Program for traversing array element.

```c
#include <stdio.h>
int main()
{
    int n;
    printf("Enter number of elements\n");
    scanf("%d",&n);
    int a[n];
    printf("Enter elements of array\n");
    for(int i=0;i<n;i++)
        scanf("%d",&a[i]);
    printf("The elements of array are\n");
    for(int i=0;i<n;i++)
        printf("%d\n",a[i]);
    return 0;
}
```

OUTPUT

```
Enter number of elements
5
Enter elements of array
1
2
3
4
5
The elements of array are
1
2
3
4
5
```

Program to insert the given elements into an array.

```c
#include <stdio.h>
int main()
{
    int a[100],n,ele,pos;
    printf("Enter the number of elements\n");
    scanf("%d",&n);
    printf("Enter the elements of the array\n");
    int i;
    for(i=0;i<n;i++)
        scanf("%d",&a[i]);
    printf("Enter the elements to be inserted\n");
    scanf("%d",&ele);
    printf("Enter the position at which the element needs to be inserted\n");
    scanf("%d",&pos);
    n++;
    for(i=n-1;i>=pos;i--)
        a[i]=a[i-1];
    a[pos-1]=ele;
    printf("The array after inserting the element is:\n");
    for(i=0;i<n;i++)
        printf("%d\n",a[i]);
    return 0;
}
```

OUTPUT

```
Enter the number of elements
5
Enter the elements of the array
1
2
3
4
6
Enter the elements to be inserted
5
Enter the position at which the element needs to be inserted
5
The array after inserting the element is:
1
2
3
4
5
6
```

Program for insertion in a sorted array.

```c
#include <stdio.h>
int main()
{
    int a[100],n,ele;
    printf("Enter the number of elements\n");
    scanf("%d",&n);
    printf("Enter the elements of the array\n");
    int i;
    for(i=0;i<n;i++)
        scanf("%d",&a[i]);
    printf("Enter the elements to be inserted\n");
    scanf("%d",&ele);
    i = n-1;
     while(ele<a[i] && i>=0)
     {
           a[i+1] = a[i];
           i--;
     }
     a[i+1] = ele;
     n++;
    printf("The array after inserting the element is:\n");
    for(i=0;i<n;i++)
        printf("%d\n",a[i]);
    return 0;
}
```

OUTPUT

```
Enter the number of elements
5
Enter the elements of the array
3
5
7
9
11
Enter the elements to be inserted
12
The array after inserting the element is:
3
5
7
9
11
12
```

Program for delete the given elements into an array.

```c
#include <stdio.h>
int main()
{
    int a[100],n,ele;
    printf("Enter number of elements\n");
    scanf("%d",&n);
    printf("Enter the elements of an array\n");
    int i;
    for(i=0;i<n;i++)
        scanf("%d",&a[i]);
    printf("Enter the element to be deleted\n");
    scanf("%d",&ele);
    int t;
    for(i=0;i<n;i++)
    {
       if(a[i]==ele)
       t=i+1;
    }
    for(i=t;i<n;i++)
        a[i-1]=a[i];
    n--;
    printf("The array after deletion is:\n");
    for(i=0;i<n;i++)
        printf("%d\n",a[i]);
    return 0;
}
```

OUTPUT

```
Enter number of elements
5
Enter the elements of an array
2
4
5
6
7
Enter the element to be deleted
6
The array after deletion is:
2
4
5
7
```

Program for missing number in an array.

```c
#include <stdio.h>
int main()
{
    int n;
    printf("Enter the number of elements\n");
    scanf("%d",&n);
    int ar[n],i,sum=0;
    printf("Enter the elements\n");
    for(i=0;i<n;i++)
    {
        scanf("%d",&ar[i]);
    }
    for(i=0;i<n;i++)
    {
        sum=sum+ar[i];
    }
    int l=ar[n-1];
    int ap=(l*(l+1))/2;
    int ele=ap-sum;

    printf("The missing number is %d",ele);
    return 0;
}
```

