Worksheet-1: C++ Basics

Task - 1

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Task 1 : Programming Exercises:[Data types and Conditional Statements]

1. Write a program that takes a temperature value from the user. It should then allow the user to choose between Celsius (C) and Fahrenheit (F) for conversion. After the user selection, it should then convert the entered temperature to the chosen scale and display the result.

Use appropriate data types for temperature and handle error like non-numeric input.

Use the following formula for conversion:

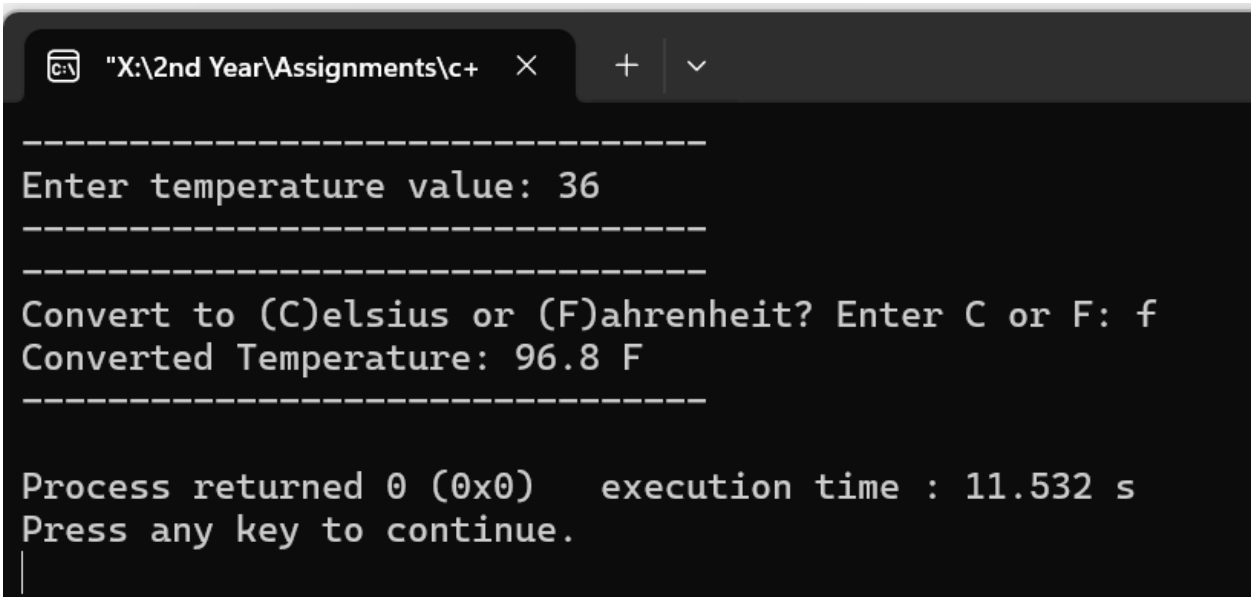
F = (C x 9/5) + 32

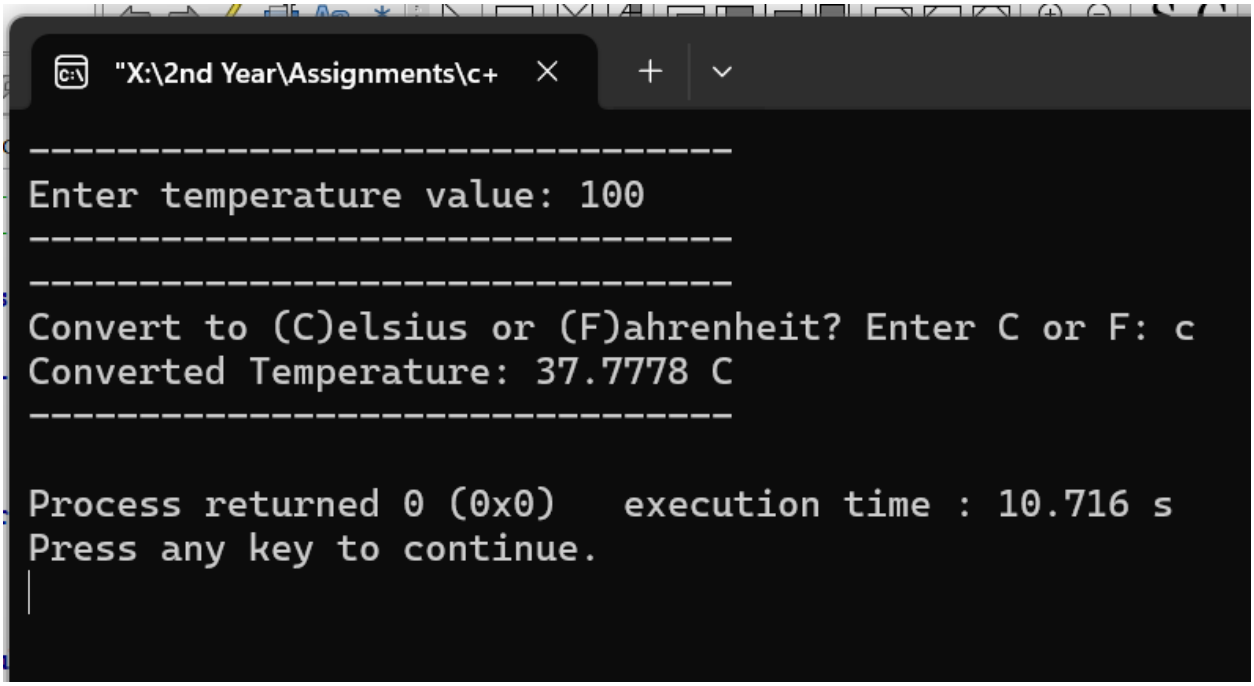
C = (F - 32) x 5/9

```
#include <iostream>
#include <limits>

using namespace std;

class TemperatureConverter

{

private:

    double temperature;

public:

    void getdata()

    {
        cout << "--------------------------------" << endl;
        cout << "Enter temperature value: ";


        while (!(cin >> temperature))

            {
                cout << "Invalid input. Please enter a numeric temperature value:
";
                cin.clear();

                cin.ignore(numeric_limits<streamsize>::max(), '\n');
```

```
            }

            cout << "--------------------------------" << endl;
    }

    double converttoFahrenheit()

        {

            return (temperature * 9.0 / 5.0) + 32;

        }


    double converttoCelsius()

        {

            return (temperature - 32) * 5.0 / 9.0;

        }

    void convertTemperature()

        {

            char choice;

            cout << "--------------------------------" << endl;

            cout << "Convert to (C)elsius or (F)ahrenheit? Enter C or F: ";
            cin >> choice;

        if (choice == 'f')

            {

                cout << "Converted Temperature: " << converttoFahrenheit() << "
F" << endl;
            }

        else if (choice == 'c' || choice == 'C')
            {
```

```
                cout << "Converted Temperature: " << converttoCelsius() << " C"
<< endl;

            }
        else
            {

                cout << "Invalid choice. Please enter 'C' or 'F'." << endl;
            }

            cout << "-------------------------------" << endl;
    }
};

int main()
    {
        TemperatureConverter C1;

    C1.getdata();
    C1.convertTemperature();

    return 0;
}
```





Task 1 : Programming Exercises:[Data types and Conditional Statements]

