**MPVM Ganga Gurukulam**

***Important Questions***

**ARRAYS & DATA STRUCTURES**

*An array is a simple data structure which can be used to store more than one values of same data type. Memory allocation for array is continuous. Whenever we have to solve the single dimensional array problem we have to draw the diagram of the array with any name say x, as shown below. Based on the above diagram we can easily identify the position of each item in the array and can be able to make necessary logic as per the question given.*

1 Write a function in C++, which accepts an integer array and its size as parameters and rearrange the array in reverse. Example if an array of five members initially contains the elements as 6,7,8,13,9,19 Then the function should rearrange the array as 19,9,13,8,7,6

2 Write a function in C++, which accept an integer array and its size as arguments and swap the elements of every even location with its following odd location. Example : if an array of nine elements initially contains the elements as 2,4,1,6,5,7,9,23,10 Then the function should rearrange the array as 4,2,6,1,7,5,23,9,10

3 Write a function in C++ which accepts an integer array and its size as arguments and replaces elements having odd values with thrice and elements having even values with twice its value. Example : If an array of five elements initially contains the elements 3,4,5,16,9 Then the function should rearrange the content of the array as 9,8,15,32,27

4 Write a function in C++ which accepts an integer array and its size as arguments and replaces elements having even values with its half and elements having odd values with twice its value

5 Write a function in C++ which accepts an integer array and its size as argument and exchanges the value of first half side elements with the second half side elements of the array. Example : If an array of eight elements has initial content as 2,4,1,6,7,9,23,10 The function should rearrange the array as 7,9,23,10,2,4,1,6. X[0] X[1] X[2] X[3] X[4] X[5] X[6] X[7] X[8] 79

6 Write a function in c++ to find and display the sum of each row and each column of 2 dimensional array. Use the array and its size as parameters with int as the data type of the array.

7 Write function SORTPOINTS() in c++ to sort an array of structure Game in descending order of points using Bubble Sort Note: Assume the following definition of structure Game struct Game { long PNo; // Player Number char PName[20]; long points; };

8 Write a c++ function to shift all the negative numbers to left and positive number in the right side.

9 Define a function SWPCOL() in C++ to swap ( interchange) the first column elements with the last column elements, for a two dimensional array passed as the argument of the function. Example : if the two dimensional array contains 2 1 4 9 1 3 7 7 5 8 6 3 7 2 1 2 After swapping of the content of 1st and last column, it should be 9 1 4 2 7 3 7 1 3 8 6 5 2 2 1 7

10 Define a function SWPROW() in C++ to swap ( interchange) the first row elements with the last row elements, for a two dimensional array passed as the argument of the function. Example : if the two dimensional array contains 2 1 4 9 1 3 7 7 5 8 6 3 7 2 1 2 After swapping of the content of the array will be 80 7 2 1 2 5 8 6 3 1 3 7 7 2 1 4 9

11 Write a function in C++ to print the product of each column of a 2D integer array passed as the argument of the function Example : if the two dimensional array contains 2 1 4 9 1 3 7 7 5 8 6 3 7 2 1 2 Then the output should appears as Product of Column1 = 70 Product Column2 = 48 Product of column3= 168 Product of Column4=378

12 Write a function in C++ to print the product of each row of a 2D integer array passed as the argument of the function Example : if the two dimensional array contains 2 1 4 9 1 3 7 7 5 8 6 3 7 2 1 2 Then the output should appears as Product of Row1 = 72 Product Row2 = 147 Product of Row3= 720 Product of Row4=28

13. Write a function which accept 2D array of integers and its size as arguments and displays the sum of elements which lie on diagonals. [Assuming the 2D array to be a square matrix with odd dimension ie 3 x 3 , 4 x 4 etc ] Example of the array content is 5 4 3 6 7 8 1 2 9 Output through the function should be Diagonal One Sum : 21 Diagonal Two: 11 81

