



UNIVERSITI KUALA LUMPUR
Malaysia France Institute

FINAL EXAMINATION
SEPTEMBER 2014 SESSION

SUBJECT CODE	: FSD23002
SUBJECT TITLE	: PROGRAMMING FUNDAMENTAL
LEVEL	: DIPLOMA
TIME / DURATION	: 8.00 PM – 10.00 PM (2 HOURS)
DATE	: 29 DECEMBER 2014

INSTRUCTIONS TO CANDIDATES

1. Please read the instructions given in the question paper **CAREFULLY**.
2. This question paper is printed on both sides of the paper.
3. Please write your answers on the answer booklet provided.
4. Answer should be written in blue or black ink except for sketching, graphic and illustration.
5. This question paper consists of **TWO (2)** sections, Section A and B. Answer all questions in Section A. For Section B, answer two (2) questions only.
6. Answer all questions in English.

THERE ARE 11 PAGES OF QUESTIONS, EXCLUDING THIS PAGE.

SECTION A (Total: 60 marks)**INSTRUCTION: Answer all questions.****Please use the answer booklet provided.****Question 1**

(a) Answer the following questions correctly.

- (i) Define the term algorithm. (2 marks)
- (ii) State two (2) methods to represent algorithm. (2 marks)
- (iii) Define the term syntax. (2 marks)
- (iv) Give two (2) example of high-level language. (2 marks)
- (v) Define the term array. (2 marks)

(b) Figure 1 is the memory overview of a float array named `cgpa[ ]`.

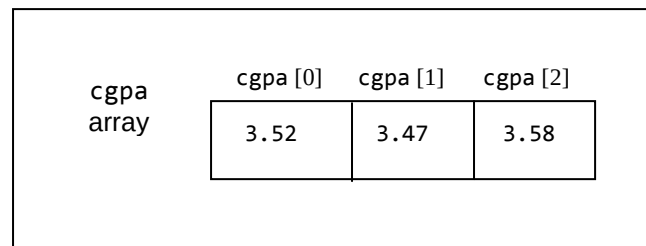


Figure 1: memory overview of array `cgpa [ ]`

- (i) State the size of the array. (1 mark)
- (ii) List the array offset of `cgpa[ ]`. (1.5 marks)
- (iii) List the content of the array. (1.5 marks)

- (c) Let say you are asked to prepare a program that is able to determine whether a number entered by user is zero (0) or non-zero. Sketch a flowchart to indicate the algorithm of the program.

(6 marks)

Question 2

- (a) State the output that will be produced after the execution of the statement below.

```
cout<<"Total volume \n\t of a cube is "
<<5*7*10<<"mm^3\n"<<endl;
```

(2 marks)

- (b) Write a C++ program that will declare and initialize a variable character *star* to the value of '*'. The program must be able to output the variable *star*.

(2 marks)

- (c) Write a C++ statement that first prompts a user to key in and read one (1) integer number and store into a variable *num*. The variable *result* will store the remainder of *num* when it is being modulus (%) by 2. Your program must be able to display the content of variable *result*. Assume that variable *result* and *num* have been declared as integer.

(6 marks)

- (d) State the output that will be produced after the execution of the statement below.

```
int x, y = 0;

while (y < 4)
{ x = (1/2.0)+ y;
  ++y;
  cout<<y<<endl;}
```

(4 marks)

Question 3

(a) Consider the flowchart in Figure 2.

