Department of Information Systems and Technologies

CTIS151 – Introduction to Programming

Fall 2024- 2025

Lab Guide #08 – Week 6 – 1

OBJECTIVES : Sentinel-controlled repetition (do...while loops), and data validation.

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Q1. a) Write a program that gets a positive integer and validates the input using a while loop. Then display if the number is odd or even.

Project Name: LG8_Q1a
File Name: Q1a.cpp

Example Run#1:

```
Enter a positive integer: -5
-5 is not a positive value!

Enter a positive integer: -4
-4 is not a positive value!

Enter a positive integer: 4
The number is even.
```

Example Run#2:

```
Enter a positive integer: -44
-44 is not a positive value!

Enter a positive integer: -56
-56 is not a positive value!

Enter a positive integer: 3
The number is odd.
```

b) Modify the Q1 part(a) that gets a positive integer value and validates it by using a while loop, then the program computes the following sequence:

Hailstones Problem: For a positive integer **n**, do the following until **n** becomes **1**:

- if **n** is even, change **n** to **n/2**
- if **n** is odd, change **n** to **3*n+1**

Finally, the output should show the result of each calculation and the number of steps as in the example run.

Project Name: LG8_Q1b
File Name: Q1b.cpp

Example Run#1:

```
Enter a positive integer: 17
Next value is 52
Next value is 26
Next value is 13
Next value is 40
Next value is 20
Next value is 10
Next value is 5
Next value is 16
Next value is 8
Next value is 4
Next value is 2
Next value is 1
Number of steps is 12
```

Example Run#2:

```
Enter a positive integer: -6
Enter a positive integer: 3
Next value is 10
Next value is 5
Next value is 16
Next value is 8
Next value is 4
Next value is 2
Next value is 1
Number of steps is 7
```

Q2. Government employee applicants should be between **18** and **35** years old.

Write a C program that reads the age for an applicant and validates the age using a do-while loop and displays an appropriate warning message.

Project Name: LG8_Q2
File Name: Q2.cpp

Example Run

```
Enter your age (18-35): 42
Invalid age! Applicants must be between 18 and 35 years old.

Enter your age (18-35): 16
Invalid age! Applicants must be between 18 and 35 years old.

Enter your age (18-35): 38
Invalid age! Applicants must be between 18 and 35 years old.

Enter your age (18-35): 20

You are eligible to apply for the position.
```

Q3. A GSM operator has an application called **Shake & Win** which offers gifts such as call, internet, and video & music packages to its customers. Each customer can shake up to three times to win.

1: Daily 1 GB Spotify,
2: Weekly 10 GB YouTube,
3: MONTHLY 1000 mins. call package,
4: 1 GB for 12 HOURS

Write a C program that generates a random number (1-4) and displays an appropriate message for the gift. The customer may want to shake again and get another gift. Your program will continue until the customer wants to stop or reaches the maximum number of shakes.

NOTE: Use **do..while** and **switch** statements!

Project Name: LG8_Q3
File Name: Q3.cpp

Example Run #1:

```
Shake & Win ;)
You won MONTHLY 1000 mins. call package

Shake again? (y/n): y

Shake & Win ;)
You won 1 GB for 12 HOURS

Shake again? (y/n): y

Shake & Win ;)
You won MONTHLY 1000 mins. call package
```

Example Run #2:

```
Shake & Win ;)
You won MONTHLY 1000 mins. call package

Shake again? (y/n): y

Shake & Win ;)
You won MONTHLY 1000 mins. call package

Shake again? (y/n): y

Shake & Win ;)
You won WEEKLY 10 GB YouTube
```

Q4. Write a C program to simulate an online course reservation system. The program offers the following courses:

- **Programming 1650** TL,
- **Database 1450** TL,
- **Network 1250** TL.

If the user registers for **2** or more courses, a **10**% discount will be applied. The program displays a menu with the following options:

```
ONLINE COURSE REGISTRATION SYSTEM
---------------------------------
1. Programming - 1650 TL
2. Database    - 1450 TL
3. Network     - 1250 TL
4. EXIT
```

The program asks the user to select a course (1 to 4). The program calculates and displays the payment amount and continues until the user wants to EXIT (choice: 4). Finally, the program displays **the total payment amount, the number of courses registered** and **discounted payment amount**.

You may assume that the user enters valid choices for the course type (1-4).