14. Write a function in C++ which accepts a 2D array of integers and its size as arguments and displays the elements of middle row and the elements of middle column. [Assuming the 2D array to be a square matrix with odd dimension ie 3 x 3 , 5 x 5, 7 x 7 etc ] Example of the array content is 5 4 3 6 7 8 1 2 9 Output through the function should be Middle row: 6 7 9 Middle Column 4 7 2

15. Write a function in C++ which accepts an integer array and its size as arguments and assign the elements into a two dimensional array of integers in the following format If the array is 1,2,3,4,5,6 if the array is 1,2,3 The resultant 2D array is The resultant 2D array is 1 2 3 4 5 6 1 2 3 1 2 3 4 5 0 1 2 0 1 2 3 4 0 0 1 0 0 1 2 3 0 0 0 1 2 0 0 0 0 1 0 0 0 0 0

16. Write a function in C++ which accepts an integer array and its size as arguments and assign the elements into a two dimensional array of integers in the following format If the array is 1,2,3,4,5,6 if the array is 1,2,3 The resultant 2D array is The resultant 2D array is 1 2 3 4 5 6 1 2 3 0 1 2 3 4 5 0 1 2 0 0 1 2 3 4 0 0 1 0 0 0 1 2 3 0 0 0 0 1 2 0 0 0 0 0 1

17. Write a function in C++ which accepts an integer array and its size as arguments and assign the elements into a two dimensional array of integers in the following format If the array is 1,2,3,4,5,6 if the array is 1,2,3 The resultant 2D array is The resultant 2D array is 1 0 0 0 0 0 1 0 0 82 1 2 0 0 0 0 1 2 0 1 2 3 0 0 0 1 2 3 1 2 3 4 0 0 1 2 3 4 5 0 1 2 3 4 5 6

18. Write a user defined function named upperhalf() which takes a 2D array A, with size n rows and n cols as arguments and print the upper half of the matrix. Example 1 2 3 1 2 3 6 7 8 7 8 2 3 4 4

19. Write a user defined function lowerhalf() which takes a 2D array, with size n rows and n cols as argument and prints the lower half of the matrix Eg:- 1 2 3 1 5 6 7 5 6 9 1 2 9 1 2

20 Write the function to find the largest and second largest number from a two dimensional array. The function should accept the array and its size as argument.

21 Write a function in C++ to merge the contents of two sorted arrays A & B into third array C. Assuming array A is sorted in ascending order, B is sorted in descending order, the resultant array is required to be in ascending order.

**Linked List, Stack, Queue**

1 Write a function in C++ to perform a PUSH operation in a dynamically allocated stack considering the following:

struct node { int x,y; Node \*Link; };

2 Write a function in C++ to perform a DELETE operation in a dynamically allocated queue considering the following description:

struct Node { float U,V; Node \*Link; };

class QUEUE

{ Node \*Rear, \*Front;

public: QUEUE( )

{ Rear =NULL; Front= NULL;}

 void INSERT ( );

void DELETE ( );

~QUEUE ( );

};

 3 Write a function in C++ to perform a PUSH operation in a dynamically allocated stack considering the following :

struct Node

{ int X,Y; Node \*Link; };

class STACK

{ Node \* Top;

public: STACK( )

{ TOP=NULL;}

void PUSH( );

void POP( );

~STACK( );

};

 4 Define function stackpush( ) to insert nodes and stackpop( ) to delete nodes, for a linked list implemented stack having the following structure for each node:

struct Node

{ char name[20];

int age;

Node \*Link;

};

class STACK

{ Node \* Top;

public: STACK( )

{ TOP=NULL;}

void stackpush( );

void stackpop( );

~STACK( ); };

5. Write a function in C++ to delete a node containing customer’s information, from a dynamically allocated Queue of Customers implemented with the help of the following structure:

struct Customer

{

int CNo;

char CName[20];

Customer \*Link;

};

6. Write a function in C++ to delete a node containing Book’s information, from a dynamically allocated Stack of Books implemented with the help of the following structure.

struct Book

{

int BNo;

char BName[20];

Book \*Next;

};