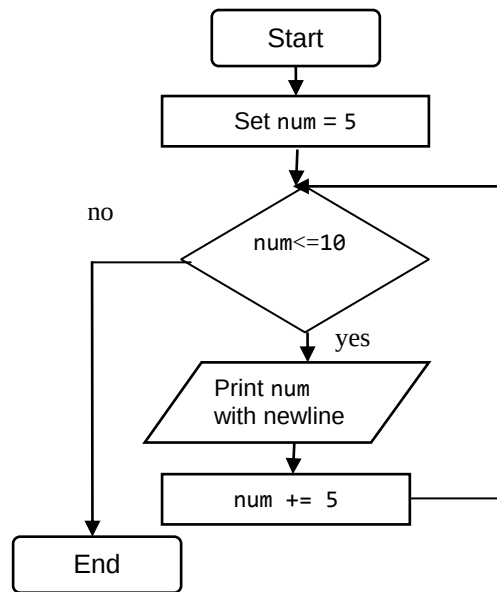


Figure 2: Flowchart to display value of variable *count*

- (i) Using the repetition statements, write a C++ program based on the flowchart in Figure 2. (5 marks)
- (ii) Show the output display of the above repetition statement. (2 marks)

(b) Consider the following code segment:

```
char msg[ ] = {'H','E','L','L','O'};
for( int a = 0; a< 5; ++a)
{
    cout<<msg[a]<<endl;
}
```

(i) Show the output displayed after the code is executed.

(5 marks)

(ii) Determine the value that *msg[4]* holds.

(2 marks)

(c) Consider the following segment of program:

```
#include <iostream>
using namespace std;
int main()
{ char myChar[5];
  int j ;
  cout<<"Please input 5 character : "<<endl;

  //complete the code

  return 0;
}
```

Using the *for* loop statement, complete the program above in which it able to read five (5) character and store in an array *myChar[]*.

(5 marks)

- (d) A program below is used to calculate the difference of two (2) numbers entered by user.

```
#include <iostream>
using namespace std;
float Diff_num(float x, float y);
int main()
{ float result = 0, num1, num2;
  cout<<"Please input 2 numbers : "<<endl;
  cin>>num1>>num2;

  //function call

  cout<<"Difference is "<<result<<endl;

  return 0;
}
//function definition
```

A programmer-defined function *Diff_num()* is used to calculate the difference and return the calculated difference to the main function.

- (i) Write the function call of the above code.

(2 marks)

- (ii) Write the function definition of *Diff_num()*.

(5 marks)

SECTION B (Total: 40 marks)**INSTRUCTION: Answer TWO (2) questions only.****Please use the answer booklet provided.****Question 4**

As a beginner in C++ program, you are asked to develop the simple length unit conversion system for an input entered. The system must work as follows:

- i. Display the conversion unit option and its operation (refer to Table 1);
- ii. Read the conversion unit option;
- iii. Read one (1) initial input value from user;
- iv. Perform the conversion and display the result;
- v. Display “Invalid option” if the arithmetic option is not the system.

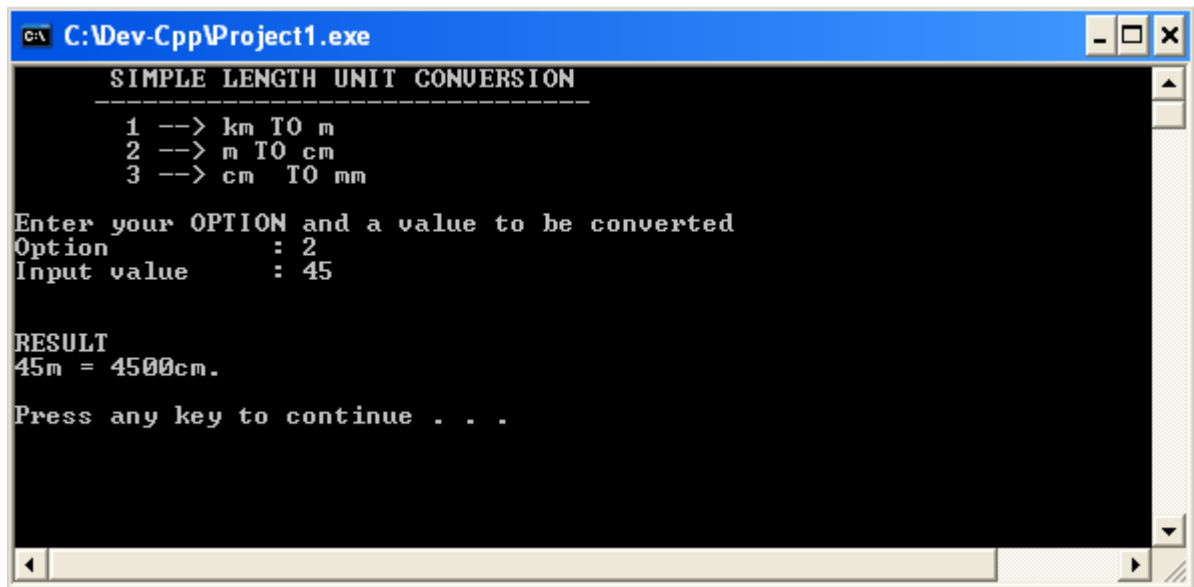
Table 1: Length unit conversion option and its operation

