Week 2 Lab

Dhaka University of Engineering & Technology, Gazipur

Computer Science and Engineering Department

CSE 1122 (Structured Programming Language Sessional)

These Programs illustrate on Conditional Statements and Loop structures in C Language:

1. Write a program that prints the quadrant number of a point (x,y) on a plane.

   Recall that points in quadrant 1 have positive x and y values, points in quadrant 2 have a negative x value and a positive y value, points in quadrant 3 have negative x and y values, and the remaining points are in the quadrant 4. If a point is on an axis, choose the quadrant with the lower quadrant number. E.g., (4,0) in 1st quadrant; (0,-4) in 3rd quadrant.

2. Write a program that reads a character from the user and then uses a *switch* statement to achieve what the following *if* statement does.

```
if  ((choice == 'A')  || (choice == 'a'))
    printf("Action movie fan\n");
else if  ((choice == 'C')  || (choice == 'c'))
    printf("Comedy movie fan\n");
else if  ((choice == 'D')  || (choice == 'd'))
    printf("Drama movie fan\n");
else
    printf("invalid choice\n");
```

3. Write a program to read in a character repeatedly (using a loop) from the user, and for each input character print a message to say whether the character is a vowel, a consonant, a digit or neither. You may define any character as the sentinel for terminating the loop.

4. Write a program to generate table of currency conversions from US dollars to BDT. Use title and column headings. Assume the conversion rate 1 US$ = 82.6 BDT.
   Allow the user to enter the starting value, ending value and the increment between lines in BDT. The starting value, ending value and the increment are all integer values. **Use do_while** loop to generate the conversion table. End the loop if user gives input -1;

   Sample Input:
   1
   5
   2
   Output:

USD	BDT
1	82.6
3	247.8
5	413

   Test Cases: (1) starting: 1, ending: 5, increment: 1; (2) starting: 0, ending: 50, increment: 5; (3) starting: 50, ending: 0, increment: 5 (treat this case as an error)

5. Write a program to Find GCD/HCF of two Numbers. E.g., GCD of 81 & 153 is 9.

6. Write a program to compute the real roots of a quadratic equation $ax^2 + bx + c = 0$, where *x* represents a variable, and *a*, *b*, and *c* are constants with $a \neq 0$. (If $a = 0$, the equation becomes a linear equation.). The roots are given by the equations:

$$x_1 = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$$

   The program should request for the values of the constant a, b and c and print the values of x_1 and x_2. Use the following rules:

   a. No solution, if both a and b are zero
   b. There is only one root if $b^2 - 4ac = 0$ i.e. $x = -b/2a$
   c. There is no real root, if $b^2 - 4ac$ is negative
   d. Otherwise, there are two real roots

7. The factorial of an integer n, written n! is the product of the consecutive integers 1 through n. For example, factorial of 5 is calculated as 5! = 5 * 4 * 3 * 2 * 1 = 120.Write a program to generate and print a table of the first 10 factorials.

8. Write a C program to print all Prime numbers between 1 to n using loop. How to print all prime numbers between given interval using loop in C program.

   Helpful reading: Sieve of Eratosthenes - GeeksforGeeks

9. Write a program that counts the number of bits set in an integer.
   For example, the number 5 (decimal), which is 101 (binary), has two bits set.

10. Write a program to find the sum of individual digits of a given integer number. Sum of the individual digits means adding all the digits of a number. For a number 2349, sum of digits is 2+3+4+9 = 18.