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CHENNAI
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3 MARKS QUESTIONS : DATA STRUCTURE

1. Write a function in C++ which accepts an integer array and its size as arguments and change all the even number with twice and odd with thrice. Example: if an array of five elements initially contains the element as
2,4,1,5,7
then the function should rearrange the array as
4,8,3,15,21
2. Write a function in C++ which accepts an integer array and its size as arguments/parameters and assign the elements into a two dimensional array of integer in the following format:
3
if the array is 1,2,3,4,5,6
the resultant 2D array is given below
given below
1 2 3 4 5 6
1 2 3 4 5 0
1 2 3 4 0 0
1 2 3 0 0 0
1 2 0 0 0 0
1 0 0 0 0 0
if the array is 1,2,3
the resultant 2D array is
1 2 3
1 2 0
1 0 0
3. Write a function in C++ which accepts an integer array and its size as arguments/parameters and then assigns the elements into a two dimensional array of integers in the following format:
(3)
If the array is 1, 2, 3, 4, 5, 6
The resultant 2 D array is given below
0 0 0 0 0 1
0 0 0 0 2 1
0 0 0 3 2 1
0 0 4 3 2 1
0 5 4 3 2 1
6 5 4 3 2 1
If the array is 1, 2, 3
The resultant 2 D array is given below
0 0 1
0 2 1
3 2 1
5. Write a C++ function RevDup(int [], int) to remove the duplicate occurrence of the value Present in an integer array, passed to the function as a parameter.
For e.g. If array initially is X[] = { 1,1,1,7,5,2,2,6}
After removing duplicate values the array will be X {} = {1, 7, 5, 2, 6}
6. Assume an array containing elements of structure Employee is required to be arranged in descending order of Salary. Write a C++ function to arrange the same with the help of bubble sort, array and its size is required to be passed as

parameter to the function. Definition of Structure Employee is as follows:

```
struct Employee
{
    int ENo;    char Ename[25];    float Salary;
};
```

7. Write a function in C++ which accepts a character array and its size as arguments and reverse that array without using second array and library function.

Example : if the array is having: "Computer Science"
Then after reversal it should be rearranged as: "ecneicS retupmoC"

8. WAP that accept an array of 10 integers with size. The function finds a particular number from the array by using the binary search method
9. Write a function in C++ which accepts an integer array and its size as arguments/parameters and assigns the elements in to two dimensional array of integers in the following format: **4**

If the array is **1,2,3,4,5,6**, then the resultant 2D array should be :

```
1 2 3 4 5 6
1 2 3 4 0 0
1 2 3 0 0 0
1 2 0 0 0 0
1 0 0 0 0 0
1 0 0 0 0 0
```

10. Suppose A,B,C are arrays of size m,n,m+n respectively. Array A is stored in ascending order and array B is in descending order. Write a function to receive 3 arrays and their sizes to store the elements of A and B into C in descending order.
11. Write a user defined function to sort the array (same as above) using insertion sort in descending order. Give the array status after each iteration
12. Write a user defined function to sort the array (same as above) using bubble sort in descending order. Give array status after each iteration
13. Using a two dimensional A[n x n], write a function to prepare one dimensional array Array[n²] that will have all the elements of A as if they were stored in Column major order.
14. Write a function to search for a given number in a given array ARR[n] using linear search technique. If the number is found, move it at the top of the array. If the number is not found, insert it at the end of the array.
15. What would be the output of the following? Assume that the array starts at location 5700 in the memory?

```
#include<iostream.h>
void main()
{
    int ab[3][4]={ 5,6,7,8,1,2,3,4,9,10,0,11};
    cout<<"\n"<<*ab[0]<<" "<<*(tab[0]+1);
    cout<<"\n"<<*(ab+0)+1);
}
```

16. Write a function that reads 10 integers into the array A. Use another integer array P of same size to store each index of the array A in the following way: The index of the first smallest element in A is stored at index 0 of P, the index of the next smallest element in A is stored at index 1 of P and so on. Print the next smallest element in A ordered in the sequence given by each succeeding index stored in P.

