

**OBJECTIVES** : Counter-controlled Repetition and Sentinel-controlled Repetition(while loops)

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**Q1.** Write a C program to find the result of the following series using the power function. The program gets the value of y from the user.

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

**Project Name:** LG7\_1  
**File Name:** Q1.cpp

**Example Run#1:**

Enter the value of y: 1  
The result is 2.31

**Example Run#2:**

Enter the value of y: 0.33  
The result is 0.20

**Q2. a)** Write a C program that gets the scores of 5 players from the user, and finds and displays the **minimum** and **maximum** scores using a **for loop**.

**Project Name:** LG7\_2a  
**File Name:** Q2a.cpp

**Example Run:**

Enter score: 355  
Enter score: 267  
Enter score: 876  
Enter score: 324  
Enter score: 664

Maximum score: 876  
Minimum score: 267

**b)** Modify the program **Q2a.cpp** to use a **while loop** instead of a for loop.

**Project Name:** LG7\_2b  
**File Name:** Q2b.cpp

**Example Run:**

Enter score: 812  
Enter score: 599  
Enter score: 360  
Enter score: 458  
Enter score: 430

Maximum score: 812  
Minimum score: 360

**c)** Modify the program **Q2b.cpp** so the program gets the scores of several players ending with a negative score.

**Project Name:** LG7\_2c  
**File Name:** Q2c.cpp

**Example Run:**

Enter the scores (a negative score to stop):  
314  
987  
675  
382  
785  
385  
211  
-9

Maximum score: 987  
Minimum score: 211

d) Modify the program **Q2c.cpp**, so the program counts and displays the number of players and then calculates the **average score** excluding these minimum and maximum scores.

**Project Name:** LG7\_2d  
**File Name:** Q2d.cpp

**Example Run:**

```
Enter the scores (a negative score to stop):
345
456
567
678
789
123
321
432
-1
There are 8 players.

Maximum score: 789
Minimum score: 123

Average score excluding the max and min scores: 466.5
```

- Q3.** A well-regarded manufacturer of widgets has been losing 4% of its sales each year. The annual profit for the firm is 10% of sales. Write a C program that gets the initial sales of the firm and the number of years and displays a table that shows the sales and profit amounts of the firm at the end of each year and the total sales and profit.

**Project Name:** LG7\_Q3  
**File Name:** Q3.cpp

**Example Run #1:**

```
Enter the sales of the firm: 185000
Enter the number of years: 5
```

YEAR	SALES	PROFIT
1	177600.00	17760.00
2	170496.00	17049.60
3	163676.16	16367.62
4	157129.11	15712.91
5	150843.95	15084.39
TOTAL	819745.22	81974.52

- Q4.** A well-known carpet company opened a new store in Ankara. The company organized a special campaign for the opening day of the store. The unit price of the carpet per square meter is **112.50 TL**. The company gives a 65% discount for only one lucky customer.

Write a C program that gets the number of waiting customers from the user. To find the lucky customer, a random number is generated for the waiting customers (*1 to noOfCustomer*). For each customer; read the square meter of the purchased carpet then calculate the price to be paid. The lucky customer gets a 65% discount. Others will pay their price without a discount. Finally, the program displays the total payment for the company.

**Project Name:** LG7\_Q4  
**File Name:** Q4.cpp

**Example Run:**

```
Enter the number of waiting customers: 6

Enter the area of your carpet: 8.5
You should pay 956.25TL

Enter the area of your carpet: 12
You should pay 1350.00TL

Enter the area of your carpet: 4
You should pay 450.00TL

Enter the area of your carpet: 36
CONGRATULATIONS!! YOU WON AN EXTRA %65 DISCOUNT!!!
You should pay 1417.50TL

Enter the area of your carpet: 10
You should pay 1125.00TL

Enter the area of your carpet: 79
You should pay 8887.50TL

The company earned 14186.25 TL from the opening day.
```

## **ADDITIONAL QUESTIONS**

**AQ1.** Given a double value for **x**, compute **z** using the following formula.

$$z = \sqrt{2x} - \frac{\sqrt{3x}}{2} + \frac{\sqrt{4x}}{3} - \frac{\sqrt{5x}}{4} - \dots - \frac{\sqrt{11x}}{10}$$

**Project Name:** LG7\_AQ1

**File Name:** AQ1.cpp

**Example Run#1:**

Enter the value of x: 1.25

The result is 0.842

**Example Run#2:**

Enter the value of x: 0.5

The result is 0.533

**AQ2.** A *Perfect number* is a number where the sum of its divisors is equal to that number (except itself). For example; 28 is a perfect number because, its divisors are 1, 2, 4, 7, 14, and the sum of these numbers is equal to 28.

Write a C program that reads an integer number and decides whether the given number is a perfect number or not.

**Project Name:** LG7\_AQ2

**File Name:** AQ2.cpp

**Example Run#1:**

Enter an integer: 496

The number 496 is a perfect number

**Example Run#2:**

Enter an integer: 13

The number 13 is a NOT a perfect number

## **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 **LG7\_Sols** folder in there.
4. From the options menu, hover your mouse cursor over the **7-Zip** option and select "**Add to LG7\_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**
1. Upload the zip file to the instructor's PC by using your preferred browser;
  - CTISL1: <http://lab1t>
  - CTISL2: <http://lab2t>
  - CTISL7: <http://lab7t>
2. Inform your assistant that you have completed the upload process.
3. 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, <http://lab2t> for Lab2 and <http://lab7t> for Lab7.