Question 1:

Playing with the variable types

```
/*****************************************************************************
*
Lab 1
*****************************************************************************
*/
#include <stdio.h>
#include <iostream>
using namespace std;
int main()
{
   float number;
   cout << "Enter a number "; // display a message in the console
   cin >> number; // get the input from the user
   // display the number entered by the user
   cout << "The number you entered was " << number;
   return 0;
}
```

1) Compile the program, then execute it three times :

- 1st execution : enter the number 3.5 and note the last message displayed in the console
- 2nd execution : enter the number 7 and note the last message displayed in the console
- 3rd execution : enter the number 0 and note the last message displayed in the console

2) Modify the program by replacing the type “float” of the variable number by “int”. Compile and execute the program three times (use the same values as previously, 3.5, 7 and 0). Explain the difference (if any) when comparing the last message displayed by the program, when the variable type is updated from float to int.

3) Modify the program by replacing the type of the variable number by “bool”. Compile and execute the program three times (use the same values as previously, 3.5, 7 and 0). Explain the difference (if any) when comparing the last message displayed by the program, when the variable type is updated from float to bool.

4) Without implementing the following in C++ codes, write down the values of the variable x in the following cases:

a) int a=5;

float b = 3.4;

int x = a + b;

b) int a=5;

float b = 3.4;

float x = a + b;

c) int a=5;

float b = 3;

bool x = a + b;

d) bool a=5;

bool b = 1;

int x = a + b;

e) bool a=5;

bool b = 1;

bool x = a + b;

Answer:

4)

a) 8

b) 8.4

c) 1

d) 2

e) 1

Question 2:

Define F the temperature in Fahrenheit and C the same temperature expressed in Celsius. You can convert the two according to the following formula :

C = (F – 32) / 1.8

Version 1 : Implement a program which obtains from the user the temperature in Fahrenheit and which outputs that temperature converted to Celsius.

Version 2 : Implement a program which obtains from the user the temperature in Celsius and which outputs that temperature converted to Fahrenheit.

Answer:

version1:

```
#include <stdio.h>
#include <iostream>
using namespace std;

int main()
{
   float F;
   float C;

   cout << "enter   F" ;

   cin >> F;

   C = (F - 32)/1.8;

   cout << "C is " << C ;

   return 0;
}
```

version 2:

```
#include <stdio.h>
#include <iostream>
using namespace std;

int main()
{
   float F;
   float C;

   cout << "enter   C " ;

   cin >> C;

   F = 1.8*C + 32;
   cout << "F is " << F ;


   return 0;
}
```

Question 3:

A course has 4 labs, the grade of each is 0, 1, 2, 3, 4, ..., 7,8, 9 or 10. Write a program which gets the grades of the 4 labs from the user and which calculates and outputs the average of the 4 values.

Example : the 4 grades are : 5, 2, 8, 10 the program should output : Average = 6.25

Answer:

```
#include <stdio.h>
#include <iostream>
using namespace std;
int main()
{
   int g1 ;
   int g2 ;
   int g3 ;
   int g4 ;

   float avg_grade;

   cout << "enter your g1";
   cin >> g1;
   cout << "enter your g2";
   cin >> g2;
   cout << "enter your g3";
   cin >> g3;
   cout << "enter your g4";
   cin >> g4;

  avg_grade = (g1 + g2 + g3 + g4 )/4;
cout<< avg_grade;

   return 0;
}
```