DEPARTMENT OF COMPUTER ENGINEERING
CMPE101: Foundation of Computer Engineering
EXPERIMENT 5

Introduction to C Programming: Selective code structure

Objectives:
1) Understand how to edit, compile and execute C computer codes.
2) Understand C programming: sequential code structure.

Note: Before writing a computer code, you should do the following steps: 1) **understand** and **analyze** the problem, 2) develop an **algorithm** and/or **flowchart** and 3) convert the **algorithm** and/or the **flowchart** into a C **code**.

Task I: Tracing and writing equivalent code segments:
A/ Given the following declarations,

```
float x;
int i,j,k;.
```

what is the output of:

a)
```
i=5; j=2;
if(i=50||j==2)
  printf("%d",i-j);
```

b)
```
i=5; j=2;
if(i==50||j==2)
 printf("%d",i-j);
```

f)
```
i=-1; j=3;
k = ++i&&--j;
printf("i = %d j = %d k = %d\n", i, j, k);
```

g)
```
i=-1; j=3;
k = i++&&--j;
printf("i = %d j = %d k = %d\n", i, j, k);
```

h)
```
i=-1; j=0;
k = i++||--j;
printf("i = %d j = %d k = %d\n", i, j, k);
```

i)
```
i=6;j=1;k=3;
k=i<j<k;
printf("i = %d j = %d k = %d\n", i, j, k);
```

j)
```
j=9;k=2;
i=j%k?++j:++k;
printf("j = %d k = %d\n", j, k);
```

k)
```
i=1, j=3;k=7;
i = (i < j)% j
printf("i = %d j = %d k = %d\n", i, j, k);
```

1) i=1, j=5;k=7;
i=--i && --j || --k
printf("i = %d j = %d k = %d\n", i, j, k);

B/ Given

FebDays =year%4 == 0? 29 : 28;
Re-write this statement using if/else structure.

C/ Given

```
int Digit=70;
scanf("%d",&Digit);
switch (Digit) {
case 0: printf("Zero"); break;
case 1: printf("One"); break;
case 2: printf("Two"); break;
case 3: printf("Three"); break;
case 4: printf("Four"); break;
case 5: printf("Five"); break;
case 6: printf("Six"); break;
case 7: printf("Seven"); break;
case 8: printf("Eight"); break;
case 9: printf("Nine"); break;
default: printf("Not a digit"); break;
}
```

1. Trace the above code for the input: 3
2. Re-write the above switch structure using nested if/else structure.

D/ Given

```
switch(i){
case 0: k+=i;break;
case 1: k*=i;break;
case 2: case 3: k/=i;break;
default: k%=i;
}
```

Re-write using switch statement

Task II: Programming

1) Consider the following code that finds the maximum of two integer numbers:

```
#include<stdio.h>
int main(){
int Num1,Num2,Max;
scanf("%d %d",&Num1,&Num2);
if(Num1 > Num2)
      Max=Num1;
else
      Max=Num2;
Printf("Max=%d",Max);
return 0;}
```

a) Edit, compile and execute this code. Use the following input values for Num1 and Num2: **4, 8**.
b) Modify the given code to read the three numbers and print the maximum one.

A sample run of the program must be as follows:

*** Program to claculate the maximum of three integer numbers ***

Enter the three number: **4, 8, -3**
The maximum number is 8.

2) To calculate the total points of a student in CMPE101 course according to his midterm, lab, and final grades, the following weights are used:

Midterm 40%,
Final 50%,
Lab 10%.

Write a C code that reads the student's midterm, final and lab grades and then computes and prints on the computer monitor his total point. If the total point is greater than or equal 60, then display
You passed
Congratulations
Otherwise, display
You failed
Sorry
A sample run of the program must be as follows:

*** Program to calculate the total point in CMPE110 course ***
Enter your grades in final, midterm, and quiz? **70 85 80**
Your total point is 77.0
You passed
Congratulations
Enter your grades in final, midterm, and quiz? **40 20 30**
Your total point is 29.0
You faild
Sorry

3/ Write a C code that reads two integer numbers and one operator (+, -, *,/), and then perform the required operation.
A sample run of the program must be as follows:

*** Calculator Problem ***
Enter two numbers: **4 3**
Enter one operator: **+**
4 + 3 = 7

Note: If the user enters a wrong operator, then your code should display "wrong operator" as an output.

4) Consider the following quadratic equation:

$$\mathbf{A*X^2 + B*X + C}$$

Then, the roots of this equation can be obtained as

$$\mathbf{X1 = (-B + SQRT(Disc))/(2*A)}$$
$$\mathbf{X2 = (-B - SQRT(Disc))/(2*A)}$$

where the discriminator **(Disc)** is given by

$$\mathbf{Disc = B^2 - 4*A*C}$$

A. Write a C program that will read the value of the inputs A, B, and C, and then check for the following conditions and do the corresponding tasks:

- If **Disc > 0**, then find the roots **X1** and **X2** and then display the result as,
  The roots are different: X1=…….. X2=……
- If **Disc = 0**, then find the roots **X1 and X2** and ten display the results as
  The roots are equal: X1 = X2=…….
- If **Disc <0**, then display the following message: **The roots are imaginary.**

B. Can you write the same code by using switch statement rather than if/else.