**Problem Solving Methodologies & Programming in C**

**========= Lab Exercise ========**

**1. Printf () Statement.**(1) Print **"Atmiya"**  
(2) Print Your Name On screen.  
(3) Print Address on screen.  
**2. Scanf () statement.**(1) Enter the value of an integer variable and print it on screen.  
(2) Print value of x and check x is less, equal or greater than zero.  
(3) Input two numbers and prints its square and cube.  
(4) Input two numbers and prints its Addition, Subtraction, Multiplication,  
     and Division.  
(5) Verify the formula of Simple Interest.  
(6) Input a Rupee and prints its value converted into Dollar.  
(7) Input a Number of Chairs and its Total Cost and Prints the Cost of Each   
     chair.  
(8) Verify the formula l=(c+d)\*(g+h).  
(9) Verify the formula x=((k-4)\*(a\*4))/100  
(10) verify the formula s=((4\*a+c)-2\*a\*b)/100  
(11) verify the formula a=p\*(1+(r/100)/n)-p  
(12) Verify the formula t=((v+s)+(l-m)\*l)  
(13) Calculate the area of circle.  
(14) Calculate the area of Triangle.  
(15) Verify the formula c= (a+b)\*(a+b)

(16) Write a program to enter two numbers and swap that numbers.

(17) Write a program to find whether year is leap or not.

(18) Write a program to enter any character and determine whether it is Uppercase, Lowercase,

Digit or Special symbol.

**3. If...Else statement:**(1) Enter value and check it is less, equal or greater than zero.  
(2) Input 2 number and print the maximum among them.  
(3) Input 2 number and print the maximum among them. (Without If statement)  
(4) Input 2 number and print the minimum among them.  
(5) Input 2 number and print the minimum among them. (Without If statement)  
(6) Input 3 number and print the maximum among them.  
(7) Input the age of 5 student and print the number of student having age  
      less than or equal to 21 and greater than 21.  
(8) To make the result of class.  
(9) Print & calculate area of circle, area of triangle & (f+g)\*(f+g) &  
     simple interest & exit in one program.  
(10) Print & calculate addition, subtraction, multiplication & division  
      of two value in one program using if() statement.  
(11) Make program of General knowledge test (similar to KBC).  
(12) Input a number & print the number is odd or even.

(13) Get a character in lower case form user and display it in upper case.

(14) Get a character from user and print tell that is it vowel or consonant.

**Make all above programs using switch () statement.**  
Get a character from user and decide is it vowel or consonant. (**Use switch**)

**4. Looping structure (while, do...while, for)**(1) print 1 to 10.  
(2) print 2,4,6,8,10,  
(3) print 1,3,5,7,9,  
(4) print 1,2,4,8,16,32,64,  
(5) print 10 to 1  
(6) print 1,10,2,9,3,8,4,7,5,6,  
(7) print 1,11,20,28,35,41,46,50,53,55,56,  
(8) print first 100 even number.  
(9) Print first 100 odd numbers.  
(10) Print first 50 natural number.  
(11) Print the total of 1 to 50.  
(12) Print the total of 1/2+2/3+....+9/10.  
(13) Print the total of 1-2+3-4+5-6+7-8+9-10.  
(14) Print the total of first 100 even numbers.  
(15) Print the total of first 100 odd numbers.  
(16) 0.1+0.02+0.003+0.0004+0.000005.  
(17) Except one no from user and display Reverse if it.

(18) Except one no from user and display sum of its digits.

(19) Except one no from user and display its factorial.

(20) Except one no from user and find if it is prime or not.

(21) Except one no from user and find if it is Armstrong or not.

