Department of Information Systems and Technologies

CTIS151 – Introduction to Programming

SPRING 2023- 2024

Lab Guide #4 – Week 5 – 1

OBJECTIVES : Built-in functions, Solving Simple arithmetic problems that require usage of input values, Displaying the result of a simple calculation. Relational and logical operators, compound statements. Selection Structures: Simple if and if…else statement

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Q1. Write a C program that performs the following calculation, according to the instruction given to you in part a and part b below.

$$\left| \frac{\sqrt{t * k} + 6 * b}{\frac{b}{\sqrt{3^t}} - \frac{s^k}{7} + 4} \right|$$

a) Initialize the values of variables as:
t = 7.2 s = 3.4 k = 2 b = 19

Example Run:

```
Result is: 43.425
```

Project Name: LG4_Q1a
File Name: Q1a.cpp

b) Take the values for the variables necessary from user.

Example Run #1:

```
Enter t and s: 1.4 3.6
Enter k and b: 6 2
Result is: 0.05
```

Example Run #2:

```
Enter t and s: 1.7 2.5
Enter k and b: 5 6
Result is: 5.13
```

Project Name: LG4_Q1b
File Name: Q1b.cpp

Q2. Write a C program to calculate, firstly, whether a sales transaction makes profit or loss, and then the profits' or losses' amount. Take two real numbers from the user as inputs, first one being the cost and the second being the sales price, your program must 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 cannot be equal.

Example Run #1:

```
Enter cost of the item:($) 8
Enter sales price of the item:($) 24

You are making a profit of 16.00 $ from
this sale.
```

Example Run #2:

```
Enter cost of the item:($) 25.5
Enter sales price of the item:($) 18.5

You are making a loss of 7.00 $ from this
sale.
```

Project Name: LG4_Q2
File Name: Q2.cpp

Q3. Write a C program that gets **3 products' unit price and their vat percentage respectively and finds the total amount to be paid.**

Examine the example run.

Example Run:

```
Enter first product price and vat:16 24
Enter second product price and vat:7 10
Enter third product price and vat:12 25
Total money is 42.54
```

Project Name: LG3_Q3
File Name: Q3.cpp

Q4. Write a C program that will read two integer numbers from the user, apply the following compound Boolean expression and display an appropriate message as 0 or 1 (0 means the result is false, 1 means it is true).

|num1+num2| x 36 = 71 OR (num1*num2≠-10)' OR (num2 - 10) / (num1 + 3) > 10

Example Run:

```
Enter the first number: 5
Enter the second number: 2
The result is 0
```

Project Name: LG4_Q4
File Name: Q4.cpp

Additional Questions

AQ1. Write a C program that takes 4 integer numbers from the user as input for the values of a, b, c and d variables respectively, in order to solve the mathematical equation given below.

$$result = a^3 + \frac{\frac{\sqrt{d}^{\,c}}{\frac{-b + \sqrt{b^2 - 4ac}}{2a}}}{\frac{a*(b-d)}{c}}$$

Example Run:

```
Enter the values for a, b, c and d: 1 6 2 3
The result of the equation is -7.4686
```

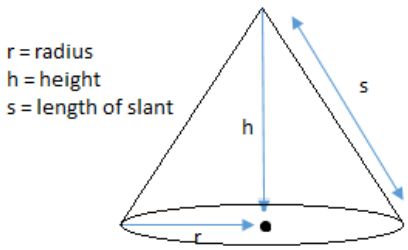
Project Name: LG4_AQ1
File Name: AQ1.cpp

AQ2. Write a C program that gets the diameter of the base of a cone in cm and its height in m as input, and calculates its slant height in m, volume in cm^3 and surface area in m^2. (Use π as 3.1415)

$$\textbf{\textit{Slant Height}}(s) = \sqrt{h^2 + r^2}$$

$$\textbf{\textit{Surface Area}} = \pi r^2 + \pi r s$$

$$\textbf{\textit{Volume}} = \frac{1}{3} \pi r^2 h$$



Example Run:

```
Enter the diameter of the cone (in cm): 76
Enter the height of the cone (in m): 0.4

The slant height of the cone is 0.6 m
The surface area of the cone is 1.112 m2
The volume of the cone is 60484.35 cm3
```

Project Name: LG4_AQ2
File Name: AQ2.cpp

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 **LG4_Sols** folder in there.
4. From the options menu, hover your mouse cursor over the **7-Zip** option and select "**Add to LG4_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**
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 and http://lab2t for Lab2