Data Structure

1. Insertion in linked list

```
#include<iostream.h>
#include<malloc.h>
#include<conio.h>
int main()
{
int n,i,j,a[10];
clrscr();
struct node
{
int data;
struct node *link;
}*node[100];

cout<<"Enter size of array: ";
cin>>n;
cout<<endl;

for(i=0; i<n; i++){
node[i]=(struct node*)malloc(sizeof(struct node));
node[i]->data = NULL;
}
for(i=0; i<n; i++){
cout<<"Enter value"<<(i+1)<<" ";
cin>>node[i]->data;
}

for(i=0; i<n; i++){
node[i]->link=node[i+1];
}
node[n-1]->link=NULL;
```

```
        cout<<"You Entered : -\n";
        for(i=0; i<n; i++){
        cout<<node[i]->data<<endl;
        }

        getch();
}
```

2. Selection short

```
        //selection sort
        #include<stdio.h>
        #include<conio.h>
        int main()
        {
          int a[40],b,n,c,tmp;
            printf("Enter size of array ");
            scanf("%d",&n);
            printf("Enter the values->\n");
            for(b=1;b<=n;b++)
            {
                printf("%d. ",b);
                scanf("%d",&a[b]);
            }

            for(b=1;b<=n;b++)
            {
                for(c=b+1;c<=n;c++)
                {
                    if(a[b]>a[c])
                    {
                        tmp=a[b];
                        a[b]=a[c];
```

```
                    a[c]=tmp;
                }}}

        printf("Values in sorted list\n");
        for(b=1;b<=n;b++)
        {
            printf("\n%d. %d",b,a[b]);
        }
}
```

3. Bubble short

```
//bubble sort
#include<stdio.h>
#include<conio.h>
int main()
{
  int a[40],b,n,c,tmp;
    printf("Enter size of array ");
    scanf("%d",&n);
    printf("Enter the values->\n");
    for(b=1;b<=n;b++)
    {
        printf("%d. ",b);
        scanf("%d",&a[b]);
    }

    for(b=n;b>=1;b--)
    {
        for(c=1;c<=b;c++)
        {
            if(a[c]>a[b])
            {
                tmp=a[b];
```

```
            a[b]=a[c];
            a[c]=tmp;
        }}}

    printf("Values in sorted list");
    for(b=1;b<=n;b++)
    {
        printf("\n%d. %d",b,a[b]);
    }
}
```

4. Add matrix using functions

```
#include<stdio.h>
#include<conio.h>
void read_arr(int a[10][10],int row,int col)
{
    int i,j;
    for(i=1;i<=row;i++)
    {
        for(j=1;j<=col;j++)
        {
            scanf("%d",&a[i][j]);
        }
    }
}

void add_arr(int ma[10][10],int mb[10][10],int mc[10][10],int row,int
col)
{
    int i,j;
    for(i=1;i<=row;i++)
    {
        for(j=1;j<=col;j++)
```

```
        {
            mc[i][j]=ma[i][j]+mb[i][j];
        }
    }
}

void print_arr(int mc[10][10],int row,int col)
{
    int i,j;
    for(i=1;i<=row;i++)
    {
        for(j=1;j<=col;j++)
        {
            printf("%d ",mc[i][j]);
        }
        printf("\n");
    }
}

int main()
{
    int m1[10][10],m2[10][10],m3[10][10],i,j,row,col;

    printf("Enter no. of row and column\n");
    scanf("%d%d",&row,&col);

    printf("Enter 1st matrix\n");
 read_arr(m1,row,col);

    printf("Enter 2nd matrix\n");
    read_arr(m2,row,col);

    add_arr(m1,m2,m3,row,col);
    printf("\nAddition of two matrix is\n");
    print_arr(m3,row,col);
```

```
}
```

5. Deletion of a value in array

```
#include<iostream.h>
#include<conio.h>
int main()
{
int arr[100],p,n,c;
clrscr();
cout<<"Enter number of elements in array\n";
cin>>n;

cout<<"Enter "<<n<<" element\n";
for(c=1;c<=n;c++)
{
cout<<"_____\n|("<<c<<")| ";
cin>>arr[c];
cout<<"|";
}
cout<<"\nEnter the location where you wish to delete element\n";
cin>>p;

if(p>n)
                                {
cout<<"Deletion not possible\n";
}
else
{
for(c=p;c<=n;c++)
{
arr[c]=arr[c+1];
cout<<"Resultent:-\n";
for(c=1;c<n;c++)
```

```
{
cout<<"_____\n|("<<c<<")| "<<arr[c]<<"|\n";
}
}
getch();
}
```