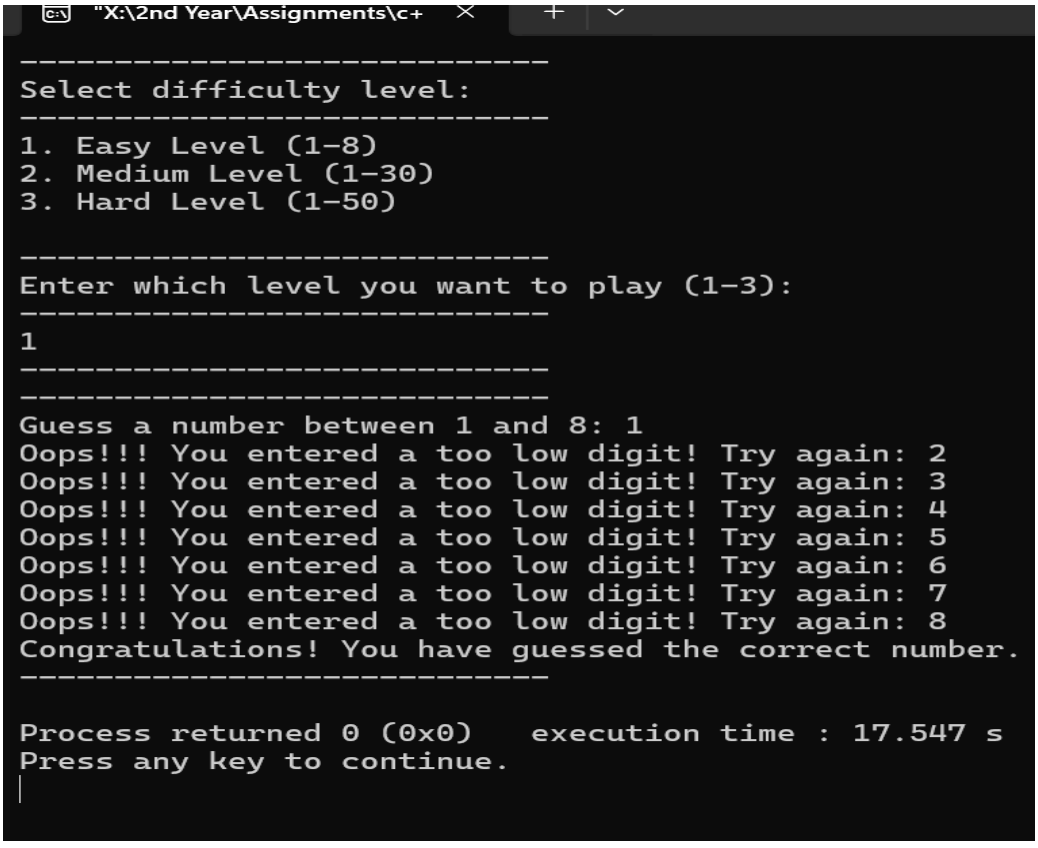
2. Write a C++ program to implement a number guessing game with different difficulty levels.
   Easy difficulty ranges from 1-8, medium from 1-30, hard from 1-50.Then,generate a random number to check if the guess is correct based on the user's selection.
   [10 marks]

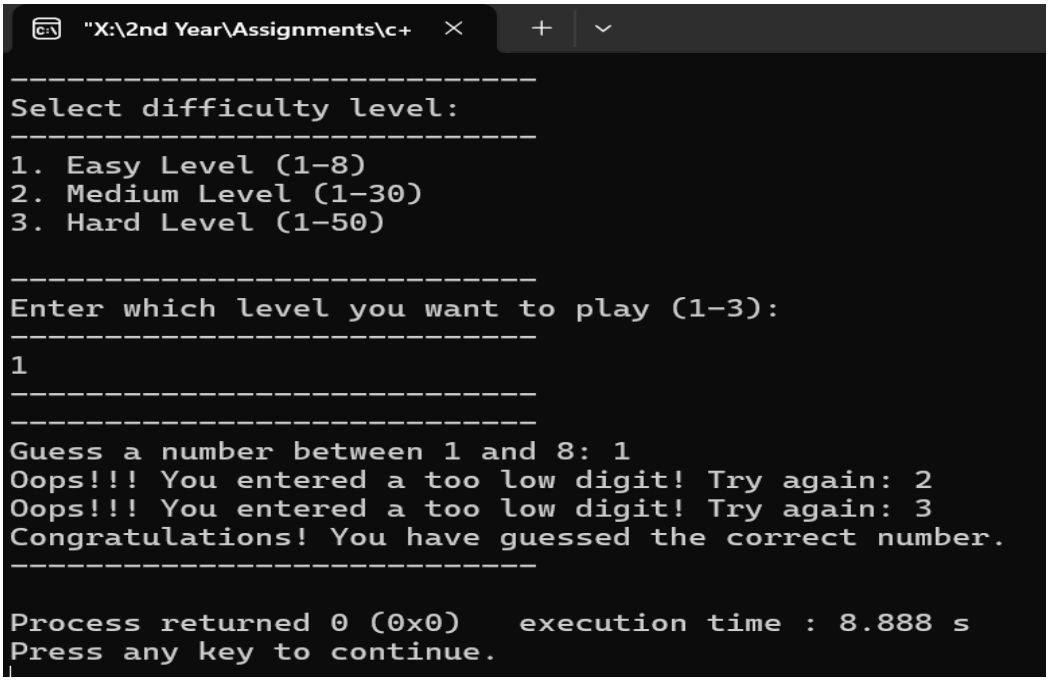
```
#include <iostream>
#include <cstdlib>
#include <ctime>

using namespace std;

class guessingGame {
private:
    int maxRange;
```

```
    int randomNumber;

public:
    void difficultylevel()

    {

        int choice;

        cout << "----------------------------" << endl;
        cout << "Select difficulty level:" << endl;
        cout << "----------------------------" << endl;

        cout << "1. Easy Level (1-8)" << endl;
        cout << "2. Medium Level (1-30)" << endl;
        cout << "3. Hard Level (1-50)" << endl << endl;

        cout << "----------------------------" << endl;
        cout << "Enter which level you want to play (1-3): "<<endl;
        cout << "----------------------------" << endl;

        cin >> choice;
        cout << "----------------------------" << endl;

        switch (choice)
        {
            case 1:

                maxRange = 8;
                break;

            case 2:

                maxRange = 30;
                break;

            case 3:

                maxRange = 50;
                break;

            default:

                cout << "Invalid choice! Defaulting to Easy Level.\n";
                maxRange = 8;
```

```
        }
    }

    void generateRandomNumber()

    {
        srand(time(0));
        randomNumber = (rand() % maxRange) + 1;

    }

    void playGame()

    {
        int guess;

        cout << "----------------------------" << endl;
        cout << "Guess a number between 1 and " << maxRange << ": ";

        while (true)

            {
                cin >> guess;

            if (guess == randomNumber)
                {

                    cout << "Congratulations! You have guessed the correct
number." << endl;
                    cout << "----------------------------" << endl;

                    break;
                }
            else if (guess < randomNumber)
                {
                    cout << "Oops!!! You entered a too low digit! Try again: ";
                }

            else

                {

                    cout << "Oops!!! You entered a too high digit! Try again: ";

                }
```

```
        }
    }
};

int main()

{
    guessingGame g1;

    g1.difficultylevel();
    g1.generateRandomNumber();
    g1.playGame();

    return 0;
}
```





