**Programming for Problem Solving**

**Lab Assignments Plan**

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| **S.No.** | **Topic** | **No. of Labs** | **Lab Assignment** |
| 1 | Data Type, Expression, Operators: Relational, Logical | 1 | 1. An employee is getting Rs. “B” as basic of salary. Dearness allowance (DA) is 31% of the basic salary. House rent allowance (HRA) is 8% or 16% depends on living city type is non-metro or metro respectively. The employee is also eligible to get 3% of basic as medical insurance premium. Compute the net salary of the employee.  2. The house wall of length “l” and width “w” is need to be tile up with the tiles. There are two types of tiles available; Type 1 having dimension m1 and n1, and Type 2 having dimension “m2” and “n2” as length and width respectively. The cost of one tile of type 1 is Rs. “r1” and type 2 is Rs. “r2”. If the total cost of the tiles is greater than Rs. 30000.00 and less than Rs. 50000.00, a discount of 5% is given. If it’s greater than Rs. 50000.00, 5% more discount is given of the exceeded amount. Compute the total cost of the wall to be tiled up.  3. Four vertices are given as (x1,y1), (x2,y2), (x3,y3) and (x4,y4). Determine whether it is a square or rectangle. Also compute the area of given shape.  4. At the beginning of a journey the reading on a car’s odometer is “S” km and the fuel tank is full. After the reading is “F” km and it takes “L” liters to fill the tank. Write a program to compute the milage of the car. |
| 2 | If else, Loop, Nested loop | 2 | 1.Write a program to generate electricity bill as per following details  i.Unit <=100 charge 0.5 Rs per unit  ii.Unit>100 and <=200 charge 50 + 0.65Rs per unit for more than 100 unit  iii.Unit >200 and <=300 charge 115 Rs + 0.75 Rs per unit for more than 200 unit  iv.Unit >300 and <=500 charge 190 Rs + 0.85 Rs per unit for more than 300 unit  2. Write a program to evaluate following series  S1 = 2+ 4+ 6 + 8 +10………………………..n  S2 = 2 + 4 +8 + 16+ ……………………..n  S3 = n\* ( n-1) \* (n-2)\*…………….1.  3. Write a program to draw following patterns |
| 3 | 1-D, 2-D Array, String | 3 | 1. Write a program to search an element in a given array using linear search and binary search.  2. Write a program to find maximum and minimum value exist in a two dimensional array of size NxN.  3. Write a program to compare the number of vowels and number of consonants occurring in a sentence.  4. Design a program to count the number of words occurring in a sentence and to find the average number of characters in each word. |
| 4 | Function, Recursion, Pointers | 2 | 1. Write a recursive function to generate Fibonacci series up to n terms.  2. Write a recursive procedure to calculate the factorial of given number.  3. Ackermann’s function is defined by :  A(m. n) = n+1 if(m=0)  =A(m-1, 1) if( m!=0 and n=0)  = A(m-1,A(m,n-1)) if ( m!=0 and n!=0)  Write a function that take m and n as input and returns A(m,n). Tabulates the value of A(m,n) for all m in the range 1 to 4 and all n range 1 to 10.  // Program to demonstrate malloc and free function. |
| 5 | Structure and Class | 4 |  |
| 6 | Union and File Handling | 1 |  |