Mahavir Education Trust's
Shah & Anchor Kutchhi Engineering College,
Chembur, Mumbai 400 088

Class: FE SEM-II **Subject: SPA**

Division- All **Year: 2018-2019**

Sr. No	Title
	OPERATORS
1	Write a program to find area and perimeter of a rectangle/Circle.
2	Write a program to calculate the volume of a sphere.
3	Write a program to find square and cube of a number.
4	Write a problem to convert a given temperature in Celsius to Fahrenheit by using formula. F = 1.8 * Celsius + 32
5	Rajesh's basic salary is input through the keyboard. His dearness allowance is 40% of basic salary and house rent allowance is 20% of basic salary. Write a program to calculate his grass salary.
6	Write a program to interchange the value of the two variables without using third variable.
7	Write a program to rotate the content of three variables without using fourth variable.
8	Write a program that converts inches to centimeters. For example, if user enters 16.9 for a length in inches, the output would be 42.926 cm (One inch equals 2.54 centimeter).
9	Write a program to exchange the digits of a two digit number.
10	Write a program to accept a 4 digit number and display sun of digits and reverse of a number.
11	Write a program to accept a 4 digit number and to check whether it is perfect square number or not.
12	Write a program to accept a number and to check whether it is even or odd number.
14	Write a program to display absolute value of an entered number using conditional operator.
15	Write a program to find maximum of three numbers using conditional operator.
	Control Structures
1	WAP to display absolute value on an entered number.
2	WAP to check whether an entered number is even or odd.
3	WAP to check whether entered number is divisible by 3 and 5 or not.
4	WAP to calculate (a/b)+(c/d), display proper message if denominator is zero.
5	WAP to accept a 4 digit number and to check whether it is perfect square number or not.
6	Write a program to accept a year as input and printout if it is a leap year. The Leap year is basically : 1. A year is a leap year if it is divisible by 4 but not by 100. 2. If a year is divisible by both 4 and by 100, then it can only be a leap year if it is also divisible by 400.
7	WAP to find largest of three numbers.
8	WAP to find smallest of three numbers.
9	WAP to find the value of Y for a particular value of K. If K=1 Y= a x +b

	K=2 $Y= ax^2+b^2$ K=3 Y= - ax K=4 Y= a+x Accept values of a, x, b and K from user.
10	WAP to calculate value of f(x), if x has different ranges of values as below f(x) = x2+2 0<=x<=10 = x2+2x 10<x<=20 = x3+2x2 20<x<=30 = 0 x>30
11	An electric power distribution company charges its domestic customers as follows. **Consumption units** **Rate of charges** up to 30 units Rs. 0.75 per unit 31 to 100 units Rs. 2.50 per unit 101 to 301 units Rs. 3.00 per unit Above 301 units Rs. 4.60 per unit WAP to read customer number and number of units consumed. Compute charges.
12	An electric power distribution company charges its domestic consumers as follows: Consumption Units Rate of Charge 0 – 200 Rs. 0.50 per unit 201 – 400 Rs. 100 plus Rs.0.65 per unit excess of 200 401 – 600 Rs. 230 plus Rs.0.80 per unit excess of 400 601 and above Rs. 390 plus Rs.1.00 per unit excess of 600 Write a program that reads the customer number and power consumed and prints the amount to be paid by the customer.
13	Write a program to grade the students in an academic institution. The grading is done according to the following rules. Average marks Grade 80 to 100 Honours 60 to 79 First Division 50 to 59 Second Division 40 to 49 Third Division 0 to 39 Fail
14	A cloth showroom has announced the following seasonal discounts on purchase of items: Purchase Amount | (Handloom items) Discount 0-100 | 5% 101-200 | 7.5% 201-300 | 10.0% Above 300 | 15.0% Write a Program using else if ladder to compute the net amount to be paid by a customer.
15	WAP to find all the roots of Quadratic equation.
16	WAP to accept number of the month and to display name of the month.
17	WAP to accept number of the day and to display name of the day.

