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1 Write a function in C++, which accepts an integer array and its size as parameters and rearranges the array in descending order.

Example: If an array of nine elements initially contains the elements as

4 2 5 1 6 7 8 12 10

Then the function should rearrange the array as

12 10 8 7 6 5 4 2 1

Ans.

#include<iostream.h>

#include<conio.h>

void select\_sort(int a[ ], int n)

{

int i, j, p,large;

for(i=0;i<n-1;i++)

{

large=a[i];

p=i;

for(j=i+1; j<n; j++)

{

if(a[j]>large)

{

large=a[j];

p=j;

}

}

a[p]=a[i];

a[i]=large;

}

}

void main()

{

int a[9]={4,2,5,1,6,7,8,12,10};

int n=0;

int i=0;

clrscr();

n=sizeof a/sizeof(int); //total size of array/size of array data type

cout<<n;

cout<<"\n Original array is :\n";

for(i=0;i<n;i++)

cout<<a[i]<<", ";

select\_sort(a,n);

cout<<"\nThe sorted array is:\n";

for(i=0; i<n; i++)

cout<<a[i]<<", ";

getch();

}

2 An array Arr[40][10] is store in the memory along the column with each element occupying 4 bytes. Find out the base address of the location Arr[3][6] if the location Arr[30][10] is stored at the address 9000.

Ans.

Given Data: Aray[40][10] W=4 B=? R=40 C=10 Lr = 0 Lc = 0

Address of Array [3][6] =?

Address of Array[30][10] =9000.

Address of an element (I,J) in column major =B + W ( (I-Lr) + R(J-Lc ) )

Therefore 9000=B+4\*((30-0)+40(10-0))

9000=B+4\*(30+40\*10)

9000 =B+4\*430

9000=B+1720

B =9000-1720

B =7280

Therefore Address of Array[3][6]=7280+4\*((3-0)+40(6-0))

=7280+4\*(3+40\*6)

=7280+4\*243

=7280+972

=8252

3 Write a function in C++ to print the product of each column of a two dimensional array passed as the arguments of the function.

Example: If the two dimensional array contains Q3

Then the output should appear as:

Product of Column 1 = 24

Product of Column 2 = 30

Product of Column 3 =240

Ans.

#include<conio.h>

#include<iostream.h>

void colProduct(int arr[4][3],int r,int c)

{

int arr2[3];

for(int i=0;i<c;i++) //loop for column

{

arr2[i]=1;

for(int j=0;j<r;j++) //loop for rows

arr2[i] \*= arr[j][i];

cout<<"Product of Column "<<i+1<<"= "<<arr2[i]<<endl;

}

}

void main()

{

int arr[4][3]={{1,2,4},{3,5,6},{4,3,2},{2,1,5}};

clrscr();

colProduct(arr,4,3);

getch();

}

4 Write a function in C++, which accepts 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

Ans.

#include<conio.h>

#include<iostream.h>

void swapElement(int arr[ ], int no)

{

int temp;

for(int i=0;i<no-1;i+=2)

{

temp=arr[i];

arr[i]=arr[i+1];

arr[i+1]=temp;

}

cout<<"\nThe elements after completed the alterations";

for(i=0;i<no;i++)

cout<<arr[i]<<" ";

}

void main()

{

int arr[9]={2,4,1,6,5,7,9,23,10};

clrscr();

swapElement(arr,9);

getch();

}

5 An array Arr[50][10] is store in the memory along the row with each element occupying 2 bytes. Find out the Base address of the location Arr[20][50], if the location Arr[10][25] is stored at the address 10000.

Ans.

This question was misprinted and was controversial.

Which one will be correct –

(i) in place of Arr[50][10] it shall be Arr[50][100]

Or

(ii) in place of location Arr[20][50], if the location Arr[10][25]

it shall be be location Arr[20][5], if the location Arr[10][2]

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6 Write a function in C++ to print the product of each row of a two dimensional array passed as the arguments of the function Example: if the two dimensional array contains Q6

Then the output should appear as:

Product of Row 1 = 8000

Product of Row 2 = 6000

Product of Row 3 =3600

Product of Row 4 = 2400

Ans.