(22) Print 0 1 1 2 3 5 8 13 21 34 55 … (Fibonanci series)

**5. Nested looping structure.**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Pattern-I** | | **Pattern-II** | | **Pattern-III** |
| **\* \*\* \*\*\* \*\*\*\* \*\*\*\*\*** | | **\* \*\* \*\*\* \*\*\*\* \*\*\*\*\*** | | **\* \*\* \*\*\* \*\*\*\* \*\*\*\*\*** |
| 12345 12345  12345 12345 12345 | 11111 22222 33333 44444 55555 | | 1  2  3   4   5 2  4  6   8   10 3  6  9   12 15 4  8  12 16  20 5  10 15  20 25 | A A A A A B B B  B B  C C C C C D D D D D E  E E  E E |
| 1 22 333 44444 555555 | 1 12 123 1234 12345 | | 5 54 543 5432 54321 | 1 21 321 4321 54321 |
| 1 2  3 4  5  6 7  8  9  10 1112131415 | 1 01 010 1010 10101 | | 1 10 101 1010 10101 | a b c d e f g h i j k l m n o |
| A bb ccc dddd eeeee | z y  x w v u t   s  r q p  o n m l | | 1 10 100 1000 10000 | 5 45 345 2345 12345 |
| **Implement all above program with Pattern-II & Pattern-III** | | | | |
| 12345 1234 123 12 1 | 12345 2468 369 48 5 | | 54321 5432 543 54 5 | 54321 4321 321 21 1 |
| 12345 2345 345 45 5 | 55555 4444 333 22 1 | | 2 4 6 8 10 4 6 8 10 6 8 10 8 10 10 | a b c d e b c d e c d e d e e |
| **Implement all above program with Pattern-I & Pattern-II** | | | | |

**6. Array**

1. Accept 5 numbers in an array and display it.
2. Accept 10 numbers in an array sort it and display it.
3. Accept 4 numbers in 2-d array.
4. Accept 9 numbers in form of matrix. (3 X 3 matrix)
5. Accept 10 numbers in an array and store it in another array.
6. Accept a string and check whether it is palindrome or not.
7. Accept 10 numbers in an array and find total of positive and negative no.
8. Accept 5 numbers in an array and find maximum and minimum value.
9. Accept 5 numbers in an array and calculate average of it.
10. Accept values in 3 X 4 arrays and find out row total, column total, maximum, minimum and total.

**7. Built in functions**

1. Accept one no and display its absolute value.
2. Accept one no and display its log.
3. Accept one no and display its square root.
4. Get 2 no from user and display base^exp. (2^3=8)
5. Get a string from user and display length of that string.
6. Get a string from user and copy it in another variable.
7. Get two strings from user and compare weather both are same or not.
8. Get a string from user and display reverse of it.
9. Get two strings from user and merge it into first string.
10. Get a string from user and display it in lower case.
11. Get a string from user and display it in upper case.

**8. User Define Function**

1. Create a user define function named **sum** which accept 2 arguments (of integer type) and return the sum of them.
2. Create a user define function named **avg** which pass array as argument (of integer type) and return its average value.
3. Create a user define function named **evenodd** which accept one argument (of integer type) and return if the number is even or odd.
4. Create a user define function named **fact** which accept one argument (of integer type) and return the factorial of given number.
5. Create a user define function named **prime** which accept one argument (of integer type) and display that the no is prime or not. (no need to return value)
6. Create a user define function named **triangle** which accept one argument (of integer type) and display a triangle like.

(If you have given 4 as argument)

1

1 2

1 2 3

1 2 3 4

1. Create a user define function named **power** which accept two arguments (of integer type) (i) base (ii) expon and display the base^expon value.
2. Create a user define function named **Sroot** which accept one argument (of integer type) and display the square root of that no.
3. Create a user define function named **ASCII** which accept one argument (of character type) and display ASCII value of that character.
4. Create a user define function named **CHR** which accept one argument (of integer type) and display character of that ASCII value.

**9. Structure**

1. Create a structure named ***student*** *that* have member variable roll no, name, m1, m2, m3, sum, average, and grade. Program ask for roll no, name, m1, m2, m3 and calculate sum, average and grade.
2. Create a structure named ***EMP*** that have member variables employee no, employee name, basic salary, DA, HRA, TA , PF and Gross Salary.
3. In above structure create an array of structure.