OUTPUT

```
Enter the number of elements
5
Enter the elements
1
2
3
5
6
The missing number is 4
```

Program to find which element is repeated in the array and which is not.

```c
#include <stdio.h>
int main(){
    int n;
    printf("Enter the number of elements\n");
    scanf("%d",&n);
    int a[n],i,b[100],j,c;
    for(i=0;i<n;i++)
        scanf("%d",&a[i]);
    for(i=0;i<n;i++; {
        c=1;
        if(a[i]!=-1){
            for(j=i+1;j<n;j++){
                if(a[i]==a[j]){
                    c++;
                    a[j]=-1; }
            }
            b[i]=c; }
    }
    printf("Non repeating elements are\n");
    for(i=0;i<n;i++){
        if(a[i]!=-1){
            if(b[i]==1)
            printf("%d\n",a[i]);   }
    }
    printf("Repeating elements are\n");
    for(i=0;i<n;i++){
        if(a[i]!=-1){
            if(b[i]>1)
            printf("%d\n",a[i]); }
    }
    return 0;}
```

OUTPUT

```
Enter the number of elements
7
1
2
2
3
5
4
4
Non repeating elements are
1
3
5
Repeating elements are
2
4
```

Program for reversal of an array.

```c
#include <stdio.h>
int main()
{
    int n;
    printf("Enter the number of elements\n");
    scanf("%d",&n);
    int a[n],i;
    printf("Enter the array\n");
    for(i=0;i<n;i++)
        scanf("%d",&a[i]);
    int t;
    for(i=0;i<=n/2;i++)
    {
        t=a[i];
        a[i]=a[n-i-1];
        a[n-i-1]=t;
    }
    printf("The reversed array is\n");
    for(i=0;i<n;i++)
        printf("%d\n",a[i]);
    return 0;
}
```

OUTPUT

```
Enter the number of elements
5
Enter the array
2
4
6
8
10
The reversed array is
10
8
6
4
2
```

Program for merging two sorted array

```c
#include <stdio.h>
int main(){
    int n,m,i,j,c[100];
    printf("Enter the number of elements of first array\n");
    scanf("%d",&m);
    printf("Enter the number of elements of second array\n");
    scanf("%d",&n);
    printf("Enter the element of first array\n");
    int a[m],b[n];
    for(i=0;i<m;i++)
        scanf("%d",&a[i]);
    printf("Enter the elements of second array\n");
    for(i=0;i<n;i++)
        scanf("%d",&b[i]);
    i=j=0;
    for(int k=0;k<m+n;k++) {
        if(i<m && j<n){
            if(a[i]<b[j]) {
                c[k]=a[i];
                i++; }
            else{
                c[k]=b[j];
                j++;    }      }
            else if(i<m){
                c[k]=a[i];
                i++; }
        else{
            c[k]=b[j];
            j++; }
    }
    printf("merged array is\n");
    for(int k=0;k<m+n;k++)
        printf("%d ",c[k]);
    return 0;}
```

OUTPUT

```
Enter the number of elements of first array
3
Enter the number of elements of second array
2
Enter the element of first array
2
4
6
Enter the elements of second array
1
3
merged array is
1 2 3 4 6
```

Program for set union.

```
#include <stdio.h>
int main()
{
    int a[100],b[100],c[100],n,m;
    printf("Enter number of elements of first array\n");
    scanf("%d",&n);
    printf("Enter the number of elements in second array\n");
    scanf("%d",&m);
    int i;
    printf("Enter the elments of the first array\n");
    for(i=0;i<n;i++) {
        scanf("%d",&a[i]);
        c[i]=a[i];
    }
    int k=i,j,count;
    printf("Enter the element of the second array\n");
    for(i=0;i<m;i++) {
        count=0;
        scanf("%d",&b[i]);
        for(j=0;j<n;j++) {
            if(c[j]!=b[i])
               count++;
        }
            if(count==n){
                c[k]=b[i];
                k++;    }
    }
    printf("Array after union is\n");
    for(i=0;i<k;i++)
        printf("%d\n",c[i]);
    return 0;}
```

