Department of Information Systems and Technologies

CTIS151 – Introduction to Programming

SPRING 2023- 2024

Lab Guide #8 – Week 7 – 2

OBJECTIVES : Counter-controlled Repetition, Sentinel-controlled Repetition
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Q1.

a) Write a C program that gets the grades of 5 students from the user, and finds and displays the **minimum** and **maximum** grades by using a **for loop**.

Project Name: LG8_Q1a
File Name: Q1a.cpp

Example Run:

```
Enter the grade: 78
Enter the grade: 56
Enter the grade: 98
Enter the grade: 73
Enter the grade: 72

Maximum grade: 98
Minimum grade: 56
```

b) Modify the program **Q1a.cpp** to use a **while loop** instead of for loop.

Project Name: LG8_Q1b
File Name: Q1b.cpp

Example Run:

```
Enter the grade: 84
Enter the grade: 90
Enter the grade: 34
Enter the grade: 75
Enter the grade: 86

Maximum grade: 90
Minimum grade: 34
```

c) Modify the program **Q1b.cpp** so the program gets the grades of several students ending with a negative grade.

Project Name: LG8_Q1c
File Name: Q1c.cpp

Example Run:

```
Enter grades (a negative value to stop):
53
42
87
66
69
98
90
71
80
36
-4

Maximum grade: 98
Minimum grade: 36
```

d) Modify the program **Q1c.cpp,** so the program counts and displays the number of students and then calculates the **average grade** excluding these minimum and maximum scores.

Project Name: LG8_Q1d
File Name: Q1d.cpp

Example Run:

```
Enter the grades (a negative score to stop):
86
96
45
97
45
87
75
60
77
-1
There are 9 students.

Maximum grade: 97
Minimum grade: 45

Average grade excluding the max and min grades: 75.1
```

Q2. Write a C program that gets a letter to count and characters until **' ! ' or ' '? '** is entered. Then, it will count the given letter in the characters and display the results on the screen. The program should also count and display the number of letters and the digits in the given sentence.

Project Name: LG8_Q2
File Name: Q2.cpp

Example Run #1:

```
Enter the letter to count: a

Enter characters: Pseudo-random numbers are numbers that appear to be random but are actually generated
by a deterministic algorithm?

The letter <a> appears 12 times.

There are 97 letters and 0 digits in the given sentence
```

Example Run #2:

```
Enter the letter to count: e

Enter characters: When he asked her favorite number, she answered without hesitation that it was 16!

The letter <e> appears 10 times.

There are 65 letters and 2 digits in the given sentence
```

Q3. Write a C program to find the result of the following series by using power function. The program gets the value of **y** from the user.

$$\frac{y^1}{2}+\frac{y^2}{4}+\frac{y^3}{6}+\frac{y^4}{8}+\cdots+\frac{y^{56}}{112}$$

Project Name: LG8_Q3
File Name: Q3.cpp

Example Run #1:

```
Enter the value of y: 1.2
The result is 1626.16
```

Example Run #2:

```
Enter the value of y: 0.25
The result is 0.14
```

ADDITIONAL QUESTIONS

AQ1. Write a C program to find and display the result of the following series operation, for a given x value.

$$-\frac{3}{(x-5)^4}+\frac{6}{(x-5)^7}-\frac{9}{(x-5)^{10}}\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\frac{30}{(x-5)^{31}}$$

Make data validation using while statement. Do not make any unnecessary checks. Indent the program properly.

Project Name: LG8_AQ1
File Name: AQ1.cpp

Example Run#1:

```
Enter x (other than 5): 5
Division by zero! Please reenter x: 7
Result: -0.15
```

Example Run#2:

```
Enter x (other than 5): 3
Result: -0.24
```

AQ2. Write a C program to calculate the parking fee for the given customers who park their cars in a parking lot, when the following are given as input for each customer:

- A menu includes showing the type of the vehicle: car, bus, truck.
- An integer showing the duration in hours that the vehicle stays in parking lot.

The program should stop when an invalid vehicle code is entered.

TYPE	FIRST RATE	SECOND RATE
Car	$0.00 first 2 hr.	$2.50 after the 2 hr.
Truck	$1.30 first 3 hr.	$2.70 after the 3 hr.
Bus	$2.50 first hr.	$3.50 after the first hr.

Project Name: LG8_AQ2
File Name: AQ2.cpp

Example Run:

```
MENU
----
1) Car
2) Truck
3) Bus
4) Exit
Enter the vehicle type: 2
Enter the duration: 6
The bill is $9.40

MENU
----
1) Car
2) Truck
3) Bus
4) Exit
Enter the vehicle type: 1
Enter the duration: 5
The bill is $7.50

MENU
----
1) Car
2) Truck
3) Bus
4) Exit
Enter the vehicle type: 3
Enter the duration: 2
The bill is $6.00

MENU
----
1) Car
2) Truck
3) Bus
4) Exit
Enter the vehicle type: 6
Wrong Choice!
MENU
----
1) Car
2) Truck
3) Bus
4) Exit
Enter the vehicle type: 4

Today 3 vehicle parked and the income from the
vehicles is 22.900
```

INSTRUCTIONS FOR UPLOADING YOUR ANSWERS:

1. **Make sure you have saved all your work** and exit from Microsoft Visual Studio 2017

2. Upon exit, if you hadn't saved already then Visual Studio will notify you to save it automatically; say **yes** to this.

3. Navigate into the directory in which you had created your lab guide solution and reverse click onto the **LG8_Sols** folder in there.

4. From the options menu, hover your mouse cursor over the **7-Zip** option and select "**Add to LG8_sols.zip**" option to archive and compress your solutions folder. Change the name of the resulting archive to your name and surname to the zip file, i.e. **NameSurname.zip**

5. Upload the zip file to the instructor's PC by using your preferred browser;

   – **CTISL1: http://lab1t**

   – **CTISL2: http://lab2t**

6. Inform your assistant that you have completed the upload process.

7. After your assistant's **approval**, delete your files using the "**Clean**" module you can either find in your start menu, the C: drive root folder or download through http://lab1t for Lab1 and http://lab2t for Lab2.