UNIVERSITI POLY-TECH MALAYSIA UPTM

Assignment Cover– be sure to keep a copy of all work submitted

To be completed by student – PLEASE PRINT CLEARLY

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Lecturer SITI ROBAYA BINTI JANTAN		Lab group / Tutorial group / Tutor (if applicable)
Course and Course Code DIPLOMA IN COMPUTER SCIENCE CC101		Submission Date: WEEK 14
Assignment No. / Title LAB WORK 2		Extension & Late submission: Allowed / Disallowed
Assignment type: INDIVIDUAL	% of Assignment Mark	Returning Date: 19/04/2024

Penalties:

1. 10% of the original mark will be deducted for every one-week period after the submission date
2. No work will be accepted after two weeks of the deadline
3. If you were unable to submit the coursework on time due to extenuating circumstances you may be eligible for an extension
4. Extension will not exceed one week

Declaration: I/we the undersigned confirm that I/we have read and agree to abide by these regulations on plagiarism and cheating. I/we confirm that this piece of work is my/our own. I/we consent to appropriate storage of our work for checking to ensure that there is no plagiarism/ academic cheating.

Signature: 

Full Name: MEGAT ADIB LUQMAN BIN MEGAT KHAIRUDDIN

This section may be used for feedback or other information

QUESTION 1:

The following C++ program is designed to convert temperature between Celsius and Fahrenheit or vice versa. However, there are bugs in the program that can cause incorrect results.

```cpp
#include <iostream>
using namespace std;

int main() {
    double temperature;
    char scale;

    cout << "Enter temperature: ";
    cin >> temperature;

    cout << "Enter scale (C for Celsius, F for Fahrenheit): ";
    cin >> scale;

    if (scale == 'C' || scale == 'c')
        double convertedTemp = celsiusToFahrenheit(scale);
        cout<<"Converted temperature: "<<convertedTemp<<" F"<<endl;

    else if (scale == 'F' || scale == 'f') {
        double convertedTemp = fahrenheitToCelsius(temperature);
        cout<<"Converted temperature: "<<convertedTemp<<" C"<<endl;
    }
    else {

    }

    return 0;
}

// Function to convert Celsius to Fahrenheit
double celsiusToFahrenheit(celsius) {
    return (celsius * 9/5) + 32;
}

// Function to convert Fahrenheit to Celsius
double fahrenheitToCelsius(double fahrenheit) {
    return (fahrenheit - 32) * 5/9;
}
```

Your task is to debug the program and identify the bugs. Describe the problem and how you solved it (Provide the improved C++ code with appropriate comments and display your sample output).

The Error:

1. **Function Declarations Inside main**: User defining the celsiusToFahrenheit and fahrenheitToCelsius functions inside the main function. This is not allowed in C++. These functions should be declared outside of main before they are used.
2. **Parameter Declaration in Functions**: In the function definitions for celsiusToFahrenheit and fahrenheitToCelsius, parameters are missing their types.

3. **Variable scale Not Initialized**: The variable scale is being used in the if conditions without being initialized or assigned a value from user input.
4. **Incorrect Condition in if Statement**: The condition in the if statement checking for Celsius scale is scale == 'C' || scale == 'C', which checks for 'C' twice. It should be 'C' || scale == 'c' to cover both uppercase and lowercase 'C'.
5. **Scope of Variables**: The variables convertedTemp, celsius, and fahrenheit are declared inside the if blocks, which means they are not accessible outside those blocks. They should be declared before the if statements if they need to be accessed outside.
6. **Misuse of else Statement**: The else statement is empty and does nothing. It's unnecessary and can be removed.
7. **Typo in Function Parameter**: There's a typo in the function fahrenheitToCelsius, where the parameter is spelled as fahreinheit instead of fahrenheit.

Improved Code :

```
/*
 Program Purpose : Convert temperature between Celsius and Farhenheit or vice versa.
        Programmer   : MEGAT ADIB LUQMAN BIN MEGAT KHAIRUDDIN
        Date             :19/04/2024
*/

#include <iostream>

using namespace std;

// Function prototypes
double celsiusToFahrenheit(double celsius);
double fahrenheitToCelsius(double fahrenheit);

int main() {
   double temperature;
   char scale;

   cout << "Enter Temperature: ";
   cin >> temperature;

   cout << "Enter scale (C for Celsius, F for Fahrenheit): ";
   cin >> scale;

   if (scale == 'C' || scale == 'c') {
      double convertedTemp = celsiusToFahrenheit(temperature);
      cout << "Converted Temperature: " << convertedTemp << " F" << endl;
```

```
    } else if (scale == 'F' || scale == 'f') {
        double convertedTemp = fahrenheitToCelsius(temperature);
        cout << "Converted Temperature: " << convertedTemp << " C" << endl;
    } else {
        cout << "Invalid scale entered." << endl;
    }

    return 0;
}

// Function to convert Celsius to Fahrenheit
double celsiusToFahrenheit(double celsius) {
    return (celsius * 9 / 5) + 32;
}

// Function to convert Fahrenheit to Celsius
double fahrenheitToCelsius(double fahrenheit) {
    return (fahrenheit - 32) * 5 / 9;
}
```

GITHUB LINK :
[megatadib/LAB-WORK (github.com)](https://github.com/megatadib/LAB-WORK)

Sample Output: