OBJECTIVE : Data Types, Constants, Arithmetic Operations, Formatting Output, Built-in functions

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Q1. The following C program has already been written to calculate the battery of a cordless car for one hour. Its battery can be charged in 5 hours. However, there are several errors in the given code.

- Write the code into Visual Studio and execute it. Then, observe the errors if they exist, correct them, and check again until the program is successful.

```c
#include <studio.h>
#declare MINUTE 300

int main(void)
{
    //declare variables
    double neededHour = 0, battery Situation = 0;

    //get the battery situation from the user
    printf("Please enter your battery situation ( Full : 1 / Half : 0.5 / Empty : 0 );
    scanf("%d", batterySituation);

    //calculate battery needed to use the cordless car for one hour
    MINUTE * battery Situation = neededHour;
    neededHour = MINUTE – neededHour;

    //output given
    printf("Your Battery Situation is %d \n You need to charge the battery for %0.2lf minute(s)
    \n", neededHour);

    return 0;

}
```

Your final example output should look like the one below.

```
Example Run #1:
Please enter your battery situation ( Full : 1 / Half : 0.5 / Empty : 0 ) : 0.5
Your Battery Situation is 0.5
You need to charge the battery for 150.00 minute(s)

Example Run #2:
Please enter your battery situation ( Full : 1 / Half : 0.5 / Empty : 0 ) : 1
Your Battery Situation is 1.0
You need to charge the battery for 0.00 minute(s)
```

Project Name: LG3_Q1
File Name: Q1.cpp

Q2. Write a C program to calculate an employee's compensation, given the employee's starting year and final salary, using the current year as 2024. You can define the current year as a constant value.

```
Example Run #1:                          Example Run #2:
Enter your entrance year: 2002           Enter your entrance year: 2010
Enter your last salary: 25000            Enter your last salary: 20000

Your compensation is 550000.00 TL        Your compensation is 280000.00 TL
```

Project Name: LG3_Q2
File Name: Q2.cpp

Q3. Write a C program that gets a decimal number (2 digits for an integral part and 4 digits for a fractional part) from the user and displays the value in the format shown in the example run.

Example Run:
```
Enter a number (2 digits integral and 4 digits fractional): 78.3456

78
78.34560
78.34560000
      78.3
78.3456000
78.35
      78
```

Q4. Write a C program that gets the lowercase and uppercase forms of any letter, to display their corresponding ASCII codes and the difference between their codes, as shown in the example run.
Note that: *Check the difference between the same letter. (e.g.: 'a' - 'A')*
What is the important point related to this difference?

Example Run #1:
```
Enter the lowercase form of any letter: a
Enter the UPPERCASE form of any letter: A

ASCII code of lowercase form 97.
ASCII code of UPPERCASE form 65.

Difference between the codes is 32.
```

Example Run #2:
```
Enter the lowercase form of any letter: b
Enter the UPPERCASE form of any letter: B

ASCII code of lowercase form 98.
ASCII code of UPPERCASE form 66.

Difference between the codes is 32.
```

Q5. Write a C Program that computes the mathematical equation given to you below. (Use minimum number of parenthesis.)

$$Result = r + \sqrt{\dfrac{c + \dfrac{a*r}{b}}{r*\dfrac{a}{e}}{\dfrac{b+4}{e}}}$$

→ Check your equation if all variables are set to 1. (Result = 1.28)

a) Initialize the values of the variables as **a** = 3, **b** = 8, **c** = 9, **e** = 5.5, **r** = 2.5 calculate and display the result.

Example Run:
```
The result of the equation is 3.74
```

b) Take values of variables from the user; calculate and display the result.

Example Run:
```
Enter a: 2
Enter b: 4
Enter c: 1
Enter e: 2.3
Enter r: 2.8


The result of the equation is 3.09
```

Additional Questions

AQ1. A clothing store decided to start a campaign to recycle old clothes. Each piece of old clothing would earn the store 50 TL, and the customer who took advantage of this campaign would be given a 20% discount voucher on their next purchase. Write a C program that takes the number of old clothes received from the user and the price of new clothes, calculates how much money was saved from recycling, and also calculates the discount as in the example run.

> **Example Run #1:**
> ```
> Enter the number of old clothes : 5
> Enter the price of new clothes (TL) : 790
> The Store saved 250.00 TL from recycling.
>
> You win 158.00 TL discount :)
> Please pay 632.00 TL.
> ```
>
> **Example Run #2:**
> ```
> Enter the number of old clothes : 1
> Enter the price of new clothes (TL) : 43.9
> The Store saved 50.00 TL from recycling.
>
> You win 8.78 TL discount :)
> Please pay 35.12 TL.
> ```

Project Name: LG3_AQ1
File Name: AQ1.cpp

AQ2. Write a C program that gets three integer numbers (**x, y, z**) from the user as input data, calculates the result of the formula below, and displays the result on the screen.

$$\left| \left(\frac{x^3}{\sqrt[5]{y^4}} + \sqrt{\frac{|x + z|}{\sqrt{y}}} \right)^3 \right| = ?$$

➔ Check your equation if all variables are set to 1. (Result = 14.1)

a) Get three integer numbers (x, y, z) from the user.

> **Example Run:**
> ```
> Enter a value for x: -5
> Enter a value for y: 1
> Enter a value for z: 3
> The result is 1887580.9
> ```

Project Name: LG3_AQ2
File Name: AQ2.cpp

b) Solve it again by doing the operations in a single line.

AQ3.

On a farm, there are several cows, sheep, and horses. Write a program that gets the number of animals from the user and calculates the central angle for each animal, if their numbers are shown in a circle graphic, as below.

> **Example Run #1:**
> ```
> Enter the number of cows: 200
> Enter the number of sheep: 400
> Enter the number of horses: 600
>
> The angle of cows is 60.00 degree
> The angle of sheep is 120.00 degree
> The angle of horses is 180.00 degree
> ```
>
> **Example Run #2:**
> ```
> Enter the number of cows: 500
> Enter the number of sheep: 500
> Enter the number of horses: 500
>
> The angle of cows is 120.00 degree
> The angle of sheep is 120.00 degree
> The angle of horses is 120.00 degree
> ```
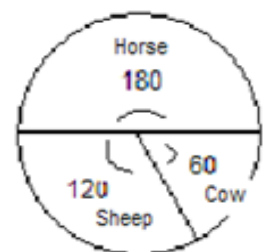
Project Name: LG3_AQ3
File Name: AQ3.cpp