#include<conio.h>

#include<iostream.h>

void rowProduct(int arr[4][3],int r,int c)

{

long arr2[4];

for(int i=0;i<r;i++)

{

arr2[i]=1;

for(int j=0;j<c;j++)

{

arr2[i] \*= arr[i][j];

}

cout<<"Product of Row "<<i+1<<"= "<<arr2[i]<<endl;

}

}

void main()

{

int arr[4][3]={{20,40,10},{40,50,30},{60,30,20},{40,20,30}};

clrscr();

rowProduct(arr,4,3);

getch();

}

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

Example : if an array of five elements initially contains elements as

3 4 5 16 9

The the function should rearrange the content of the array as

9 8 75 32 27

Ans.

#include<conio.h>

#include<iostream.h>

void manipulate(int a[],int size)

{

for(int i=0;i<size;i++)

{

if (a[i]%2==1)

a[i]=a[i]\*3;

else

a[i]=a[i]\*2;

cout<<a[i]<<',';}

}

void main()

{

int a[5]={2,3,4,5,6};

clrscr();

manipulate(a,5);

getch();

}

8 An array Array[20][15] is stored in the memory along the column with each element occupying 8 bytes. Find out the base address of the element Array[2][3] if the element Array[4][5] is stored at the address 1000.

Ans.

Given Data: Aray[20][15] W=8 B=? R=20 C=15 Lr=0 Lc=0

Address of Array [2][3] =?

Address of Array[4][5] =1000.

Address of an element(I,J) in column major=B+W((I-Lr)+R(J-Lc))

Therefore 1000=B+8\*((4-0)+20(5-0))

1000=B+8\*(4+20\*5)

1000 =B+8\*104

1000=B+832

B=1000-832

B=168

Therefore Address of Array[2][3]=168+8\*((2-0)+20(3-0))

=168+8\*(2+20\*3)

=168+8\*62

=168+496

=664

9 Write a function in C++ which accepts a 2D array of integers and its size as arguments and displays the elements which lie on diagonals. [Assuming the 2D Array to be a square matrix with odd dimension i.e., 3x3, 5x5, 7x7 etc…]

Example: if the array content is

5 4 3

6 7 8

1 2 9

Output through the function should be :

Diagonal One : 5 7 9

Diagonal Two : 3 7 1

Ans.

#include<conio.h>

#include<iostream.h>

void diag(int a[3][3],int size)

{

cout<<"First Diagonal:";

for (int i=0;i<size;i++)

for(int j=0;j<size;j++)

if(i==j)

cout<<a[i][j]<<" ";

cout<<"\n Second Diagonal:";

for(i=0;i<size;i++)

for(j=0;j<size;j++)

if((i+j)==(size-1))

cout<<a[i][j]<<" ";

}

void main()

{

int a[3][3]={{5,4,3},{6,7,8},{1,2,9}};

clrscr();

diag(a,3);

getch();

}

10 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 .

Example : If an array of five elements initially contains the elements as

3 4 5 16 9

then the function should rearrange content of the array as

6 2 10 8 18

Ans.

#include<conio.h>

#include<iostream.h>

void accept(int a[ ],int size)

{

for (int i=0;i<size;i++)

{

if(a[i]%2==0)

a[i]=a[i]/2;

else

a[i]=a[i]\*2;

cout<<a[i]<<',';

}

}

void main()

{

int a[5]={3,4,5,16,9};

clrscr();

accept(a,5);

getch();

}

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11 An array Arr[15][20] is stored in the memory along the row with each element occupying 4 bytes. Find out the Base address of the location Arr[3][2], if the location Arr[5][2] is stored at the address 1500.

Ans.

Given Data: Arr[15][20] W=4 B=? R=15 C=20 Lr =0 Lc =0

Address of Arr[3][2] = ?

Address of Arr[5][2] = 1500.

Address of an element(I,J)in row major=B+W(C(I-Lr)+(J-Lc))

Therefore, 1500 = B+4(20(5-0)+(2-0))

1500 = B+4(20\*5+2)

1500 = B+4\*102

1500 = B+408

B =1500-408

B=1092

Address of Arr[3][2]

=1092+4(20\*3+2)

=1092+4(62)

=1092+248

=1340.

12 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 i.e., 3x3, 5x5, 7x7 etc…]

Example : If the array content is

3 5 4

7 6 9

2 1 8

Output through the function should be :

Middle Row : 7 6 9

Middle Column : 5 6 1

Ans.