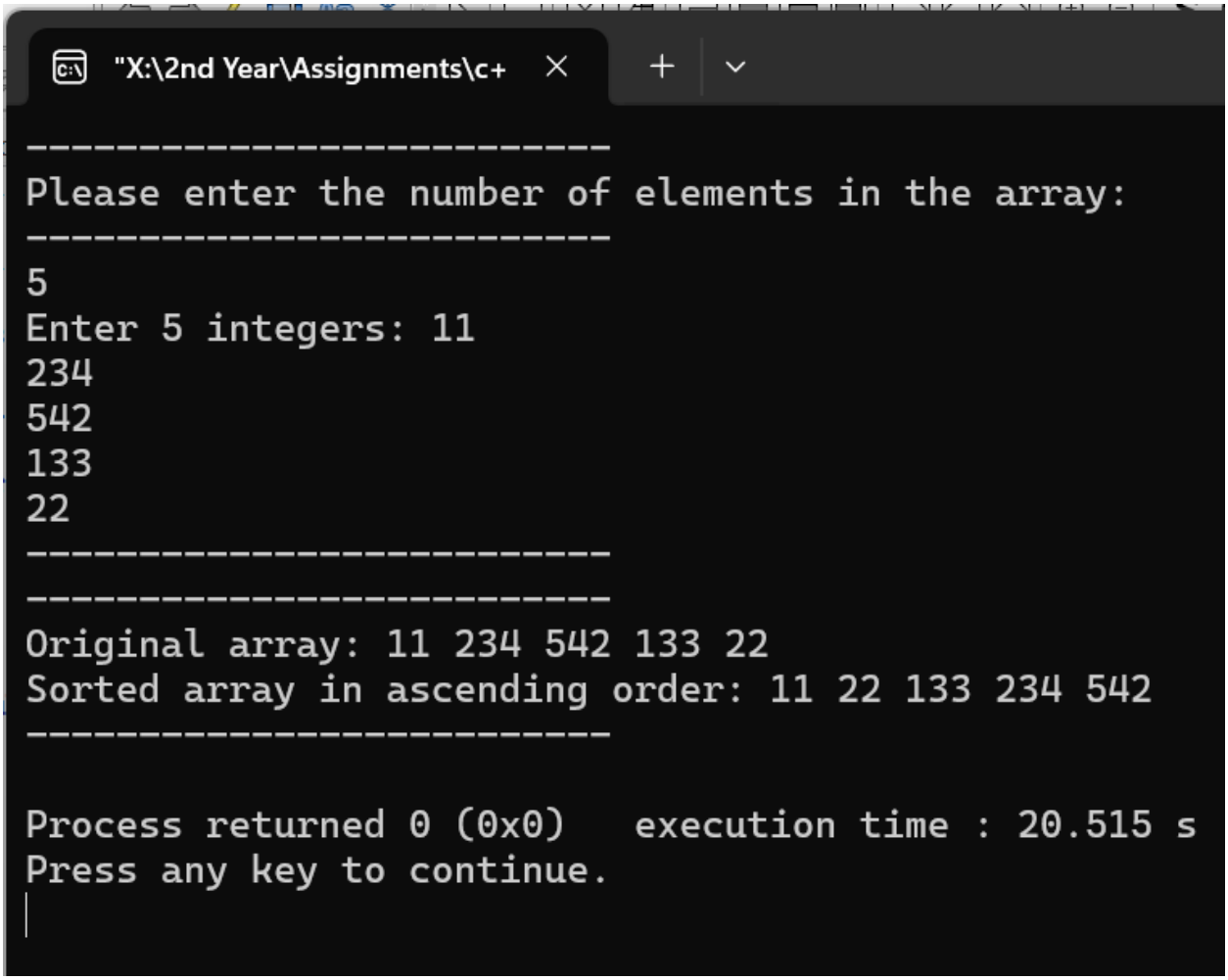
Task 1 : Programming Exercises:[Data types and Conditional Statements]

