

# Department of Information Systems and Technologies

## CTIS151 – Introduction to Programming

Fall 2024- 2025

### Lab Guide #05 – Week 4 – 2

**OBJECTIVES** : Relational and logical operators, if and if... else statement, compound statements, nested if and switch statements

**Instructors** : Serpil TIN

**Assistants** : Berk ÖNDER, Efe Mert ŞAHİNKÖÇ, Hatice Zehra YILMAZ

**Q1.** A university implements a system for the alumni people, to provide communication among their graduates. To enroll in the system users first enter their birth day and month, and then pay a fixed annual fee (1200 TL).

University makes special campaigns for each year, this year's campaign is;

- If the birth month is "March" or "June" or "December", members will get a 10% discount,
- If the birthday is between 15 and 20, members will get an extra 15% discount, which will be applied to the fee.

Write a C program to implement a system for graduates by getting birth day and month as input. Then the program calculates the final fee for that graduate and checks if s/he can benefit from the campaign.

**Project Name:** LG5\_1

**File Name:** Q1.cpp

**Example Run #1:**

```
Welcome to University Alumni Club Membership System
Enter your birth day and month: 29 07

Final fee is 1200.00 TL.
```

**Example Run #2:**

```
Welcome to University Alumni Club Membership System
Enter your birth day and month: 16 10

Final fee is 1020.00 TL.
```

**Example Run #3:**

```
Welcome to University Alumni Club Membership System
Enter your birth day and month: 26 03

Final fee is 1080.00 TL.
```

**Example Run #4:**

```
Welcome to University Alumni Club Membership System
Enter your birth day and month: 18 06

Final fee is 918.00 TL
```

**Q2.** A customer pays the water bill which consists of the **base payment**, the **water charge**, the **wastewater charge**, and the **VAT**.

The bill is created according to the following criteria:

Each customer has to pay a **10.00 TL** base payment for the first 5 m<sup>3</sup> of water usage and **3.25 TL** for each additional m<sup>3</sup>.

The wastewater charge is **50%** of the water charge.

**8% VAT** will be added to the total bill.

Write a C program that reads the water usage in m<sup>3</sup> and then computes and displays the **water charge**, **wastewater charge**, **VAT amount**, and the **total water bill**.

**Project Name:** LG5\_2

**File Name:** Q2.cpp

**Example Run #1:**

```
Enter the water usage (in m3): 5
Water Charge      : 10.00 TL
Waste Water Charge:  5.00 TL
VAT (% 8)         :  1.20 TL
Total bill is 16.20 TL
```

**Example Run #2:**

```
Enter the water usage (in m3): 10
Water Charge      : 26.25 TL
Waste Water Charge: 13.13 TL
VAT (% 8)         :  3.15 TL
Total bill is 42.52 TL
```

**Q3.** Write a C program that gets character inputs from the user to identify whether the given keyboard inputs are uppercase, lowercase, or non-letter inputs. The program converts lower-case characters with upper-case letters and vice-versa. A warning message will be displayed for non-letter inputs.

**Project Name:** LG5\_3  
**File Name:** Q3.cpp

**Example Run #1:**

```
Enter a character: g
The letter 'g' is a lowercase letter
The uppercase form of the letter is 'G'
```

**Example Run #2:**

```
Enter a character: #
It is NOT a letter
```

**Example Run #3:**

```
Enter a character: D
The letter 'D' is an uppercase letter
The lowercase form of the letter is 'd'
```

**Example Run #4:**

```
Enter a character: 5
It is NOT a letter
```

**Q4.** A market gives a chance to win a discount on its 10<sup>th</sup> anniversary. For all customers, a number is created between 1 and 5; according to that number, they get a discount rate for their shopping. The table for the discounts is below.

1	15%
2	35%
3	50%
4	75%
5	80%

Write a C program that gets the bill for the customer and creates a random number between 1 and 5 for the customer. According to the result, the discounted bill is shown in the example run below. (You may find the algorithm for generating random numbers below)

**Project Name:** LG5\_Q4  
**File Name:** Q4.cpp

**Example Run #1:**

```
Enter your bill: 100
You won 15% discount
Your new bill is 85.00 TL
```

**Example Run #2:**

```
Enter your bill: 345
You won 35% discount
Your new bill is 224.25 TL
```

**Example Run #3:**

```
Enter your bill: 200
You won 80% discount
Your new bill is 40.00 TL
```

**Example Run #4:**

```
Enter your bill: 35
You won 80% discount
Your new bill is 7.00 TL
```

**GENERATION OF RANDOM NUMBERS:**

1. Use stdlib.h (for srand function)
2. Use time.h (for time function).
3. srand(time(0)); for getting different number every time you run the program.
4. For getting a random number between 0 – 50: num = rand() % 51;
5. Apply debug process to check the random number.

