Department of Information Systems and Technologies

CTIS151 – Introduction to Programming

SPRING 2023- 2024

Lab Guide #5 – Week 6 – 1

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

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Q1. 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
b) By using a switch statement

Project Name: LG6_Q1
File Name: Q1.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!
```

Q2. Write a C program that gets a student information (Only for juniors and freshman's) as class and semester. The program gets the number of hours, for each must course of a student, then finds and displays the total hours which the student spends for must courses, according to the given table below. (Do not forget to check invalid semester and invalid class)

Use switch statement

Project Name: LG6_Q2
File Name: Q2.cpp

Class	Semester	Courses
1	Fall (F)	151,163,165
	Spring (S)	152,164,166
2	Fall (F)	221,255,259
	Spring (S)	222,256,264

Example Run #1:
```
Enter the class of the student: 2
Enter the semester of the student: F
Courses
Enter number of course hours for 221/255/259:6
8 4
Student spends 18 hours for must courses
```

Example Run #2:
```
Enter the class of the student: 1
Enter the semester of the student: s
Courses
Enter number of course hours for 152/164/166:8
4 5
Student spends 17 hours for must courses
```

Example Run #3:
```
Enter the class of the student: 4
Enter the semester of the student: F
Invalid Class!
```

Example Run #4:
```
Enter the class of the student: 2
Enter the semester of the student: d
Invalid Semester!
```

Q3. Write the program code for number guessing game ☺
Generate a random number between 1-10, read the user's guess to find the secret number and display an appropriate message as in the example run. (See the explanation below about the random number generation).

Project Name: LG6_Q3
File Name: Q3.cpp

a) Read a seed value from the user, and send it to **srand** function as parameter. (**`srand(seed)`**)

Example Run:
```
Enter a seed value to test your program: 1453

Please guess, the randomly generated number (1-10): 6
You couldn't guess correctly! The number was 4, See you again next time.
```

b) Modify your program and send **time** to **srand** function as parameter. **`srand(time(NULL))`**

Example Run#1:
```
Please guess, the randomly generated number (1-10): 4
Congratulations! You have guessed the number correctly :)
```

Example Run#2:
```
Please guess, the randomly generated number (1-10): 8
You couldn't guess correctly! The number was 9, See you again next time.
```

Why don't we use seed value for the random number generation?
Why do we prefer time(NULL) instead of constant value?

GENERATION OF RANDOM NUMBERS:

1. Use stdlib.h (for srand function)

2. Use time.h (for time function).

3. srand(time(0)); seeds the random number generator, for getting different number every time you run the program. For getting a random number between 0 – 50: num = rand() % 51;

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: 23
```

Additional Questions

AQ1. MuratJet Airlines has a promotion for domestic flights with the price **1099.99** TL (including tax amount). There are some special discounts as follows:

Speacial Case	Discount Rate
Disabled passengers	%40
Other passengers	Discounts will be applied according to the age of the passengers

Age	Discount Rate
> 65	%15
13-65	No discount
0-12	%33

A passenger has a 15 kg baggage allowance included in the price. If the baggage weight exceeds this limit, the passenger has to pay **45.00 TL** per extra kg.

Write a C program that reads the **age information** and the **disability status** from the user; calculates the ticket payment according to the information above. Also the baggage weight for the passenger will be read, if the baggage weight exceeds the limit, the program will calculate and display the extra payment. If the user enters a wrong answer for the disability information, a warning message will be displayed. Examine the example runs below.

Project Name: LG6_AQ1
File Name: AQ1.cpp

Example Run #1:

```
Enter your age: 60
Disability ? (y/n): n
Ticket payment: 1099.99 TL
Enter baggage weight: 15
```

Example Run #2:

```
Enter your age: 70
Disability ? (y/n): y
Ticket payment: 659.99 TL
Enter baggage weight: 15
```

Example Run #3:

```
Enter your age: 10
Disability ? (y/n): n
Ticket payment: 736.99 TL
Enter baggage weight: 15
```

Example Run #4:

```
Enter your age: 40
Disability ? (y/n): n
Ticket payment: 1099.99 TL
Enter baggage weight: 21.25
Your baggage weight exceeds the limit with 6.25
kg, please pay 281.25 TL
```

Example Run #5:

```
Enter your age: 72
Disability ? (y/n): n
Ticket payment: 934.99 TL
Enter baggage weight: 18.75
Your baggage weight exceeds the limit with 3.75
kg, please pay 168.75 TL
```

Example Run #6:

```
Enter your age: 42
Disability ? (y/n): X
```

AQ2. Write a C program that gets a logical operator as a character ('&' for AND operation, 'V' for OR operation, 'X' for XOR operation) and then returns the truth value of the given A and B input values according to that logical operator.

Hint: You may use **switch** statements. For the logical operations, see the truth tables below.

AND

A	B	Output
0	0	0
0	1	0
1	0	0
1	1	1

OR

A	B	Output
0	0	0
0	1	1
1	0	1
1	1	1

XOR

A	B	Output
0	0	0
0	1	1
1	0	1
1	1	0

exclusive-OR

Project Name: LG6_AQ2
File Name: AQ2.cpp

Example Run #1:

```
Enter the logical operator: V
Enter the value of A: 0
Enter the value of B: 1
The truth value of the operation is: 1
```

Example Run #2:

```
Enter the logical operator: T
Invalid Character
```