Module 1: Sorting Techniques

1) Bubble Sort

```
#include<iostream.h>
#include<conio.h>
void main()
{
 clrscr();
 int n,a[25],i,j,temp;
 cout<<"Enter Number Of Elements:";
 cin>>n;
 cout<<"\n Enter Array Elements:";
 for(i=0;i<n;i++)
 {
 cin>>a[i];
 }
 for(i=0;i<n;i++)
 {
 for(j=i+1;j<n;j++)
 {
 if(a[i]>a[j])
 {
 temp=a[i];
 a[i]=a[j];
 a[j]=temp;
}
 }
}
 cout<<"\n Sorted Elements Are";
 for(i=0;i<n;i++)
 {
 cout<<a[i]<<"\t";
}
 getch();
 }

 /*
   Output -
   Enter Number Of Elements:4

 Enter Array Elements:88 5 99 10

 Sorted Elements Are: 5   10      88      99
*/
```

2) Insertion Sort

```
#include<iostream.h>
#include<conio.h>
void main()
{
 clrscr();
 int n,a[25],i,j,temp;
 cout<<"Enter Number Of Elements:";
 cin>>n;
 cout<<"\n Enter Array Elements:";
 for(i=0;i<n;i++)
 {
 cin>>a[i];
 }
 for(i=0;i<n;i++)
 {
 temp = a[i];
 j=i-1;
 while(j>=0 && a[j]>temp)
 {
 a[j+1]=a[j];
 j--;
 }
 a[j+1]=temp;
 }
 cout<<"\n Sorted Elements are :";
 for(i=0;i<n;i++)
 {
 cout<<a[i]<<"\t";
 }
 getch();
 }

 /*
   Output -
   Enter Number Of Elements:5

 Enter Array Elements:76 14 20 1 86

 Sorted Elements are :1 14      20      76      86
*/
```

3) Selection Sort

```
#include<iostream.h>
#include<conio.h>
        void main()
{
        int n,i,j,a[25],temp,min;
        clrscr();
        cout<<"Enter the elements:";
        cin>>n;
        cout<<"\Enter array element:";
        for(i=0;i<n;i++)
        {
        cin>>a[i];
        }
        for(i=0;i<n;i++)
        {
        min=i;
        for(j=i+1;j<n;j++)
        {
        if(a[j]<a[min])
        {
        min=j;
        }
        }
        if(min!=1)
        {
        temp=a[i];
        a[i]=a[min];
        a[min]=temp;
        }
        }
        cout<<"sorted elements are:";
        for(i=0;i<n;i++)
        {
        cout<<a[i]<<"\t";
        }
        getch();
        }

        /* Output -
        Enter the elements:4
Enter array element:88 66 33 22
sorted elements are: 22   33      66      88
              */
```

4) Shell Sort

```
#include<iostream.h>
#include<conio.h>
 void main()
 {
 int n,i,j,a[20],temp,k;
 clrscr();
 cout<<"Enter the elements:";
 cin>>n;
 cout<<"Enter array elements:";
 for(i=0;i<n;i++)
 {
 cin>>a[i];
 }
 for(i=n/2;i>0;i=i/2)
 {
 for(j=i;j<n;j++)
 {
 for(k=j-1;k>=0;k=k-i)
 {
 if(a[k+i]>a[k])
 break;
 else
 {
 temp=a[k];
 a[k]=a[k+i];
 a[k+i]=temp;
 }
 }
 }
 }
 cout<<"\n sorted elements are:";
 for(i=0;i<n;i++)
 {
 cout<<a[i]<<"\t";
 }
 getch();
 }

 /*
 output -
 Enter the elements:3
Enter array elements:55 2 89
 sorted elements are:2  55      89
*/
```

5) Radix Sort

```
#include<iostream.h>
#include<conio.h>
int getMax(int a[] ,int n)
{
	int max =a[0];
	for(int i=1;i<n;i++)
	{
		if(a[i]>max)
		{
		max=a[i];
	}
}
	return max;
}
void countsort(int a[],int n,int exp)
{

	int output[50],i,count[10]={0};
	for(i=0;i<n;i++){
		count[(a[i]/exp)%10]++;
}
for(i=1;i<10;i++){
count[i]+=count[i-1];
}
for(i=n-1;i>=0;i--)
{
output[count[(a[i]/exp)%10]-1]=a[i];
count[(a[i]/exp)%10]--;
}
for(i=0;i<n;i++)
{
a[i]=output[i];
}
}
void radixsort (int a[],int n)
{
int exp,m;
m=getMax(a,n);
for(exp=1;m/exp>0;exp*=10){
countsort(a,n,exp);
 }
}
void main(){
	int n,i,a[20];
```

```
        clrscr();
        cout<<"\nenter n of elements :";
        cin>>n;
        cout<<"\n enter array elements :";
        for(i=0;i<n;i++){
                cin>>a[i];
        }
        radixsort(a,n);
        cout<<"\nsorted element are :";
        for(i=0;i<n;i++){
                cout<<a[i]<<"\t";
        }

        getch();
}
```

/* **Output -**

```
enter n of elements :3

 enter array elements :99 5 77

sorted element are :5   77      99
*/
```