Lab Assignment

Subject: Programming for problem solving **Discipline: B – Tech (All)**
Subject Code: ES-CS291 **Semester: 2nd**

Assignment – 1

The objective of this assignment is to learn how to write C program using Input/output Function and conditional statements using:

(a) 'if else' condition
(b) 'if else if' condition and how to use logical operators.
(c) 'switch case' statement

Assignment:

The objective of this assignment is to learn how to write C program using Input/output Function and conditional statements using:

a. 'if else' condition
b. 'if else if' condition and how to use logical operators.
(c) 'switch case' statement

Assignment:

1. Write a C program to swap two numbers. (with and without third variable)
   [**Hints:** Swapping is used in various programs like sorting the array. It is mainly used in the area when we want to store old values without using much space.
   Algorithm:
   Using Third variable:
   STEP 1: Declare a variable a,b and c as integer;
   STEP 2: Read two numbers a and b;
   STEP 3: c=a;
   STEP 4: a=b;
   STEP 5: b=a;
   STEP 6: Print a and b
   Without using third variable:
   STEP 1: START
   STEP 2: ENTER A, B
   STEP 3: PRINT A, B
   STEP 4: A = A + B
   STEP 5: B= A - B
   STEP 6: A =A - B
   STEP 7: PRINT A, B
   STEP 8:
   END]
2. Write a C program to check whether a number is even or odd using if-else statement.
   [Hint:
   Algorithm:
   Step 1: Start
   Step 2: Taking input of a number say n
   Step 3: Read the number n
   Step 4: Check if((n%2)==1), then
   Print n is an odd number
   Else
   Print n is an even number
   Step 5: End
3. Write a C program to check whether a year is a leap year or not.
   [Hint:

In the Gregorian calendar, a normal year consists of 365 days. Because the actual length of a sidereal year (the time required for the Earth to revolve once about the Sun) is actually

365.2425 days, a "leap year" of 366 days is used once every four years to eliminate the error caused by three normal (but short) years. Any year that is evenly divisible by 4 is a leap year: for example, 1988, 1992, and 1996 are leap years.
However, there is still a small error that must be accounted for. To eliminate this error, the Gregorian calendar stipulates that a year that is evenly divisible by 100 (for example, 1900) is a leap year only if it is also evenly divisible by 400.
To determine whether a year is a leap year, follow these steps:

1. If the year is evenly divisible by 4, go to step 2. Otherwise, go to step 5.
2. If the year is evenly divisible by 100, go to step 3. Otherwise, go to step 4.
3. If the year is evenly divisible by 400, go to step 4. Otherwise, go to step 5.
4. The year is a leap year (it has 366 days).
5. The year is not a leap year (it has 365 days).]

4. Write a C program to find all roots of a quadratic equation ax^2+bx+c=0 for all possible combinations of a, b and c. A quadratic equation will have two roots which are obtained using the following expression X=(-b±√(b^2-4ac))/2a where b^2-4ac is called discriminate.

Note: When, b^2-4ac>0 roots are real and unequal.
b^2-4ac=0 roots are real and equal i.e.x=-b/2a .
b^2-4ac<0 roots are imaginary i.e.x=-b/2a±(√(b^2-4ac))/2a*i.

[Hint: Quadratic equations are the polynomial equations of degree 2 in one variable of type: $f(x) = ax^2 + bx + c$ where a, b, c, ∈ R and a ≠ 0. It is the general form of a quadratic equation where 'a' is called the leading coefficient and 'c' is called the absolute term of f (x).
A quadratic equation will always have two roots. The nature of roots may be either real or imaginary.
The roots of a quadratic equation are given by the quadratic formula:

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

Step 1. Start
Step 2. Read the coefficients of the equation, a, b and c from the user.
Step 3. Calculate discriminant = (b * b) – (4 * a * c)
Step 4. If discriminant > 0:
4.1: Calculate root1 = (-b + sqrt(discriminant)) / (2 * a)
4.2: Calculate root2 = (-b - sqrt(discriminant)) / (2 * a)
4.3: Display “Roots are real and different”
4.4: Display root1 and root2 Step
Step 5: Else if discriminant = 0:
5.1: Calculate root1 = -b / (2 *a)
5.2: root2 = root1
5.3: Display “Root are real and equal”
5.4: Display root1 and root2
Step 6. Else:
6.1: Calculate real = -b / (2 * a)
6.2:Calculate imaginary = sqrt(-discriminant) / (2 * a)
6.3: Display “Roots are imaginary”
6.4: Display real, “±” , imaginary, “i”
Step 7. Stop]

Lab Assignment

Subject: Programming for problem solving **Discipline: B – Tech (All)**
Subject Code: ES-CS291 **Semester: 2nd**

5. Mr. Sayan Ghosh is an employee of a Private Firm. His Basic is Rs. 5500/-. Now the dearness allowance is 74% of his basic salary and house rent allowance is 15% of basic salary. Write a program to calculate his gross salary. [Though his basic salary is given, do this program where basic is taken through keyboard].

[Hint: Gross salary = Basic + DA + HRA; where Basic is given through keyboard.
DA will be calculated from basic. DA= 74% of Basic
HRA= 15% of Basic]

6. Write a C program to calculate and print electricity bill for consumer @Rs.3.75 per unit, given the following information: previous meter reading and current reading.

[Hint:
Step 1: Two meter reading will be given through the keyboard.
Step 2: Total consumption of electricity can be calculated by the difference of current and previous electricity reading.
Step 3: To calculate electricity bill amount multiply Calculated difference with 3.75.
Step 4: Print the calculated electricity bill.]