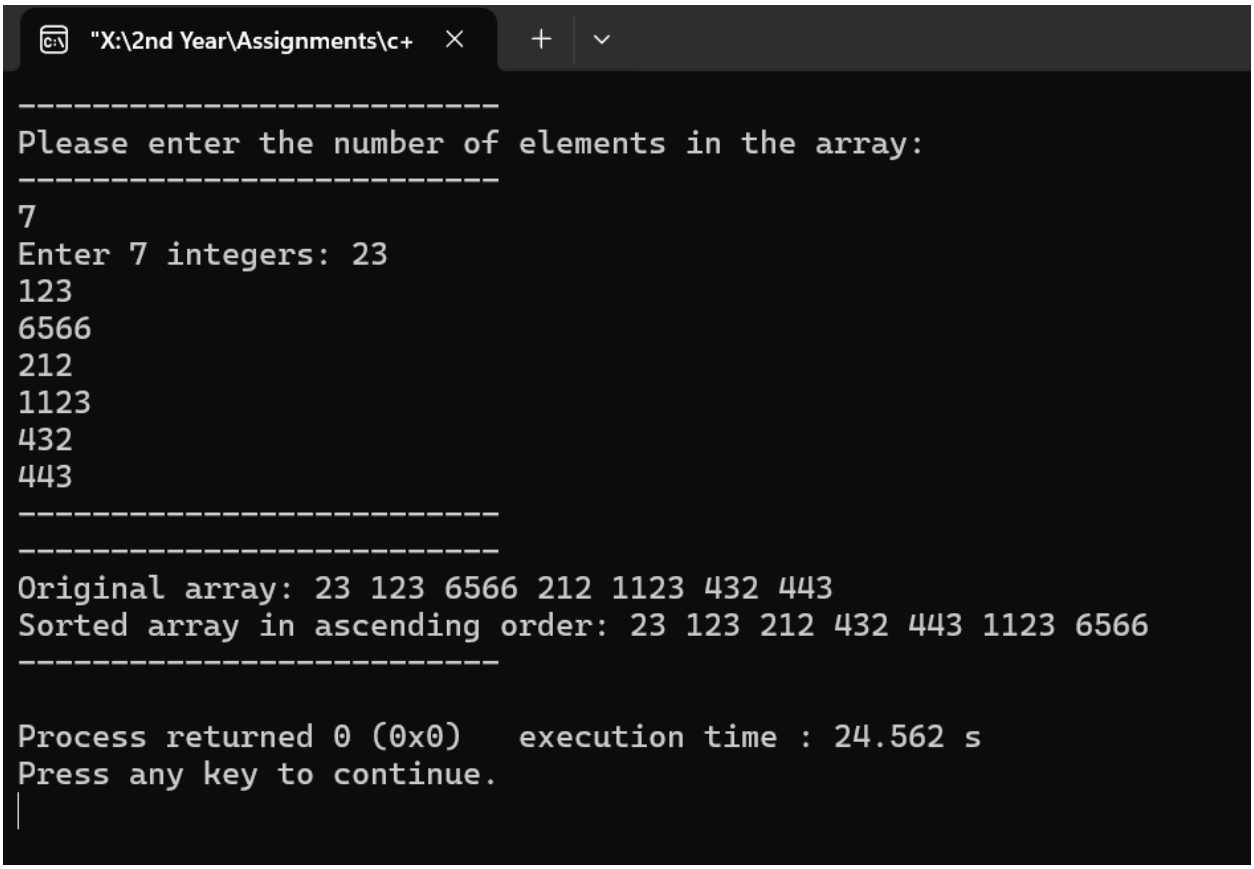
3. Write a program that reads an array of integer numbers from the user and sorts the numbers in the ascending order.

```
#include <iostream>

#include <algorithm>

using namespace std;

class ArraySorted
{
private:

    int arr[100];

    int size;

public:
    void getdata()

    {
```

```
        cout << "-------------------------" << endl;

        cout << "Please enter the number of elements in the array: "<<endl;

        cout << "-------------------------" << endl;

        cin >> size;

        if (size <= 0 || size > 100)

            {

                cout << "Invalid size of array. Please enter a number between 1
and 100.\n";
                return;
            }

            cout << "Enter " << size << " integers: ";

        for (int i = 0; i < size; i++)

            {

                cin >> arr[i];

            }

        cout << "-------------------------" << endl;

    }

    void displayArray()

    {
        for (int i = 0; i < size; i++)

            {

                cout << arr[i] << " ";

            }

        cout << endl;

    }
```

```
    void sortedArray()
    {

        cout << "-------------------------" << endl;

        cout << "Original array: ";
        displayArray();

        sort(arr, arr + size);

        cout << "Sorted array in ascending order: ";
        displayArray();

        cout << "-------------------------" << endl;

    }
};

int main()
{
    ArraySorted A1;

    A1.getdata();
    A1.sortedArray();

    return 0;
}
```