OUTPUT

```
Enter number of elements of first array
4
Enter the number of elements in second array
2
Enter the elments of the first array
1
2
3
4
Enter the element of the second array
2
4
Array after union is
1
2
3
4
```

Program for set intersection.

```c
#include <stdio.h>
int main()
{
    int a[100],b[100],c[100],n,m,co=0,i,j,k;
    printf("Enter number of elements of first array\n");
    scanf("%d",&n);
    printf("Enter the number of elements in second array\n");
    scanf("%d",&m);
    printf("Enter the elments of the first array\n");
    for(i=0;i<n;i++)
        scanf("%d",&a[i]);
    printf("Enter the element of the second array\n");
    for(i=0;i<m;i++){
        scanf("%d",&b[i]);
        k=0;
        for(j=0;j<n;j++){
            if(a[j]==b[i]){
                k++;
                break; }
        }
        if(k==1){
                c[i]=b[i];
                co++;}
    }
    printf("Array after intersection is\n");
    for(i=0;i<co;i++)
        printf("%d\n",c[i]);
    return 0;
}
```

OUTPUT

```
Enter number of elements of first array
4
Enter the number of elements in second array
2
Enter the elments of the first array
1
2
3
4
Enter the element of the second array
2
4
Array after intersection is
2
4
```

Program for set difference

```c
#include <stdio.h>
int main(){
    int i,j,n,m,t,k=0;
    printf("Enter the number the elements in first array\n");
    scanf("%d",&n);
    printf("Enter the number of elements of second array\n");
    scanf("%d",&m);
    printf("Enter the elements of first array\n");
    int a[100],b[100],c[100];
    for ( i = 0; i < n; i++)
        scanf("%d",&a[i]);
    printf("Enter the elemnets of second array\n");
    for ( i = 0; i < m; i++)
        scanf("%d",&b[i]);
    for ( i = 0; i < n; i++){
        t=0;
        for(j=0;j<m;j++){
            if(a[i]==b[j])
            t=1;
        }
        if(t==0){
            c[k]=a[i];
            k++;}
    }
     printf("Array after difference is\n");
        for ( i = 0; i < k; i++)
            printf("%d\n",c[i]);
    return 0;  }
```

OUTPUT

```
Enter the number the elements in first array
4
Enter the number of elements of second array
3
Enter the elements of first array
1
2
3
4
Enter the elemnets of second array
2
4
6
Array after difference is
1
3
```

Program for set symmetric difference.

```
#include <stdio.h>
void symmDiff(int arr1[], int arr2[], int n, int m)
{
    int i = 0, j = 0;
    printf("The symmetric difference is\n");
    while (i < n && j < m) {
        if (arr1[i] < arr2[j]) {
            printf("%d\n",arr1[i]);
            i++;
        }
        else if (arr2[j] < arr1[i]) {
            printf("%d\n",arr2[j]);
            j++;      }
        else {
            i++;
            j++;     }   }
}
int main(){
   int n,m;
   printf("Enter the number of elements in first set\n");
   scanf("%d",&n);
   printf("Enter the number of elements in second set\n");
   scanf("%d",&m);
   int arr1[n],arr2[m];
   printf("Enter element of first set\n");
   for(int i=0;i<n;i++)
   scanf("%d",&arr1[i]);
   printf("Enter element of second set\n");
   for(int i=0;i<m;i++)
   scanf("%d",&arr2[i]);
    symmDiff(arr1, arr2, n, m);
    return 0;    }
```

