CTIS151 – Introduction to Programming
FALL 2024 - 2025

Lab Guide #4 - Week 4 - 1

OBJECTIVES : Solving simple arithmetic problems that require usage of input values. Displaying the result of a simple calculation, if and if… else statement!
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Q1. Write a C program that takes 2 double values (**t, s**) and 2 integer values (**k, b**) and performs the following mathematical equation.

$$\left| \frac{\sqrt{t * k} + 4 * b}{\frac{b}{\sqrt{2^t}} - \frac{s^k}{2} + 7} \right|$$

➜ Check your equation if all variables are set to 1. (Result = 0.69)

Example Run #1:
```
Enter t and s: 1.7 2.8
Enter k and b: 5 4
Result is: 0.25
```

Example Run #2:
```
Enter t and s: 1.9 2.4
Enter k and b: 4 8
Result is: 6.38
```

Project Name: LG4_Q1
File Name: Q1.cpp

Q2. Write a C program that will read two integer numbers from the user, do the following operation, and display an appropriate message (0 means the result is false, and 1 means it is true).

|num1-num2| x 12 = 60 OR (num1/num2≠-2)' AND (num2 - 1) / (num1 + 9) > 0

Example Run #1:
```
Enter the first number: 0
Enter the second number: 5
The result is 1
```

Example Run #2:
```
Enter the first number: 1
Enter the second number: 3
The result is 0
```

Project Name: LG4_Q2
File Name: Q2.cpp

Q3. Write a C program that calculates whether a sales transaction makes a profit or loss and the profits or losses amount. Take two real numbers from the user as inputs, the first being the cost and the second being the sales price, have your program perform the necessary calculations, and deliver the results. Examine the example run below for the example output. Note: Assume that the sales and the cost prices are unequal.

Example Run #1:
```
Enter cost of the item:($) 15
Enter sales price of the item:($) 10


You are making a loss of 5.00 $ from this
sale.
```

Example Run #2:
```
Enter cost of the item:($) 9
Enter sales price of the item:($) 19


You are making a profit of 10.00 $ from
this sale.
```

Project Name: LG4_Q3
File Name: Q3.cpp

Q4. Write a C program that gets the **lecture quiz**, the **midterm**, the **lab work**, and the **lab final** as input from the user and

➤ calculates and displays the total grade using the following percentages:
- 5% of the lecture quiz,
- 15% of the midterm,
- 30% of the lab work,
- 20% of the lab final,

➤ displays a message about whether the student is eligible or not to enter the lecture final exam:
  If the student gets
  - at least 8 points from the Lecture Quiz plus the Midterm Exam,
  - at least 17 points from the Lab Exams plus the Lab Final Exam weighted average,
the student will be eligible for the Final Exam.

```
Example Run1:
Enter lecture quiz grade : 78
Enter midterm grade : 65
Enter lab work grade : 69
Enter lab final grade : 45

Total grade is 43.35

The student is eligible for lecture final exam.

Example Run2:
Enter lecture quiz grade : 52
Enter midterm grade : 36
Enter lab work grade : 45
Enter lab final grade : 12

Total grade is 23.90

The student is NOT eligible for lecture final exam.
```

Project Name: LG4_Q4
File Name: Q4.cpp

Q5. Write a C program that gets three values for the variables a, b, and c of a mathematical equation to compute the result of the equation given to you below, using built-in functions. Your program must, also, check for any occurrence of the division by zero problem, as well as values inside the root functions as they cannot be below zero.

$$\frac{\frac{\sqrt[5]{a^8} + \frac{\sqrt{a}}{2c}}{\sqrt{b + a^3}} + |a + c|}{4c^3 + b - 2a}$$

➔ Check your equation if all variables are set to 1. (Result = 1.02)

```
Example Run1:
Enter the values of a, b, and c respectively: -1 5 6
There is an error caused by the values.


Example Run2:
Enter the values of a, b, and c respectively: 5 5 0
There is an error caused by the values.


Example Run3:
Enter the values of a, b, and c respectively: 5 4 3
The result is 0.09
```

Project Name: LG4_Q5
File Name: Q5.cpp

Additional Questions

AQ1.

Write a C program that calculates attendance obligation for given lectures in a department. There are two types of attendance Obligation, which is 75% for most courses, and 50% for elective courses. Program gets;

- Number of weeks in a department,
- Number of lecture hours in a week,
- Lecture type M/m for Must, E/e for Elective,

  from the user, then displays the hour of attendance obligation for the given lecture as shown in the example run below.
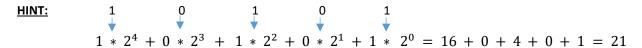
```
Example Run1:
Enter the number of weeks in a semester: 15
Enter the number of lecture hours in a week: 3
Enter the type of lecture, (M/m for Must) / (E/e for Elective): M

You must attend 34 hours

Example Run2:
Enter the number of weeks in a semester: 14
Enter the number of lecture hours in a week: 3
Enter the type of lecture, (M/m for Must) / (E/e for Elective): E

You must attend 21 hours
```

Project Name: LG4_AQ1
File Name: AQ1.cpp

AQ2.

Write a C program that reads a five-digit binary number, converts that number to decimal, then displays the decimal number, digits of the decimal number, and the sum of its digits as in the example run.

HINT:

$$1 \quad\quad 0 \quad\quad 1 \quad\quad 0 \quad\quad 1$$

$$1 * 2^4 + 0 * 2^3 + 1 * 2^2 + 0 * 2^1 + 1 * 2^0 = 16 + 0 + 4 + 0 + 1 = 21$$

```
Example Run1:
Enter a binary number: 11011
Decimal equivalent : 27
Digits of the decimal number : 2 and 7
Sum of its digits : 9

Example Run2:
Enter a binary number: 10111
Decimal equivalent : 23
Digits of the decimal number : 2 and 3
Sum of its digits : 5
```

Project Name: LG4_AQ2
File Name: AQ2.cpp