 points)

due by October 2, Wednesday 8:00am

Remarks:

- No emailed homeworks will be accepted.
 - Only submission is via the BB system.
 - No late submissions will be accepted.
-

Questions for the deliverable:

1. Write a program that reports whether a number input is divisible by 7.
Hint: If a number is divisible by 7, that means you can divide it by 7 and get a remainder of 0.

Test Data:

(i)

Enter an integer number : 79

Your integer number: 79 is not divisible by 7

(ii)

Enter an integer number : 28

Your integer number: 28 is divisible by 7

2. Write a program that reads two integers from the keyboard and prints if the first is a multiple of the second. **Hint:** Use modulus operator.

Test Data:

(i)

Enter the first integer : 23
Enter the second integer : 58
23 is NOT evenly divisible by 58

(ii)

Enter the first integer : 240
Enter the second integer : 3
240 is evenly divisible by 3

3. Modify the hw1, q1 program so that it prints out the letter grade based on the grading scale of this class available on the syllabus.

Test Data:

(i)

Please enter points scored in Homework 1 :59
Please enter points scored in Homework 2 :59
Please enter points scored in Homework 3 :59
Please enter points scored in Mid-Term :59
Please enter points scored in Final :59

Hw1	Hw2	Hw3	Mid-Term	Final	Total
59	59	59	59	59	59

Overall Grade: 59 out of 100
Your letter grade is : F

(ii)

Please enter points scored in Homework 1 :97
Please enter points scored in Homework 2 :97
Please enter points scored in Homework 3 :97
Please enter points scored in Mid-Term :97
Please enter points scored in Final :97

Hw1	Hw2	Hw3	Mid-Term	Final	Total
97	97	97	97	97	97

Overall Grade: 97 out of 100
Your letter grade is : A+

(iii)

Please enter points scored in Homework 1 :80

Please enter points scored in Homework 2 :90
Please enter points scored in Homework 3 :70
Please enter points scored in Mid-Term :50
Please enter points scored in Final :80

Hw1	Hw2	Hw3	Mid-Term	Final	Total
80	90	70	50	80	71

Overall Grade: 71 out of 100
Your letter grade is : C-

4. Write a program that inputs three integers from the keyboard and prints the sum, average, product, smallest and largest of these numbers.

Test Data:

(i)

Please enter Integer 1 : 24
Please enter Integer 2 : 34
Please enter Integer 3 : 54
Sum of 24, 34 and 54 is 112

Average of 24, 34 and 54 is 37

Product of 24, 34 and 54 is 44064

Smallest of 24, 34 and 54 is 24

Largest of 24, 34 and 54 is 54

(ii)

Please enter Integer 1 : 5
Please enter Integer 2 : 1
Please enter Integer 3 : 9
Sum of 5, 1 and 9 is 15

Average of 5, 1 and 9 is 5

Product of 5, 1 and 9 is 45

Smallest of 5, 1 and 9 is 1

Largest of 5, 1 and 9 is 9

5. Write a program that reads in the quiz scores of a class of ten students. The grades are integers in the range of 0-100. If the grade entered is not within this range, reject and ask for a number in the range. Calculate and display the total of all student grades and calculate the average.

Extra Credit (10%): Calculate the standard deviation. Use only what we have so far learned in class about c++. YOu may need to do some lookup for standard deviation.

Test Data: (with the extra credit. If you don't want to do the extra credit, ignore the std and var parts).

```
(i)
Quiz Score #1 : 50
Quiz Score #2 : 60
Quiz Score #3 : 70
Quiz Score #4 : 80
Quiz Score #5 : 90
Quiz Score #6 : 100
Quiz Score #7 : 50
Quiz Score #8 : 60
Quiz Score #9 : 70
Quiz Score #10 : 80
Total is 710
```

Avg is 71

Variance is 249

Std Var is the square root of variance

```
(ii)
Quiz Score #1 : 101
Out of range, re-enter
Quiz Score #1 : -4
Out of range, re-enter
Quiz Score #1 : 50
Quiz Score #2 : 60
Quiz Score #3 : 70
Quiz Score #4 : 120
Out of range, re-enter
Quiz Score #4 : 80
```

```
Quiz Score #5 : 90
Quiz Score #6 : 100
Quiz Score #7 : 50
Quiz Score #8 : 60
Quiz Score #9 : 70
Quiz Score #10 : 80
Total is 710
```

```
Avg is 71
```

```
Variance is 249
```

```
Std Var is the square root of variance
```

6. Write a program that displays the following menu:

```
Geometry Calculator
```

1. Calculate the Area of a Circle
2. Calculate the Area of a Rectangle
3. Calculate the Area of a Triangle
4. Quit

```
Enter your choice (1-4):
```

If the user enters 1, the program should ask for the radius of the circle and then display its area. Use 3.14159 for π . If the user enters 2, the program should ask for the length and width of the rectangle, and then display the rectangle's area. If the user enters 3, the program should ask for the length of the triangle's base and its height, and then display its area. If the user enters 4, the program should end. Input Validation: Display an error message if the user enters a number outside the range of 1 through 4 when selecting an item from the menu. Do not accept negative values for the circle's radius, the rectangle's length or width, or the triangle's base or height.