OUTPUT

```
Enter the number of elements in first set
5
Enter the number of elements in second set
3
Enter element of first set
2
4
5
7
8
Enter element of second set
5
8
11
The symmetric difference is
2
4
7
```

Program for matrix addition

```c
#include <stdio.h>
int main()
{
    int n,m,i,j;
    printf("Enter the order of each array\n");
    scanf("%d%d",&n,&m);
    printf("Enter the element of first matrix\n");
    int a[n][m],b[n][m];
    for(i=0;i<n;i++){
        for(j=0;j<m;j++)
        scanf("%d",&a[i][j]);
    }
    printf("Enter the elements of second matrix\n");
    for(i=0;i<n;i++){
        for(j=0;j<m;j++)
        scanf("%d",&b[i][j]);
    }
    printf("Matrix after addition is\n");
    for(i=0;i<n;i++){
        for(j=0;j<m;j++)
        printf("%d\n",a[i][j]+b[i][j]);
    }
    return 0;
}
```

OUTPUT

```
Enter the order of each array
2
3
Enter the element of first matrix
1
2
3
4
5
6
Enter the elements of second matrix
7
8
9
10
11
12
Matrix after addition is
8
10
12
14
16
18
```

Program for matrix subtraction

```c
#include <stdio.h>
int main()
{
    int n,m,i,j;
    printf("Enter the order of each array\n");
    scanf("%d%d",&n,&m);
    printf("Enter the element of first matrix\n");
    int a[n][m],b[n][m];
    for(i=0;i<n;i++){
        for(j=0;j<m;j++)
        scanf("%d",&a[i][j]);
    }
    printf("Enter the elements of second matrix\n");
    for(i=0;i<n;i++){
        for(j=0;j<m;j++)
        scanf("%d",&b[i][j]);
    }
    printf("Matrix after subtraction is\n");
    for(i=0;i<n;i++){
        for(j=0;j<m;j++)
        printf("%d\n",a[i][j]-b[i][j]);
    }
    return 0;
}
```

OUTPUT

```
Enter the order of each array
2
3
Enter the element of first matrix
1
3
5
6
7
8
Enter the elements of second matrix
4
2
6
4
1
2
Matrix after additioin is
-3
1
-1
2
6
6
```

Program for matrix multiplication

```c
#include <stdio.h>
int main()
{
    int i,j,m,n,p,q;
    printf("Enter the order of the first matrix\n");
    scanf("%d%d",&m,&n);
    printf("Enter the order of second matrix\n");
    scanf("%d%d",&p,&q);
    int a[m][n],b[p][q],c[m][q],k;
    if(n==p){
        printf("Enter the elements of the first matrix\n");
        for(i=0;i<m;i++){
            for(j=0;j<n;j++)
            scanf("%d",&a[i][j]);    }
        printf("Enter the elements of second matrix\n");
        for(i=0;i<p;i++){
            for(j=0;j<q;j++)
            scanf("%d",&b[i][j]);   }
        for(i=0;i<m;i++){
            for(j=0;j<p;j++){
                c[i][j]=0;
                for(k=0;k<n;k++)
                    c[i][j]=c[i][j]+a[i][k]*b[k][j];    }
        }
        printf("Matrix after multiplication is\n");
        for(i=0;i<m;i++){
            for(j=0;j<p;j++)
            printf("%d\n",c[i][j]);  }
    }
    return 0;     }
```

OUTPUT

```
Enter the order of the first matrix
1
3
Enter the order of second matrix
3
1
Enter the elements of the first matrix
1
3
5
Enter the elements of second matrix
4
6
2
Matrix after multiplication is
32
12
7
```