Project Name: LG8_Q4
File Name: Q4.cpp

Example Run#1:

```
ONLINE COURSE REGISTRATION SYSTEM
---------------------------------
1. Programming - 1650 TL
2. Database    - 1450 TL
3. Network     - 1250 TL
4. EXIT
Enter your choice (1-4): 1
Registered successfully! Payment: 1650.00 TL

ONLINE COURSE REGISTRATION SYSTEM
---------------------------------
1. Programming - 1650 TL
2. Database    - 1450 TL
3. Network     - 1250 TL
4. EXIT
Enter your choice (1-4): 4
Total payment amount    : 1650.00 TL
No of registered courses: 1
```

Example Run#2:

```
ONLINE COURSE REGISTRATION SYSTEM
---------------------------------
1. Programming - 1650 TL
2. Database    - 1450 TL
3. Network     - 1250 TL
4. EXIT
Enter your choice (1-4): 2
Registered successfully! Payment: 1450.00 TL

ONLINE COURSE REGISTRATION SYSTEM
---------------------------------
1. Programming - 1650 TL
2. Database    - 1450 TL
3. Network     - 1250 TL
4. EXIT
Enter your choice (1-4): 3
Registered successfully! Payment: 1250.00 TL

ONLINE COURSE REGISTRATION SYSTEM
---------------------------------
1. Programming - 1650 TL
2. Database    - 1450 TL
3. Network     - 1250 TL
4. EXIT
Enter your choice (1-4): 4

Total payment amount    : 2700.00 TL
No of registered courses: 2

10% discount applied
Discounted  amount  : 2430.00 TL
```

ADDITIONAL QUESTIONS

AQ1. Write a C program that takes a positive integer number, then finds and displays the product of the digits.

Project Name: LG8_AQ1
File Name: AQ1.cpp

Example Run:

```
Enter a positive integer: -5
Enter a positive integer: -3
Enter a positive integer: 0
Enter a positive integer: -1
Enter a positive integer: 1234

Product of digits = 24
```

AQ2. Suppose that you own a drink distributorship that sells fruit juice **(F/f), milk(M/m) and coke(C/c).**

Write a C program to

- get the case inventory for each drink at the beginning of the week.
- process all sales and purchase transactions for each drink (until one of the drinks runs out of stock).
- display the final inventory.

Each transaction will consist of two data items;

- The first item will be the drink code (F/f or M/m or C/c),
- The second will be the amount purchased (a positive integer value) or the amount sold (a negative integer value).

Project Name: LG8_AQ2
File Name: AQ2.cpp

Example Run:

```
Enter case inventory for Fruit Juice: 400
Enter case inventory for Milk: 60
Enter case inventory for Coke: 150

Enter the drink code (Fruit Juice(F/f), Milk (M/m), Coke (C/c): f
Enter the amount purchased (>0) / amount sold (<0): 25
Fruit Juice stock info: 425

Enter the drink code (Fruit Juice(F/f), Milk (M/m), Coke (C/c): F
Enter the amount purchased (>0) / amount sold (<0): -55
Fruit Juice stock info: 370

Enter the drink code (Fruit Juice(F/f), Milk (M/m), Coke (C/c): r
Invalid Drink
Enter the drink code (Fruit Juice(F/f), Milk (M/m), Coke (C/c): M
Enter the amount purchased (>0) / amount sold (<0): -40
Milk stock info: 20

Enter the drink code (Fruit Juice(F/f), Milk (M/m), Coke (C/c): m
Enter the amount purchased (>0) / amount sold (<0): -100
SORRY! There is not enough product in the STOCK!
There are 20 Milk(s)

Enter the drink code (Fruit Juice(F/f), Milk (M/m), Coke (C/c): C
Enter the amount purchased (>0) / amount sold (<0): 250
Coke stock info: 400

Enter the drink code (Fruit Juice(F/f), Milk (M/m), Coke (C/c): c
Enter the amount purchased (>0) / amount sold (<0): -500
SORRY! There is not enough product in the STOCK!
There are 400 Coke(s)

Enter the drink code (Fruit Juice(F/f), Milk (M/m), Coke (C/c): m
Enter the amount purchased (>0) / amount sold (<0): -20
Milk stock info: 0

Stock Information
*****************
FRUIT JUICE   370
MILK            0
COKE          400
```

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**
   - **CTISL7: http://lab7t**
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, http://lab2t for Lab2 and http://lab7t for Lab7.