**Array – 1D Array**

**Q1 - Write a program to accept n numbers in an array and display the largest and smallest number. Using these values, calculate the range of elements in the array.**

#include<stdio.h>

int main(){

int n,i;

printf("Enter the numbers of element in array =");

scanf("%d",&n);

int arr[n];

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

{

printf("Enter the number ");

scanf("%d",&arr[i]);

}

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

{

printf("%d \n",arr[i]);

}

int max ,min;

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

{

max=0;

if(max<arr[i])

{

max=arr[i];

}

}

printf("Maximum number in the array is = %d \n",max);

return 0;

}

**Output**

Enter the numbers of element in array =4

Enter the number 9 8 6 2

Maximum number in the array is = 9

**Q2 - Write a program to accept an array of n elements and a number say key.**

**Check whether key is present in the array or not.**

#include<stdio.h>

int main(){

int n,i ,key;

printf("Enter the numbers of element required in array =");

scanf("%d",&n);

int arr[n];

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

{

printf("Enter the numbers in array ");

scanf("%d",&arr[i]);

}

printf("Enter the key you want to search = ");

scanf("%d",&key);

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

{

if (key==arr[i])

{

printf("Key is found");

}

}

return 0;

}

**Output**

Enter the numbers of element required in array =4

Enter the numbers in array 6 5 3 8

Enter the key you want to search = 6

Key is found

**Q3 - Write a program to accept an integer array and an integer say num and**

**counts the occurrences of the num in the array.**

#include<stdio.h>

int main(){

int n ,num, count=0;;

printf("Enter the number that you want to create an array");

scanf("%d",&n);

int arr[n];

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

{

scanf("%d",&arr[i]);

}

printf("Enter the number for showing occurence");

scanf("%d",&num);

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

{

if (num==arr[i])

{

count++;

}

}

printf("%d",count);

return 0;

}

**Output**

Enter the number that you want to create an array 5

1 2 1 2 1

Enter the number for showing occurrence 1

3

**Q4 - Write a program to accept n numbers from the user and store them in an array.**

**Then sort the array in descending order and display it.**

#include <stdio.h>

int main (){

int i, j, a, n,element;

int num[element];

printf("enter number of elements in an array\n");

scanf("%d", &n);

printf("Enter the elements\n");

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

scanf("%d", &num[i]);

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

{

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

{

if (num[i] > num[j])

{

a = num[i];

num[i] = num[j];

num[j] = a;

}

}

}

printf("The numbers in descending order is:\n");

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

printf("%d\n", num[i]);

}

return 0;

}

**Output**

enter number of elements in an array 5

Enter the elements 12 23 89 11 22

The numbers in ascending order is: 89 23 22 12 11

**Q5 - Write a program to accept a decimal number and convert it to binary.**

#include<stdio.h>

int main()

{

int n,r,m=1,bin=0;

printf("\nEnter the Number : ");

scanf("%d",&n);

while(n!=0)

{

r=n%2;

bin=bin+(r\*m);

m=m\*10;

n=n/2;

}

printf("\nBinary Value : %d",bin);

return 0;

}

**Output**

Enter the Number: 5

Binary Value: 101

**2D Array**

**Q1 - Write a program to accept, display and print the sum of elements of each row and sum of elements of each column of a matrix.**

#include<stdio.h>

int main(){

int n,m,sum;

printf("\n Enter the Row size of matrix = ");

scanf("%d",&n);

printf("\n Enter the Column size of matrix = ");

scanf("%d",&m);

int arr[n][m];

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

{

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

{

scanf("%d",&arr[i][j]);

}

}

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

{

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

{

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

}

printf("Sum of the %d row is = %d\n", i, sum);

sum = 0;

}

return 0;

}

**Output**

Enter the Row size of matrix = 3

Enter the Column size of matrix = 3

1 2 3 4 5 6 7 8 9

Sum of the 0 row is = 6

Sum of the 1 row is = 15

Sum of the 2 row is = 24

**Q2 -Write a program to accept a matrix A of size mXn and store its transpose in matrix B. Display matrix B.**

#include <stdio.h>

void main()

{

int array[10][10];

int i, j, m, n;

printf("Enter the order of the matrix \n");

scanf("%d %d", &m, &n);

printf("Enter the coeficients of the matrix\n");

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

{

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

{

scanf("%d", &array[i][j]);

}

}

printf("The given matrix is \n");

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

{

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

{

printf(" %d", array[i][j]);

}

printf("\n");

}

printf("Transpose of matrix is \n");

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

{

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

{

printf(" %d", array[i][j]);

}

printf("\n");

}

}

**Output**

Enter the order of the matrix 3 3

Enter the coeficients of the matrix 1 2 3 4 5 5 6 7 8

The given matrix is

1 2 3

4 5 5

6 7 8

Transpose of matrix is

1 4 6

2 5 7

3 5 8

**Q3 - Write a program to add and multiply two matrices.**

**Perform necessary checks before adding and multiplying the matrices.**

#include<stdio.h>

#include<stdlib.h>

int main()

{

int a[10][10],b[10][10],mul[10][10],r,c,i,j,k;

printf("enter the number of row=");

scanf("%d",&r);

printf("enter the number of column=");

scanf("%d",&c);

printf("enter the first matrix element=\n");

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

{

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

{

scanf("%d",&a[i][j]);

}

}

printf("enter the second matrix element=\n");

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

{

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

{

scanf("%d",&b[i][j]);

}

}

printf("multiply of the matrix=\n");

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

{

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

{

mul[i][j]=0;

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

{

mul[i][j]+=a[i][k]\*b[k][j];

}

}

}

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

{

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

{

printf("%d\t",mul[i][j]);

}

printf("\n");

}

return 0;

}

**Output**

enter the number of row=2

enter the number of column=2

enter the first matrix element= 1 2 3 4

enter the second matrix element= 1 2 3 4

multiply of the matrix=

7 10

15 22

**Q4 - Write a program to perform the following operations on a square matrix. Write**

**i) Check if the matrix is symmetric.**

**ii) Display the trace of the matrix (sum of diagonal elements).**

**iii) Check if the matrix is an upper triangular matrix.**

#include<stdio.h>

int main(){

int a[3][3],i,j,r,c,o,b[3][3],trace;

printf("enter the number of row=");

scanf("%d",&r);

printf("enter the number of column=");

scanf("%d",&c);

printf("enter the matrix element=\n");

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

{

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

{

scanf("%d",&a[i][j]);

}

}

printf("Enter the Operation want to perform. \n");

printf("1 - Check if the matrix is symmetric. \n");

printf("2 - Display the trace of the matrix (sum of diagonal elements). \n");

printf("3 - Check if the matrix is an upper triangular matrix.");

scanf("%d",&o);

switch (o)

{

case 1:

printf("Transpose of matrix is \n");

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

{

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

{

if (a[i][j]==b[i][j])

{

printf("Matrix A is symmetric Matrix ");

}

}

}

break;

case 2:

printf("Trace of matrix is :");

trace =a[0][0]+a[1][1]+a[2][2];

printf("%d",trace);

break;

case 3:

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

{

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

{

if (a[1][0]==0&&a[2][0]==0&&a[2][1]==0)

{

printf("this is upper triangular matrix");

}

}

}

break;

default:printf("this is normal matrix ");

}

return 0;

}

**Output**

enter the number of row=2

enter the number of column=2

enter the matrix element= 1 1 1 1

Enter the Operation want to perform.

1 - Check if the matrix is symmetric.

2 - Display the trace of the matrix (sum of diagonal elements).

3 - Check if the matrix is an upper triangular matrix.1

Matrix is symmetric