18	WAP to accept one digit number and to display that number in word.
19	WAP to simulate simple arithmetic calculator using switch-case.
20	Write a menu driven program to calculate area of different geometric objects (Circle, Triangle, Rectangle, and Square).
21	Write a menu driven program to read a double-type value x and a character type variable M that represents the type of mathematical function and display the value of (a) ceil(x), if c or C is assigned to M, (b) floor(x), if f or F is assigned to M, (c) sqrt(x), if s or S is assigned to M, (d) log(x), if l or L is assigned to M, (e) fabs(x), if a or A is assigned to M, using switch statement.
22	WAP to find sum of the digits of a given number.
23	WAP to find reverse of a given number.
24	WAP to check whether an entered number is palindrome or not.
25	WAP to check whether an entered number is Armstrong number or not.
26	WAP to find GCD and LCM of two numbers.
27	WAP to display table of the given number.
28	WAP to calculate factorial of the given number.
29	WAP to calculate power of a number(x raised to n), accept value of x and n from user.
30	WAP to check prime property of a given number.
31	WAP to display first 'n' terms of a Fibonacci series.
32	Write a program to calculate and display the following series value after accepting value of n. 1+ ½! - ⅓! + ¼! -.....+ 1/n!
33	Write a program to calculate sum of the series 1/2 – 3/4 + 5/6 – 7/8 +..... upto n terms
34	Write a program to compute the value of Euler's number e that is used as the base of natural logarithms. Use the following formula. e = 1 + 1/1! + 1/2! + 1/3! + ... + 1/n!
35	WAP to calculate sum of series ½+3/4+5/6+..... upto n terms.
36	WAP to display all Armstrong numbers between 100 and 999.
37	WAP to display all Palindrome numbers between 100 and 999.
38	WAP to display all Prime numbers between X1 and X2. Accept value of X1 and X2 from user.
39	WAP to display all factors of a given number.
40	WAP to display all possible combination of 1, 2 and 3.
41	WAP to display all possible combination of 1, 2 and 3 without repeating character in combination.
42	WAP to display all possible combination of A, B and C.

<table>
<tr><td>43</td><td>WAP to display all possible combination of A, B and C without repeating character in combination.</td></tr>
<tr><td>44</td><td>WAP to display following patterns
<table>
<tr><td>1
12
123
1234</td><td>1
22
333
4444</td><td>*
**
***
****</td><td>****
***
**
</td><td>
**
****
******</td><td>1234
123
12
1</td><td>4321
321
21
1</td><td>1
121
12321
1234321</td><td>ABCD
ABC
AB
A</td><td>A
ABA
ABCBA
ABCDCBA</td><td>ABCDCBA
ABCBA
ABA
A</td></tr>
<tr><td>1
23
456
78910</td><td>1
01
101
0101</td><td>0
101
21012
3210123</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr>
</table></td></tr>
<tr><td>45</td><td>WAP to find sum of digits, reducing it to one digit number.</td></tr>
<tr><td>46</td><td>WAP which will accept and display only positive number.</td></tr>
<tr><td colspan="2">Arrays</td></tr>
<tr><td>1</td><td>WAP to find largest and smallest element of one dimensional array.</td></tr>
<tr><td>2</td><td>WAP to find sum of even and odd elements present in an array of n elements.</td></tr>
<tr><td>3</td><td>WAP to accept and sort ‘n’ elements of an array in ascending order.</td></tr>
<tr><td>4</td><td>WAP to find largest and second largest element of an array.</td></tr>
<tr><td>5</td><td>WAP to find binary equivalent of a given decimal number.</td></tr>
<tr><td>6</td><td>WAP to find octal equivalent of a given decimal number.</td></tr>
<tr><td>7</td><td>WAP to search a given element in an array.</td></tr>
<tr><td>8</td><td>WAP to search and display position of a given element in an array.</td></tr>
<tr><td>9</td><td>WAP to rotate the content of an array.</td></tr>
<tr><td>10</td><td>WAP to calculate standard deviation of n items by using following formulae.
sd= sqrt(variance)
$variance = 1/n \sum_{i=1}^{n} (x\,i - m)(x\,i - m)$
$mean = m = 1/n \sum_{i=1}^{n} (x\,i)$</td></tr>
<tr><td>11</td><td>WAP for fitting a straight line through a set of points (xi,yi),i=1,2,3,.....n. The straight line equation is y=mx+c and the values of m and c are given by
$m = \frac{n\sum(xiyi) - (\sum xi)(\sum yi)}{n(\sum xi^2) - (\sum xi)^2}$
$C = \frac{1}{n}(\sum yi - m\sum xi)$</td></tr>
<tr><td>12</td><td>WAP to find sum of elements of an array of size m*n.</td></tr>
<tr><td>13</td><td>WAP to find trace of square matrix.</td></tr>
</table>