"X:\2nd Year\Assignments\c+
Please enter the number of elements in the array:
5
Enter 5 integers: 11
234
542
133
22
Original array: 11 234 542 133 22
Sorted array in ascending order: 11 22 133 234 542
Process returned 0 (0x0) execution time : 20.515 s
Press any key to continue.



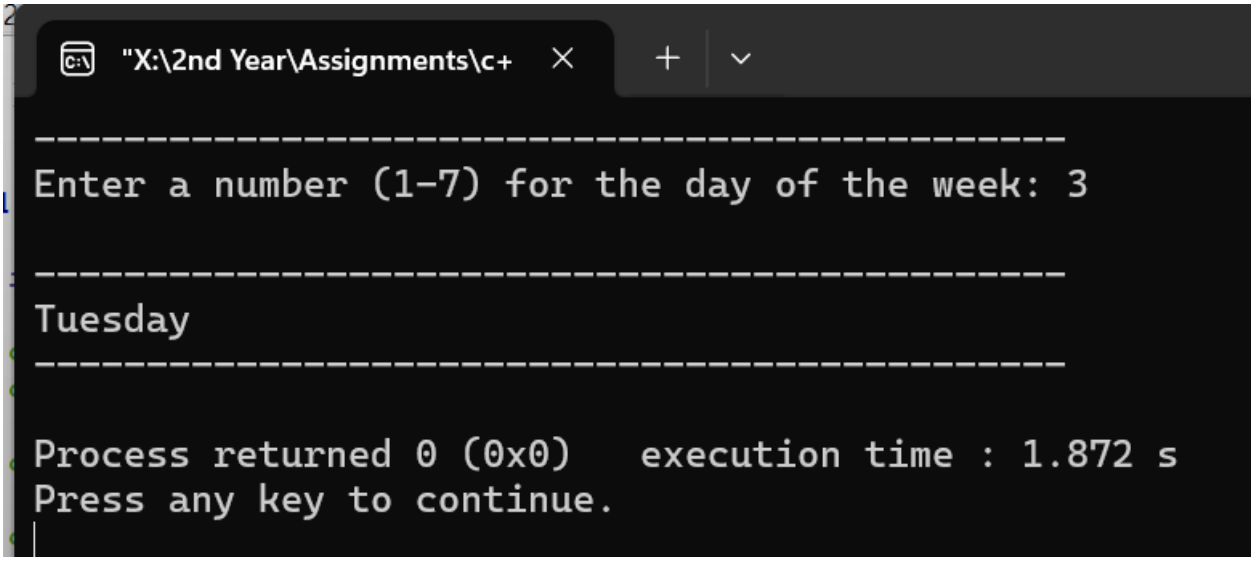
Task 1 : Programming Exercises:[Data types and Conditional Statements]