**Example program:**

```
#include <stdio.h>
#include <stdlib.h> //for srand funtion
#include <time.h> //for time function

int main(void)
{
    int num;

    /* we use srand function to be able to get a random number but we cannot use the srand function on
    its own, so we also use time function in it to give a start point to the srand function; because time
    is different every time you run the program, the random number will be different also */
    srand(time(NULL));

    /* because time returns a very big number it returns the millisecond value of the hour, so we want
    to get a random number between 0 and 99, we get the modulus 100 of the rand function */
    num = rand() % 100;

    /* to create a number between a range*/
    //num = rand() % ((Max+1)-Min) + Min
    printf("The random number is: %d", num);

    return 0;
}
```

**Example Run #1:**

The random number is: 99

**Example Run #2:**

The random number is: 26

**Q5.** An Insurance Company determines auto insurance rates based on a driver's license year and gender.

- The base rate is 10% of the price of the car.
- For male drivers, if the license year is
  - until 20, 4% discount,
  - more than 20, 6% discount
- Female drivers, if the license year is
  - until 10, 5% discount,
  - more than 10, 7% discount
- Those who do not have an accident background will have a 10% extra discount in addition to all discounts.

Write a C program that gets the price of the car, accident background, gender, and how long the user has a driver's license information and shows the insurance premium (Total Cost of the insurance).

**Project Name:** LG5\_Q5

**File Name:** Q5.cpp

**Example Run #1:**

```
Enter the information of the driver;
Car price: 10000
Gender: m
Years: 12
Do you have any accident(Y-y/N-n): n
The cost of the insurance is $ 864.0
```

**Example Run #3:**

```
Enter the information of the driver;
Car price: 8000
Gender: m
Years: 25
Do you have any accident(Y-y/N-n): y
The cost of the insurance is $ 752.0
```

**Example Run #2:**

```
Enter the information of the driver;
Car price: 5000
Gender: f
Years: 5
Do you have any accident(Y-y/N-n): n
The cost of the insurance is $ 427.5
```

**Additional Question**

**AQ1.** Write a C program that reads the price (TL), weight (kg), and shipping method of an item and calculates and displays the total payment according to the criteria below.

Shipping Method Type	Shipping Method	Base shipping cost (up to 1 kg items)	Extra cost per each additional kg
S/s	Standard	30 TL	5 TL
E/e	Express	40 TL	10 TL
O/o	Overnight	60 TL	15 TL

- In Standard shipping, for items with a price of **200 TL** or above, the shipping is free. Otherwise, for items up to 1 kg the base shipping cost is **30 TL**. An additional **5 TL** is added for each additional kg.
- In Express shipping, for items up to 1 kg the base shipping cost is **40 TL**. An additional **10 TL** is added for each additional kg.
- For Overnight shipping, for items up to 1 kg the base shipping cost is **60 TL**. An additional **15 TL** is added for each additional kg.

a) By using an if statement

**Project Name:** LG5\_AQ1a

**File Name:** AQ1a.cpp

b) By using a switch statement

**Project Name:** LG5\_AQ1b

**File Name:** AQ1b.cpp

**Example Run #1:**

```
Enter the price of the item (in TL): 65.50
Enter the weight of the item (in kg): 3.5
Enter the shipping method (S/s for Standard, E/e for Express, O/o for Overnight): o
Total cost is 155.50 with Overnight shipping
```

#### Example Run #2:

Enter the price of the item (in TL): 56.25  
Enter the weight of the item (in kg): 0.37  
Enter the shipping method (S/s for Standard, E/e for Express, O/o for Overnight): E  
  
Total cost is 96.25 with Express shipping

#### Example Run #3:

Enter the price of the item (in TL): 200  
Enter the weight of the item (in kg): 2.7  
Enter the shipping method (S/s for Standard, E/e for Express, O/o for Overnight): S  
  
Total cost is 200.00 with free shipping

#### Example Run #4:

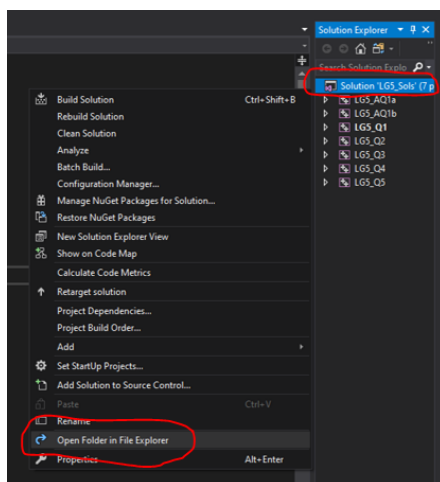
Enter the price of the item (in TL): 199.99  
Enter the weight of the item (in kg): 1  
Enter the shipping method (S/s for Standard, E/e for Express, O/o for Overnight): s  
  
Total cost is 229.99 with Standard shipping

#### Example Run #5:

Enter the price of the item (in TL): 340.99  
Enter the weight of the item (in kg): 8  
Enter the shipping method (S/s for Standard, E/e for Express, O/o for Overnight): m  
Shipping method unavailable!

### INSTRUCTIONS FOR UPLOADING YOUR ANSWERS:

1. **Make sure you have saved all your work** and exit from Microsoft Visual Studio
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 **LG5\_Sols** folder in there. (Right-click on the **solution**, then select the 'Open Folder in File Explorer' option)



4. From the options menu, hover your mouse cursor over the **7-Zip** option and select **"Add to LG5\_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. Login to **"CTIS151 Moodle Page"**, Find the **LabGuide-05 submission** link for your section, then Upload the zip file. E.g. Section 01 students will upload their solutions to: **LabGuide-05 Submission - Sec 01**
6. Inform your assistant that you have completed the upload process.