Department of Computer Engineering

## CENG103 – Computer Programming 1

Fall 2017 - 2018

# **Lab Guide #4 – Week 4**

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| **OBJECTIVE** : You will learn how to:  1. Relational and logical operators  2. If statements  3. Switch statements |
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1. Write a C program that gets the values of the variables **a, b** and **c** from the user and **if necessary** calculates the following arithmetic operation using necessary built-in functions.



**Project Name**: LabGuide4\_1

**Source File Name**: Question\_1.cpp

**Example\_Run #1:**

Enter a: 9.3

Enter b: 3.2

Enter c: 0.2

The result is 0.4906

**Example\_Run #2:**

Enter a: -2

Enter b: 9

Enter c: 3

ERROR! Division by ZERO!

1. Write a C program that calculates the attendance obligation for a given lecture in a department, in which department there are two types of attendance obligations, which are **%90 for English lectures**, **%75 for other lectures**. The program gets;

* Number of weeks in a semester,
* Number of lectures hour in a week,
* Lecture type **E/e** for English, **O/o** for Others;

from the user, then displays the hour of attendance obligation for the given lecture as shown in the example run. If the user enters a wrong letter as lecture code (letter except E or O), the program will give a warning message.

**Project Name**: LabGuide4\_2

**Source File Name**: Question\_2.cpp

**Example Run#1:**

Enter the number of week in a semester:14

Enter the number of lecture hour in a week:4

What is your lecture (E for English) / (O for Others):0

You must attend 42 hours

**Example Run#2:**

Enter the number of week in a semester:14

Enter the number of lecture hour in a week:2

What is your lecture (E for English) / (O for Others):x

You entered a wrong lecture code!!!

1. **(This question is optional)** EvrenJet Airlines has a promotion for domestic flights with the price **89.99** TL (including tax amount). There are some special discounts as follows:

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| --- | --- |
| **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 6.00 TL per extra kg.

**a)** Write a C program that reads the age information and the disability status from the user; calculates the ticket payment according to 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 enteres a wrong answer for the disability information, a warning meassage will be displayed. Examine the example runs below.

**Project Name**: LabGuide4\_3a

**Source File Name**: Question\_3a.cpp

**Example\_Run #1:**

Enter your age: 60

Disability ? (y/n): n

Ticket payment: 89.99 TL

Enter baggage weight: 15

**Example\_Run #2:**

Enter your age: 70

Disability ? (y/n): y

Ticket payment: 53.99 TL

Enter baggage weight: 15

**Example\_Run #3:**

Enter your age: 10

Disability ? (y/n): n

Ticket payment: 60.29 TL

Enter baggage weight: 15

**Example\_Run #4:**

Enter your age: 40

Disability ? (y/n): n

Ticket payment: 89.99 TL

Enter baggage weight: 21.25

Your baggage weight exceeds the limit with 6.25 kg, please pay 37.50 TL

**Example\_Run #5:**

Enter your age: 72

Disability ? (y/n): n

Ticket payment: 76.49 TL

Enter baggage weight: 18.75

Your baggage weight exceeds the limit with 3.75 kg, please pay 22.50 TL

**Example\_Run #5:**

Enter your age: 42

Disability ? (y/n): X

Invalid answer !!

**b)** Modify the **Question\_3a.cpp** using the switch statement instead of if statements where necessary.

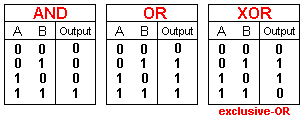
**Project Name**: LabGuide4\_3b

**Source File Name**: Question\_3b.cpp

**ADDITIONAL QUESTIONS:**

1. 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

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| --- | --- |
| **Example\_Run:**  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:**  Enter the logical operator:***X***  Enter the value of A:***1***  Enter the value of B:***1***  The truth value of the operation is: **0**  **Project\_name:** LabGuide4\_AQ1  **File\_name**: AQ1.cpp |

**2.** Write a C program in order to find the solution of the problem below.



* During coding, define X, Y and Z as constant values using 3, 4 and 5 as values respectively. Take A, B and C from the user, generate Q as a random number between 0 and 9.
  + Hint: a random integer in C as requested in this question is generated as follows:

srand(time(NULL);

int Q = (rand() % 10) + 1;

* + - As a result of this function call above and the mod10 usage; Q will have a random value between 0 and 9 since anything above 9 will be divisible by 10 with a result bigger than or equal to 0. We add +1 to this result in for all occasions logically since Q exists in certain divisor parts in the math question above and nothing is divisible by 0.
    - The rand() and srand() functions are included in the <stdlib.h> library.
    - srand function must be called before the rand() function in order to initialize it. If you use a constant value with srand instead of time(NULL), as in the example, you will always get the same random number sequence.
      * time() function is included in the <time.h> library.

**Example Run:**

Please enter the value for A, B and C: 10 12 14

The result is 28.00

**Hint**: Note that due to Q being a random value, your results may vary, this is a good opportunity for you to validate your results using debugging instead of just visual representations.

**Project\_name:** LabGuide4\_AQ2

**File\_name**: AQ2.cpp

**Note that**: Hunt for when Q returns the same value as shown in the screenshot below in debug in order to validate your results