UNIT CONVERSION OPTION	UNIT CONVERSION OPERATION
1	kilometer (km) to meter(m) 1km= 1000m
2	meter(m) to centimeter(cm) 1m = 100cm
3	centimeter(cm) to millimeter(mm) 1cm = 10mm

- a) Assume that the problem above will use the *switch* statement, sketch a flowchart that will represent the above system.

(10 marks)

- b) Using the *switch* statement, write a complete C++ program based on the flowchart in Question 6 (a). Refer to Figure 3 and Figure 4 as the input output example of the system.



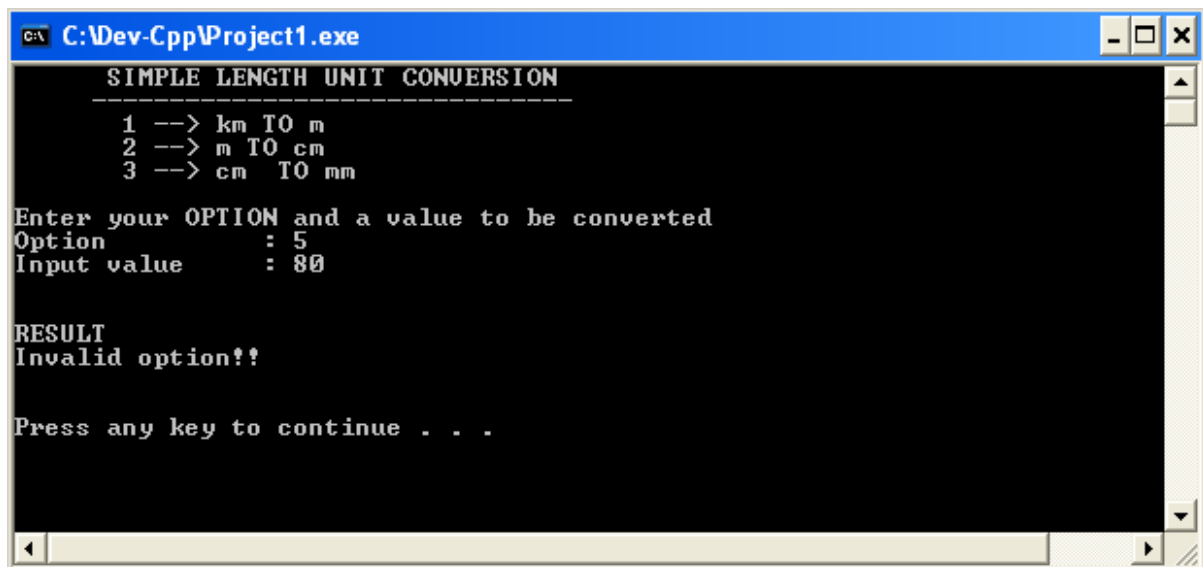
```
C:\Dev-Cpp\Project1.exe
SIMPLE LENGTH UNIT CONVERSION
-----
1 --> km TO m
2 --> m TO cm
3 --> cm TO mm

Enter your OPTION and a value to be converted
Option      : 2
Input value  : 45

RESULT
45m = 4500cm.

Press any key to continue . . .
```