#include<conio.h>

#include<iostream.h>

void accept(int a[3][3],int size)

{

cout<<"Middle Row:";

for(int i=0;i<size;i++)

for(int j=0;j<size;j++)

if(i==size/2)

cout<<a[i][j]<<'\t';

cout<<"\n Middle Column:";

for(i=0;i<size;i++)

for(j=0;j<size;j++)

if(j==size/2)

cout<<a[i][j]<<'\t';

}

void main()

{

int a[3][3]={{1,2,3},{4,5,6},{7,8,9}};

clrscr();

accept(a,3);

getch();

}

13

Write function in C++ which accepts an integer array and size as arguments and assign values into a 2D array of integers in the following format :

If the array is 1, 2, 3, 4, 5, 6

The resultant 2D array is 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 given :

1 2 3

1 2 0

1 0 0

Ans.

#include<conio.h>

#include<iostream.h>

void twoDArray(int aa[ ],int size)

{ int twodarr[6][6];

for (int i=0;i<size;i++)

{

for (int j=0;j<size;j++)

{

if((i+j)>=size)

twodarr [i][j]=0;

else

twodarr[i][j]=a[j];

cout<< twodarr[i][j]<<” “;

}

cout<<endl;

}

}

void main()

{

int arr[6]={1,2,3,4,5,6};

clrscr();

twoDArray (arr,6);

getch();

}

14 Write a function in C++ which accepts an integer array and its size as arguments and exchanges the values of first half side elements with the second half side elements of the array.

Example :

If an array of 8 elements initial content as

2 4 1 6 7 9 23 10

The function should rearrange array as

7 9 23 10 2 4 1 6

Ans

#include<iostream.h>

void modify(int a[],int size)

{

int i,j,temp;

for(i=0,j=size/2; j<size; i++,j++)

{

temp=a[i];

a[i]=a[j];

a[j]=temp;

}

for(i=0;i<size;i++)

{

cout<<a[i]<<" ";

}

}

void main()

{

int a[8]={2,4,1,6,7,9,23,10};

clrscr();

modify(a,8);

getch();

}

15 Write function in C++ which accepts an integer array and size as arguments and assign values into a 2D array of integers in the following format :

If the array is 1, 2, 3, 4, 5, 6

The resultant 2D array is given below :

1 0 0 0 0 0

1 2 0 0 0 0

1 2 3 0 0 0

1 2 3 4 0 0

1 2 3 4 5 0

1 2 3 4 5 6

If the array is 1, 2, 3

The resultant 2D array is given :

1 0 0

1 2 0

1 2 3

Ans.

#include<conio.h>

#include<iostream.h>

void input (int a[],int size)

{

int b[6][6];

for (int i=0;i<size;i++)

{

for (int j=0;j<size;j++)

{

if((i<j))

b[i][j]=0;

else

b[i][j]=a[j];

cout<<b[i][j]<<" ";

}

cout<<endl;

}

}

void main()

{

int a[6]={1,2,3,4,5,6};

clrscr();

input(a,6);

getch();

}

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16 Write a function in C++ to print sum of all values which either are divisible by 2 or divisible by 3 present in a 2D array passed as the argument of the function.

Ans.

#include<conio.h>

#include<iostream.h>

void Sum(int A[3][3],int R,int C)

{

int i,j,S=0;

for(i=0;i<R;i++)

for(j=0;j<C;j++)

if(A[i][j]%2==0||A[i][j]%3==0)

S=S+A[i][j];

cout<<"\nThe Sum of all the values which are divisible by 2 or 3 in the array = "<<S;

}

void main()

{

int a[3][3]={{1,2,3},{4,5,6},{7,8,9}};

clrscr();

Sum(a,3,3);

getch();

}

17 Write a function in C++ to find the sum of diagonal elements from a 2D array of type float. Use the array and its size as parameters with float as its return type.

Ans.