Program for matrix transpose

```c
#include <stdio.h>
int main()
{
    int m,n,i,j;
    printf("Enter the order of the matrix\n");
    scanf("%d%d",&m,&n);
    int a[100][100],b[100][100];
    printf("Enter the element of the matrix\n");
    for(i=0;i<m;i++)
    {
        for(j=0;j<n;j++)
            scanf("%d",&a[i][j]);
    }
    for(i=0;i<m;i++)
    {
        for(j=0;j<n;j++)
            b[j][i]=a[i][j];
    }
    printf("The matrix after transpose is\n");
    for(i=0;i<n;i++)
    {
        for(j=0;j<m;j++)
            printf("%d\n",b[i][j]);
    }
    return 0;
}
```

OUTPUT

```
Enter the order of the matrix
3
2
Enter the element of the matrix
4
5
6
1
2
7
The matrix after transpose is
4
6
2
5
1
7
```

Program for matrix transposition without second matrix

```
#include <stdio.h>
int main()   {
    int m,n,i,j,t=0;
    printf("Enter the order of the matrix\n");
    scanf("%d%d",&m,&n);
    int a[100][100];
    printf("Enter the element of the matrix\n");
    for(i=0;i<m;i++){
        for(j=0;j<n;j++)
            scanf("%d",&a[i][j]);   }
    if(m<n){
    for(i=0;i<m;i++){
        for(j=i+1;j<n;j++){
            t=a[i][j];
            a[i][j]=a[j][i];
            a[j][i]=t;    }
    }   }
    else{
    for(i=0;i<m;i++){
        for(j=0;j<i;j++){
            t=a[i][j];
            a[i][j]=a[j][i];
            a[j][i]=t;    }
    }   }
    printf("The matrix after transpose is\n");
    for(i=0;i<n;i++){
        for(j=0;j<m;j++)
            printf("%d\n",a[i][j]);
    }
    return 0;    }
```

OUTPUT

```
Enter the order of the matrix
2
3
Enter the element of the matrix
1
2
3
4
5
6
The matrix after transpose is
1
4
2
5
3
6
```

Program for Linear Search

```c
#include <stdio.h>
int main()
{
    int a[100],i,n,ele,c=0;
    printf("Enter the number of element\n");
    scanf("%d",&n);
    printf("Enter the elements of the array\n");
    for(i=0;i<n;i++)
        scanf("%d",&a[i]);
    printf("Enter the element to be searched\n");
    scanf("%d",&ele);
    for(i=0;i<n;i++)
    {
        if(ele==a[i])
        {
            c++;
            printf("Position=%d\n",i+1);
        }
    }
    if(c>0)
        printf("Element found %d times",c);
    else
        printf("Element not found");
    return 0;
}
```

OUTPUT

```
Enter the number of element
5
Enter the elements of the array
1
2
3
4
4
Enter the element to be searched
4
Position=4
Position=5
Element found 2 times
```

Program for Binary Search

```c
#include <stdio.h>
int binary(int a[],int n, int ele){
    int f=0,l=n-1,mid;
    while(f<=l){
        mid=f+(l-f)/2;
        if(ele==a[mid])
        return mid;
        else if(ele>a[mid])
        f=mid+1;
        else if(ele<a[mid])
        l=mid-1;
    }
    return 0;    }
int main(){
    int n,a[100],ele,i;
    printf("Enter the number of elemnets\n");
    scanf("%d",&n);
    printf("Enter the elements of the array\n");
    for(i=0;i<n;i++)
        scanf("%d",&a[i]);
    printf("Enter the element to be searched\n");
    scanf("%d",&ele);
    int result = binary(a,n,ele);
```

```
    if(result==0)
    printf("Element not found");
    else
    printf("Element found at index %d",result);
    return 0;
}
```

OUTPUT

```
Enter the number of elemnets
5
Enter the elements of the array
1
2
3
5
6
Enter the element to be searched
2
Element found at index 1
```