14	WAP to calculate sum of elements present on, above and below diagonal of square matrix.
15	WAP to check whether square matrix is symmetric or not.
16	WAP to find transpose of a square matrix using only one matrix.
17	WAP to find transpose of a square matrix using two matrices.
18	WAP to find multiplication on two M*N matrices.
19	Write a program that queries a user for the no. of rows and columns representing students and their marks. Read data row by row and display the data in tabular form along with the row totals, column totals and grand totals. E.g 1 3 6 | 10 7 9 8 | 24 8 12 14 | 34
20	Write a program to compute and print a multiplication table for numbers 1 to 5 as given below . 1 2 3 4 5 1 1 2 3 4 5 2 2 4 6 8 10 3 3 6 9 12 15 4 4 8 12 16 20 5 5 10 15 20 25
21	WAP to except a string and display its length without using standard library function.
22	WAP to accept a string, copy it into another string and display this new string.
23	WAP to accept two strings, compare them and display if they are equal or not. If they are not equal display the one which is greater.
24	WAP to accept two strings, join them and display the result.
25	Write a program to accept lower case string from user and convert it to upper case. E.g all the best --- ALL THE BEST
26	WAP to accept a string and find the number of Vowels in it.
27	WAP to reverse the user entered string.
28	WAP to check whether the entered string is palindrome or not.
Function	
1	WAP to find factorial of given number using function.
3	WAP to find out the value of ${}^{n}P_{r}$ (permutation) using a function.
4	WAP to find GCD and LCM of two numbers, using function.

5	WAP to find value of Y using function, where $Y=X^n$.
6	WAP using function to check if the entered number is prime number or not.
7	WAP to find factorial of a given number, using recursive function.
	Write a program which will accept two numbers, n and r and calculate value of ${}^nC_r = n! / r!(n-r)!$. Program should make use of recursion.
8	WAP to find n Fibonacci elements, using a recursive function.
9	WAP to find GCD of two natural numbers using Euclid's Algorithm: GCD(m, n)=GCD(n, m) if n>m = m if n=0 = GCD(n, m%n) otherwise
10	Write a program using recursive function 'power' to compute x^n pow (x,n)=1 if n=0 pow(x,n)=x if n=1 pow(x,n)=x*pow(x,n-1) otherwise
	Write a program to find a sum of first n natural numbers using recursion.
	Write a program to read an array of 'n' elements and find the largest and second largest element of an array using functions.
	Write a program to find the largest element from 2D array using user define function.
	WAP to calculate and display sum of all the elements except diagonal elements of the matrix using function.
	Write a program which contain the functions to do the following: a) To read elements of two MXN matrices b) To multiply two matrices c) To display elements of the resultant matrix
	Character Array & Function
11	Write a function to find the last occurrence of a character in a given string.
12	WAP to extract 'n' characters from a given string, starting from m^{th} position, using function.
13	WAP to calculate the frequency of a given character in a string using function.
	WAP to concatenate first, middle and last name using user defined function.(without using any library function)
	Pointers
	Write a program to swap two numbers using call-by-reference method.
	Given a list of 'n' elements, Write a program to find the sum of all elements of an array using pointers.
	WAP using pointers to display the content of an array in reverse order.
	Write a program to display sum of all even and odd elements of an array using array and pointers.
	Structure
	A Hospital needs to maintain details of patients. Details to be maintained are First name, Middle name, Surname, Date of Birth, Disease. Write a program which will print the list of all patients with given disease.
	Define a structure called Player with data members Player name, team name, batting average

	Create array of objects, store information about players, Sort and display information of players in descending order of batting average.
	Write a program to design a structure named employee to print names and nos. of employee who have 5 years or more experience and salary less than Rs. 10,000 using array of structure (Name, No, Experience and salary as member).
	Define a structure "Hockey" consisting of following elements. i) Player name ii) Name of the country iii) Number of matches played iv) Number of goal scored Write a program to read record of 'N' players and to prepare following list: i) List prepared according to players name. ii) List prepared according to country name iii) List prepared according to number of matches played List prepared according to number of goals scored.
	Files
	WAP to copy the contents of one file to another file
	Write a program to create a text file and count and display the number of letters, digits, blank spaces and special characters.
	Write a program to accept a set of characters from user until the user presses the full stop (.) and store it in a text file. Read from the file and display the same from the file.