#include<conio.h>

#include<iostream.h>

float diasum(float arr[3][3],int r,int c)

{

int i,j;

float Dsum=0.0;

for(i=0;i<r;i++)

for(j=0;j<c;j++)

if((i==j))

{

Dsum=Dsum+arr[i][j];

cout<<arr[i][j]<<endl;

}

cout<<Dsum;

return Dsum;

}

void main()

{

float arr[3][3]={{1,2,3},{4,5,6},{7,8,9}};

clrscr();

diasum(arr,3,3);

getch();

}

18 Assume a array E containing elements of structure Employee is required to be arranged in descending order of Salary. Write a C++ function to arrange same with the help of bubble sort, the array and its size is required to be passed as parameters to the function. Definition of structure Employee is as follows:

Ans.

void sortEmp(Employee E[ ],int n)

{

int i,j;

Employee Etemp;

for(i=0;i<n;++i)

for(j=0;j<(n-1)-i ;j++)

if(E[j].salary<E[j+1].salary)

{

Etemp=E[j];

E[j]=E[j+1];

E[j+1]=temp;

}

cout<<"The details of the employee in ascending order of salary ";

for(i=0;i<n;i++)

cout<<E[i].Eno<<'\t'<<E[i].name<<’\t<<E[i].Salary<<endl;

}

19 Given two arrays of integers X and Y of sizes m and n respectively. Write a function named MERGE() which will third array named Z, such that the following sequence is followed.

All odd numbers of X from left to right are copied into Z from left to right.

All even numbers of X from left to right are copied into Z from right to left.

All odd numbers of Y from left to right are copied into Z from left to right.

All even numbers of Y from left to right are copied into Z from right to left.

X, Y and Z are passed as arguments to MERGE().

Eg. X is {3, 2, 1, 7, 6, 3} and {9, 3, 5, 6, 2, 8, 10}

the resultant array Z is {3, 1, 7, 3, 9, 3, 5, 10, 8, 2, 6, 6, 2}

Ans.

void MERGEARRAY(int X[ ], int m,int Y[ ],int n,int Z[ ])

{

int mn,i,,left=0,right=mn-1;

mn=m+n;

for(i=0;i<m;i++)

if(X[i]%2= = 1)

Z[left++]=X[i]; //For copying odd numbers of X into Z from left to right

else

Z[right- -]=X[i]; //For copying even number of X into Z from right to left

for(i=0;i<n;i++)

if (X[i]%2= = 1)

Z[left++]=Y[i]; //For copying odd numbers of Y into Z from left to right

else

Z[right- -]=Y[i]; //For copying even number of X into Z from right to left

}

20 Suppose a 1D array AR containing integers is arranged in ascending order. Write a user defined function in C++ to search for one integer from AR with the help of binary search method, to show presence of the number in the array. The function should have three parameters: (1) an array AR (2) the number to be searched and (3) the number of elements N in the array.

Ans.

#include<conio.h>

#include<iostream.h>

void Search(int AR[], int Sno, int EN)

{

int l=0,u=EN-1,m,flag=0;

while(l<=u)

{

m=(l+u)/2;

if(Sno==AR[m])

{

flag=1;

break;

}

else if(Sno<AR[m])

u=m-1;

else

l=m+1;

}

if( flag==0)

cout<<"\nThe Search Element "<<Sno<<"is not available";

else

cout<<"\nThe Search Element "<<Sno<<" is available";

}

void main()

{

int AR[5]={1,2,3,4,5};

clrscr();

Search(AR,4,5);

getch();

}

21 An array VAL[1…15][1…10] is stored in the memory with each element requiring 4 bytes of storage. If the base address of the array VAL is 1500, determine the location of VAL[12][9] when the array VAL is stored (i) Row wise (ii) Column wise.

Ans.

Given Data:

VAL[1…15][1…10]

Word Length (W) = 4 Bytes

Base Address of VAL(B) = 1500

VAL[12][9] = ?

C = Total No of Columns R = Total No of Rows

Lr = Least Row=1 Lc = Least Column=1

( i ) Row Major:

Address of an element (I,J) in row major = B + W ( C (I-Lr) + (J – Lc))

VAL [12][9] = 1500 + 4 (10 \* (12-1) + (9-1))

= 1500 + 4 (10 \* 11+8)

= 1500 + 4 (118)

= 1500 + 472

= 1972.

( i ) Column Major:

Address of an element (I,J) in column major = B + W ( (I-Lr) + R(J – Lc))

VAL [12][9] = 1500 + 4 ((12-1) +15 \* (9-1))

= 1500 + 4 (11 + 15 \* 8)

= 1500 + 4 ( 11+ 120)

= 1500 + 4 \* 131

= 1500 + 524 = 2024.