17. Write a user defined function to sort the given array using Selection sort mechanism.
 $\text{int A[]} = \{10, 14, 126, 23, 26, 33, 44, 48, 50, 55, 60, 66\};$
 Print array after each iteration.
18. Write a user defined function to search for 55 and 23 in the following array.
 10, 14, 126, 23, 26, 33, 44, 48, 50, 55, 60, 66 Make use of binary search method.

4 MARKS QUESTIONS : DATA STRUCTURE

1. An array $A[40][10]$ is stored in the memory along the column with each element occupying 4 bytes. Find out the Base address and address of the element $A[3][6]$ if the element $A[30][10]$ is stored at the address 9000.
2. Given two dimensional array $A[10][20]$, base address of A being 100 and width of each element is 4 bytes, find the location of $A[8][15]$ when the array is stored as *a) column wise* *Row wise*.
3. An array $M[-3 \dots 18][-8 \dots 37]$ is stored in the memory along the column with each of its elements occupying 8 bytes. Find out the base address and the address of an element $M[2][5]$, if the element $M[5][10]$ is stored at address 4000
4. An array $P[10][10]$ is stored in the memory along the column with each element occupying 2 bytes of storage, find out the base address and address of the location $P[5][5]$, if the element $P[2][2]$ is stored at the memory location at 1000.
5. An array $A[-2 \dots 8][-2 \dots 5]$ is stored in the memory along the column with each element occupying 4 bytes. Find out the address of the element $A[3][2]$.
6. If an array $B[11][8]$ is stored as column wise and $B[2][2]$ is stored at 1024 and $B[3][3]$ at 1084. Find out the base address, size of an element and address of $B[5][3]$.
7. An array $Arr[35][15]$ is stored in the memory along the row with each of its element occupying 4 bytes. Find out the base address and the address of an element $Arr[20][5]$, if the location $Arr[2][2]$ is stored at the address 3000.

2 Mark Questions : Linked List, Stack, Queue

1. Convert the following infix expressions to postfix expressions
 1. $A + (B * C) ^ D - (E / F - G)$
 2. $A * B / C * D ^ E * G / H$
 3. $((A*B)-((C_D)*E/F)*G$
 4. $A+B/(P+Q)^C/D-E/F$
 5. $A+B/C*D+F*G$
 6. $A+B-A/(B*(A-B-A*D)^B)$
 7. $(B+(C+D)*(E+F)/G)/H$
 8. $A*(B/C)/D-E-(F+G/H)$
 9. $(TRUE \parallel FALSE) \&\& ! (FALSE \parallel TRUE)$
 10. $(A / B + C) / D + E / (F + G * H / I)$
 11. $A \text{ OR NOT } B \text{ AND } C$

12. $((ax/by - a/b) - dx/fx) + a + b$
13. $((b - (c*d - e) + f) / g) + (h*j + x)$
14. $A + (((B*C) * (D+E) + F*G)^{(H-J)})$
15. $(A-B) * (C / (D-E) + F - G)$

2. Evaluate the following postfix expression E given below, show the contents of the stack during the evaluation

1. E = 5, 9, +, 2, /, 4, 1, 1, 3, -, *, +
2. E = 80, 35, 20, -, 25, 5, +, -, *
3. E = 30, 5, 2, ^, 12, 6, /, +, -
4. E = 15, 3, 2, +, /, 7, +, 2, *
5. E = 25, 8, 3, -, / 6, *, 10 +
6. E = 8, 7, -, 9, 8, *, -, 2, /, 3, 4, * 2, / -
7. E = 5, 20, 15, -, *, 25, 2, *, -
8. IF A=2, C=3, D=2, E=5, F=4, G=6 then EFG^D+AC/- +
9. E = 10, +, 15, *, 25, 5, /, 2+
10. E = 7, 6, 2, /, +, 18, -
11. E = AB - CD + E * + WHERE A = 5, B = 3, C = 5, D = 4 AND E = 2
12. E = 7, 6, +, 8, *, 2, -, 3, *, 2, 4, *, -