Figure 3: Sample of input and output of the system when option 2, input value 45 were entered.



```
C:\Dev-Cpp\Project1.exe
SIMPLE LENGTH UNIT CONVERSION
-----
1 --> km TO m
2 --> m TO cm
3 --> cm TO mm

Enter your OPTION and a value to be converted
Option      : 5
Input value  : 80

RESULT
Invalid option!!

Press any key to continue . . .
```

Figure 4: Sample of input and output of the system when option 5, input value 80 were entered.

(10 marks)

Question 5

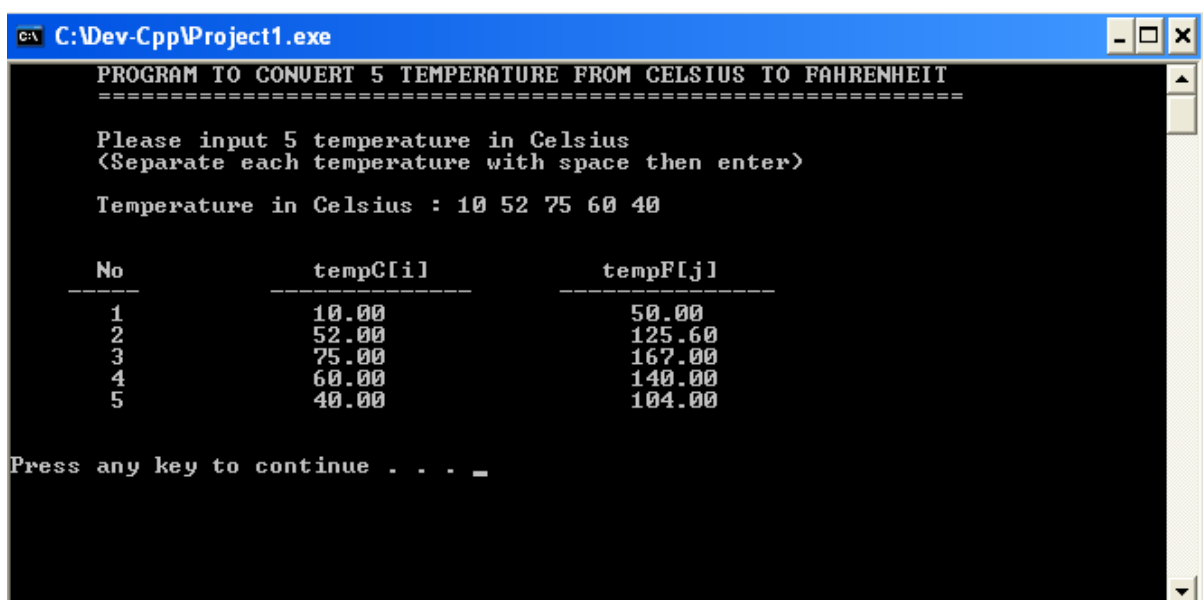
- (a) The temperature in Celsius can also be presented in Fahrenheit using the following formula:

$$^{\circ}\text{F} = \left(^{\circ}\text{C} \times \frac{9}{5}\right) + 32$$

Using this formula, you are asked to develop a system that is able to convert and display five (5) temperatures in Fahrenheit from five (5) initial temperature in Celsius entered by user. The program will work as follows:

- Read five (5) temperatures in Celsius and store in an array named *tempC[]*.
- Convert the temperatures using the formula and store in an array named *tempF[]*.
- Display the content of both arrays.