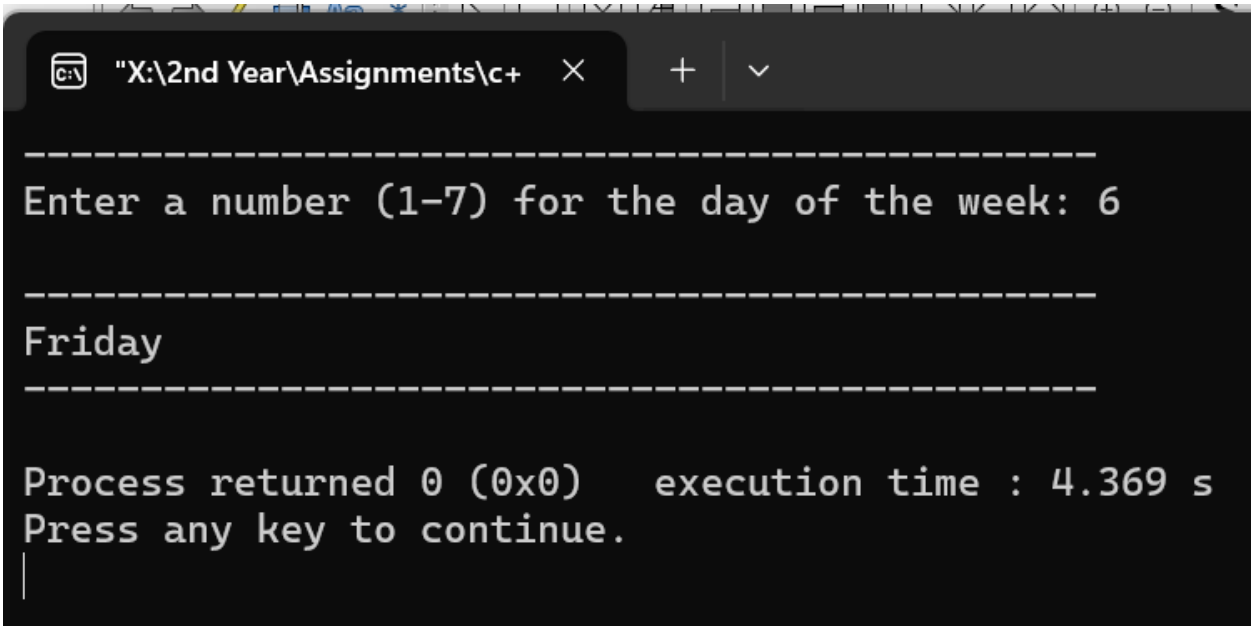
4. Write a program that reads a number from the user and based on the user input, it says what day of the week it is, Sundays being 1 and Saturdays being 7. You system should give appropriate response for invalid input entries.

```
#include <iostream>

using namespace std;

class Weekdays

{

public:

    void displayDay(int day)
{
        switch (day)
```

```
        {
            case 1:

              cout << "Sunday" << endl;
              break;

            case 2:

              cout << "Monday" << endl;
              break;

            case 3:

              cout << "Tuesday" << endl;
              break;

            case 4:

              cout << "Wednesday" << endl;
              break;

            case 5:
              cout << "Thursday" << endl;
              break;

            case 6:

              cout << "Friday" << endl;
              break;

            case 7:

              cout << "Saturday" << endl;
              break;

            default: cout << "WrOnG InPuT! Please enter a number between 1 and
7." << endl;
        }
    }

    void getDay()
{
        int day;
```

```
        cout << "Enter a number (1-7) FoR the day of the week: ";

        cin >> day;
        cout<<endl;

        displayDay(day);
    }
};

int main()
{

    Weekdays w1;

    w1.getDay();

    return 0;
}
```




"X:\2nd Year\Assignments\c+
Enter a number (1-7) for the day of the week: 6
Friday
Process returned 0 (0x0) execution time : 4.369 s
Press any key to continue.