Expected Output:

```
R:\yuva\teaching\UMF\CSC175\W2010\Homeworks\hw3>hw3-q6.exe
Geometry Calculator
```

1. Calculate the area of a Circle
2. Calculate the area of a Rectangle
3. Calculate the area of a Triangle
4. Quit

Enter your choice (1-4): 1

Enter the circle's radius: -3

The radius can not be less than zero.

R:\yuva\teaching\UMF\CSC175\W2010\Homeworks\hw3>hw3-q6.exe
Geometry Calculator

1. Calculate the area of a Circle
2. Calculate the area of a Rectangle
3. Calculate the area of a Triangle
4. Quit

Enter your choice (1-4): 1

Enter the circle's radius: 4

The area is 50.2654

R:\yuva\teaching\UMF\CSC175\W2010\Homeworks\hw3>hw3-q6.exe
Geometry Calculator

1. Calculate the area of a Circle
2. Calculate the area of a Rectangle
3. Calculate the area of a Triangle
4. Quit

Enter your choice (1-4): 2

Enter the rectangle's length: -4

Enter the rectangle's width: 5

Only enter positive values for length and width.

R:\yuva\teaching\UMF\CSC175\W2010\Homeworks\hw3>hw3-q6.exe
Geometry Calculator

1. Calculate the area of a Circle
2. Calculate the area of a Rectangle
3. Calculate the area of a Triangle
4. Quit

Enter your choice (1-4): 2

Enter the rectangle's length: 5
Enter the rectangle's width: 7

The area is 35

R:\yuva\teaching\UMF\CSC175\W2010\Homeworks\hw3>

R:\yuva\teaching\UMF\CSC175\W2010\Homeworks\hw3>hw3-q6.exe
Geometry Calculator

1. Calculate the area of a Circle
2. Calculate the area of a Rectangle
3. Calculate the area of a Triangle
4. Quit

Enter your choice (1-4): 3
Enter the length of the base: 9
Enter the triangle's height: -4

Only enter positive values for base and height.

R:\yuva\teaching\UMF\CSC175\W2010\Homeworks\hw3>hw3-q6.exe
Geometry Calculator

1. Calculate the area of a Circle
2. Calculate the area of a Rectangle
3. Calculate the area of a Triangle
4. Quit

Enter your choice (1-4): 3
Enter the length of the base: 5
Enter the triangle's height: 6

The area is 15

R:\yuva\teaching\UMF\CSC175\W2010\Homeworks\hw3>hw3-q6.exe
Geometry Calculator

1. Calculate the area of a Circle
2. Calculate the area of a Rectangle
3. Calculate the area of a Triangle
4. Quit

Enter your choice (1-4): 4

Bye!

R:\yuva\teaching\UMF\CSC175\W2010\Homeworks\hw3>hw3-q6.exe
Geometry Calculator

1. Calculate the area of a Circle
2. Calculate the area of a Rectangle
3. Calculate the area of a Triangle
4. Quit

Enter your choice (1-4): 8

You may only enter 1, 2, 3, or 4.

R:\yuva\teaching\UMF\CSC175\W2010\Homeworks\hw3>

Deliverables:

1. Source Code: (.cpp file) that must start with a comment block similar to the following:

```

/*****
** Author          : Suleyman Uludag
** Program         : hw1, q1
** Date Created    : September 15, 2013
** Date Last Modified : September 16, 2013
** Usage          : No command line arguments
**
** Problem:
Accept the following information from the user (keyboard):
- Hw1, hw2 and hw3 (out of 100)
- Midterm (out of 100)
- Final exam (out of 100)
Calculate the total grade out of 100 based on the following grading scale:
Hws          -->    30% (10% each)
Midterm      -->    30%
Final Exam   -->    40%
** Pseudocode:
** 1)
** 2)
*****/
```

2. Executable (.exe file under windows). You must explicitly state the platform of your executable (such as Linux, etc.) if it is not Windows. Please name your file by using the question number: **hw1-q1.exe** (for Windows)
3. Screenshot of your app. For screenshot, you can use the following free program on windows:

<http://www.wisdom-soft.com/downloads/setupscreenhunterfree.exe>

For Linux/Unix, there are many alternatives. I personally like shutter.

File naming convention example:

hw1-q1.png (or .jpg or another graphics format)

4. You must zip all the above three files into ONE .zip file and submit your assignment by the deadline on moodle system. Name your file as Lastname-Firstname-hw#.zip. For example, **Uludag-Suleyman-hw1.zip**

For generating .zip file, you may use the following free software on Windows:

<http://www.7-zip.org/download.html>

Linux/Unix has many built-in.