Program for Ternary Search

```
#include <stdio.h>
int ternary(int a[],int m,int ele){
int m1,m2,c=0,beg=0,end=m-1;
    while (beg<=end){
        m1=beg+(end-beg)/3;
        m2=m1+(end-beg)/3;
        if(ele==a[m1])
        return m1;
        else if (ele==a[m2])
        return m2;
        else if(ele<a[m1])
        end=m1-1;
        else if(ele>a[m2])
        beg=m2+1;
        else{
        beg=m1+1;
        end=m2-1;    }
    }
    return 0;    }
int main() {
     int m,a[100],ele;;
    printf("Enter the number of elements of the array\n");
    scanf("%d",&m);
    printf("Enter the elements of the array\n");
    for (int i = 0; i < m; i++)
        scanf("%d",&a[i]);
    printf("Enter the element to be searched\n");
```

```
    scanf("%d",&ele);
    int result=ternary(a,m,ele);
    if(result==0)
    printf("Element not found");
    else
    printf("Element found at index %d",result);
    return 0;    }
```

OUTPUT

```
Enter the number of elements of the array
5
Enter the elements of the array
2
4
5
8
9
Enter the element to be searched
5
Element found at index 2
```

Program for Jump Search

```
#include <stdio.h>
#include <math.h>
int min(int a, int b){
    if(b>a)
    return a;
    else
    return b; }
int jumpsearch(int arr[], int x, int n)   {
    int step = sqrt(n),prev=0;
    while (arr[min(step, n)-1] < x){
        prev = step;
        step += sqrt(n);
        if (prev >= n)
            return -1;   }
    while (arr[prev] < x){
        prev++;
        if (prev == min(step, n))
            return -1;    }
    if (arr[prev] == x)
        return prev;
    return -1;    }
int main(){
    int m,a[100],ele;
    printf("Enter the number of elements of the array\n");
    scanf("%d",&m);
    printf("Enter the elements of the array\n");
    for (int i = 0; i < m; i++)
```

```
        scanf("%d",&a[i]);
    printf("Enter the element to be searched\n");
    scanf("%d",&ele);
    int index = jumpsearch(a, ele, m);
    if(index >= 0)
    printf("Number is at %d index",index);
    else
    printf("Number is not exist in the array");
    return 0;    }
```

OUTPUT

```
Enter the number of elements of the array
5
Enter the elements of the array
1
2
4
6
8
Enter the element to be searched
6
Number is at 3 index
```

Program for Bubble Sort

```
#include <stdio.h>
int main()
{
    int a[100],i,n,j,t;
    printf("Enter the number of elements\n");
    scanf("%d",&n);
    printf("Enter the elements of the array\n");
    for(i=0;i<n;i++)
        scanf("%d",&a[i]);
    for(i=0;i<n-1;i++){
        for(j=0;j<n-i-1;j++){
            if(a[j]>a[j+1]){
                t=a[j];
                a[j]=a[j+1];
                a[j+1]=t;
            }
        }
    }
    printf("The elements in ascending order :\n");
    for(i=0;i<n;i++)
        printf("%d\n",a[i]);
    return 0;
}
```

OUTPUT

```
Enter the number of elements
5
Enter the elements of the array
1
3
5
2
0
The elements in ascending order :
0
1
2
3
5
```

Program for Selection Sort

```c
#include <stdio.h>
int main()
{
    int n;
    printf("Enter the number of element\n");
    scanf("%d",&n);
    int a[n];
    printf("Enter the elements of the array\n");
    int i;
    for(i=0;i<n;i++)
    scanf("%d",&a[i]);
    int j,t;
    for(i=0;i<n-1;i++){
    int min = i;
        for (j = i+1; j < n; j++)
          if (a[j] < a[min])
            min = j;
        if(min != i){
                t=a[min];
                a[min]=a[i];
                a[i]=t;
            }
    }
    printf("The array after sorting is\n");
    for(i=0;i<n;i++)
```

```
    printf("%d\n",a[i]);
    return 0;
}
```

OUTPUT

```
Enter the number of element
5
Enter the elements of the array
1
8
9
7
5
The array after sorting is
1
5
7
8
9
```