Refer to Figure 5 for the example of output and output display of the program. Write a C++ program that will produce a system as explain above. Use the declaration of two (2) arrays named *tempC[]* and *tempF[]* with the size of 5.



```

C:\Dev-Cpp\Project1.exe
PROGRAM TO CONVERT 5 TEMPERATURE FROM CELSIUS TO FAHRENHEIT
=====
Please input 5 temperature in Celsius
<Separate each temperature with space then enter>
Temperature in Celsius : 10 52 75 60 40

  No      tempC[i]      tempF[j]
  ---      -
  1         10.00         50.00
  2         52.00        125.60
  3         75.00        167.00
  4         60.00        140.00
  5         40.00        104.00

Press any key to continue . . . _
  
```

Figure 5: Sample of input and output of the system in converting 5 temperature in Celsius to Fahrenheit.

(15 marks)

(b) Consider the program given below:

```
#include <iostream>
#include <cmath>
using namespace std;
int main( )
{
    int x=2,y;

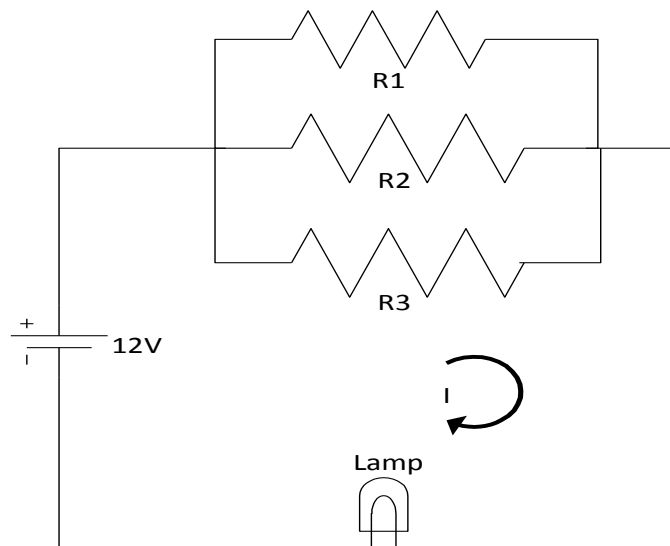
    while(x<=6)
    {
        y = pow(x,2.0) + (5*x) + 6;
        cout<<"When x is "<< x <<" y is "<<y<<endl<<endl;
        x++;
    }
    return 0;
}
```

Sketch the flowchart of the program above.

(10 marks)

Question 6

A program is developed to calculate and display the total resistance, R_{Total} and the current, I that flow in circuit. The program will work in a way that user is required to input the value of R_1 , R_2 and R_3 of the circuit below. The total resistance, R_{Total} and current, I can be calculated using the formula given as shown in Figure 6.



$$R_{Total} = \frac{1}{\left(\frac{1}{R_1} + \frac{1}{R_2} + \frac{1}{R_3}\right)}$$

$$I = \frac{V}{R_{Total}}$$

I: Current in the circuit
V: Voltage supply in the circuit
R_{Total}: Total resistance

Figure 6: The formula to calculate the total resistance and current of the circuit

- (a) Write a simple program that is able to calculate and display the total resistance R_{Total} and current, I of the circuit above.

(5 marks)

(b) Let say that the above program need to be constructed using programmer-defined function. The details of the program are as follows:

- (i) The main function will read the value of a , b , c and d of a trapezoid.
- (ii) A programmer-defined function *calcTotResistance* (), will be used to calculate the total resistance in the circuit. The function will receive the value of R_1 , R_2 , and R_3 as its parameter. The calculated total resistance, R_{Total} value will be returned to the main function.
- (iii) A programmer-defined function *calcCurrent* (), will be used to calculate the current, I flow in the circuit. The function will receive the value of calculated R_{Total} and voltage supply, V as its parameter. The calculated current, I will be returned to the main function.
- (iv) The main function will display the value of total resistance, R_{Total} and current, I

Develop the program from the above program's details.

(15 marks)

END OF QUESTIONS