1. Write a program for the Insertion sort algorithm.

```
#include<stdio.h>
void main()
{
   int n,array[1000],c,d,t;
   printf("Enter number of elements\n");
   scanf("%d",&n);
   printf("Enter %d integers\n",n);
   for(c=0;c<n;c++)
   scanf("%d",&array[c]);
   for(c=1;c<=n-1;c++)
   {
      d=c;
      while(d>0&&array[d-1]>array[d])
      {
         t=array[d];
         array[d]=array[d-1];
         array[d-1]=t;
         d--;
      }
   }
   printf("Sorted array in ascending order:\n");
   for(c=0;c<=n-1;c++)
   {
   printf("%d\n",array[c]);
   }
}
```

OUTPUT:

```
Enter number of elements
4
Enter 4 integers
42
56
85
47
Sorted array in ascending order:
```

42
47
56
85

2. Write a program for the Selection sort algorithm.

```
#include<stdio.h>
void main()
{
   int n,array[100],c,d,temp,position;
   printf("Enter number of elements\n");
   scanf("%d",&n);
   printf("Enter %d integers\n",n);
   for(c=0;c<n;c++)
   scanf("%d",&array[c]);
   for(c=0;c<=n-1;c++)
   {
      position=c;
      for(d=c+1;d<n;d++)
      {
         if(array[position]>array[d])
         position=d;
      }
      if(position!=c)
      {
         temp=array[c];
         array[c]=array[position];
         array[position]=temp;
      }
   }
   printf("Sorted array in ascending order:\n");
   for(c=0;c<n;c++)
   printf("%d\n",array[c]);
}
```

OUTPUT:

```
Enter number of elements
6
Enter 6 integers
53
68
48
93
74
69
Sorted array in ascending order:
48
53
68
69
74
93
```

3. Write a program for the Bubble sort algorithm.

```
#include<stdio.h>
void main()
{
   int n,array[100],c,d,temp;
   printf("Enter number of elements\n");
   scanf("%d",&n);
   printf("Enter %d integers\n",n);
   for(c=0;c<n;c++)
   scanf("%d",&array[c]);
   for(c=0;c<=n-1;c++)
   {

      for(d=0;d<n-c;d++)
      {
         if(array[d]>array[d+1])
         {
```

```
            temp=array[d];
            array[d]=array[d+1];
            array[d+1]=temp;
          }

       }

    }
    printf("Sorted array in ascending order:\n");
    for(c=0;c<n;c++)
    printf("%d\n",array[c]);
}
```

OUTPUT:

```
Enter number of elements
7
Enter 7 integers
23
64
85
16
75
99
10
Sorted array in ascending order:
10
16
23
64
75
85
99
```

4. Write a program for the Merge sort algorithm.

```
#include<stdio.h>
void mergesort(int a[],int i,int j);
```

```
void merge(int a[],int i1,int j1,int i2,int j2);
int main()
{
    int a[30],n,i;
    printf("Enter no of elements:");
    scanf("%d",&n);
    printf("Enter array elements:");

    for(i=0;i<n;i++)
    scanf("%d",&a[i]);

    mergesort(a,0,n-1);
    printf("\nSorted array is:");
    for(i=0;i<n;i++)

    printf("%d",a[i]);

    return 0;
}
void mergesort(int a[],int i,int j)
{
    int mid;
    if(i<j)
    {
        mid=(i+j)/2;
        mergesort(a,i,mid);
        mergesort(a,mid+1,j);
        merge(a,i,mid,mid+1,j);

    }
}
void merge(int a[],int i1,int j1,int i2,int j2)

{
     int temp[50];
     int i,j,k;
     i=i1;
     j=i2;
     k=0;
```

```
    while(i<=j1&&j<=j2)
    {
      if(a[i]<a[j])
      temp[k++]=a[i++];
      else
      temp[k++]=a[j++];
    }
    while(i<=j1)
     temp[k++]=a[i++];

    while(j<=j2)
     temp[k++]=a[j++];

    for(i=i1,j=0;i<=j2;i++,j++)
    a[i]=temp[j];

}
```

OUTPUT:

```
Enter no of elements:4
Enter array elements:25
85
38
64

Sorted array is:25386485
```

5. Write a program for the Heap sort algorithm.

```
#include<stdio.h>
void create(int []);
void down_adjust(int [],int);
void main()
{
```

```
  int heap[30],n,i,last,temp;
  printf("Enter no. of elements:");
  scanf("%d",&n);
  printf("\nEnter elements:");
  for(i=1;i<=n;i++)
  scanf("%d",&heap[i]);
  heap[0]=n;
  create(heap);
  while(heap[0] > 1)
  {

   last=heap[0];
   temp=heap[1];
   heap[1]=heap[last];
   heap[last]=temp;
   heap[0]--;
   down_adjust(heap,1);
  }

  printf("\nArray after sorting:\n");
  for(i=1;i<=n;i++)
  printf("%d ",heap[i]);
}

void create(int heap[])
{
  int i,n;
  n=heap[0];
  for(i=n/2;i>=1;i--)
  down_adjust(heap,i);
}

void down_adjust(int heap[],int i)
{
  int j,temp,n,flag=1;
  n=heap[0];

  while(2*i<=n && flag==1)
  {
```

```
    j=2*i;
    if(j+1<=n && heap[j+1] > heap[j])
    j=j+1;
    if(heap[i] > heap[j])
    flag=0;
    else
    {
       temp=heap[i];
       heap[i]=heap[j];
       heap[j]=temp;
       i=j;
    }
  }
}
```

OUTPUT:

```
Enter no. of elements:6

Enter elements:54
74
87
17
63
59

Array after sorting:
17 54 59 63 74 87
```