6. Multiplication of Matrix

```
#include<iostream.h>
#include<conio.h>
int main()
{
clrscr();
int a[2][2],b[2][2],c[2][2],i,j,k;
cout<<"Enter elements in first matrix\n\n";
for(i=0;i<2;i++)
{
for(k=0;k<2;k++)
{
cout<<"a"<<i<<k<<"  ";
cin>>a[i][k];
}
}

cout<<"\nEnter the elements of 2nd mayrix\n\n";
for(k=0;k<2;k++)
{
for(j=0;j<2;j++)
{
cout<<"b"<<k<<j<<"  ";
cin>>b[k][j];
}
}
```

```
//multiplication of matrix
for(i=0;i<2;i++)
{
for(j=0;j<2;j++)
{
c[i][j]=0;
for(k=0;k<2;k++)
{
c[i][j]=c[i][j]+a[i][k]*b[k][j];
}
}
}

cout<<"\nThe result is :-\n";
for(i=0;i<2;i++)
{
for(j=0;j<2;j++)
{
cout<<"c"<<i<<j<<"  "<<c[i][j]<<endl;
}
}

getch();
}
```

7. Searching

```
/*
  Searching
*/
#include<iostream.h>
#include <conio.h>
int main()
```

```
{
int c,n,a[100],x,check;
clrscr();
cout<<"Enter maximum size of list ";
cin>>n;

cout<<"Enter "<<n<<" numbers\n";
for(c=1;c<=n;c++)
{
cout<<"__________\n|("<<c<<") |";
cin>>a[c];
cout<<"|";
}

cout<<"\nEnter a number to search ";
cin>>x;

for(c=1;c<=n;c++)
{
if(a[c]==x)
{
cout<<"The number "<<x<<" is found at location ("<<c<<")";
check=1;
break;
}
else{
check=0;
}
}
if(check==0){
cout<<"\n"<<x<<" is not found";
}
getch();
}
```

8. Factorial of a number

```
#include<stdio.h>
#include<conio.h>
int main()
{
int fact=1,a;
printf("enter the value");
scanf("%d",&a);
while(a>=1)
{
fact=fact*a;
a--;
}
printf("%d",fact);

}
```

9. Demonstrate shorting

```
#include<iostream.h>
#include<conio.h>
int main()
{
int i,imin,j,n,temp,a[100];
clrscr();
cout<<"Enter number of element\n";
cin>>n;

cout<<"\nEnter "<<n<<" elements\n";
for(i=1;i<=n;i++)
{
cout<<"_____\n| "<<i<<". | ";
//enter the no. of elements
```

```
cin>>a[i];
}

for(i=1;i<=n-1;i++)
{
imin=i;
for(j=i+1;j<=n;j++)
{
if(a[imin]>a[j])
{
imin=j;
}}
//this loop is used for insert minimum value(imin) in first element(i)
if(imin!=i)
{
temp=a[i];
a[i]=a[imin];
a[imin]=temp;
}}

cout<<"\nSorted list in ascending order:\n";
//this loop is used for print list in sort list
for(i=1;i<=n;i++)
{
cout<<"_____\n| "<<i<<". | "<<a[i]<<" |\n";
}
getch();
}
```

10. Switch statement

```
#include<stdio.h>
#include<conio.h>
int main()
```

```
{
char o;
int num1,num2;

printf("select an operator either + or - or * or /\n");
scanf("%c",&o);
printf("\nEnter two operands\n");
scanf("%d%d",&num1,&num2);

switch(o)
{
case '+':
printf("%d + %d = %d",num1,num2,num1+num2);
break;
case '-':
printf("%d - %d = %d",num1,num2,num1-num2);
break;
case '*':
printf ("%d * %d = %d",num1,num2,(num1*num2));
break;
case '/':
printf("%d / %d = %d",num1,num2,num1/num2);
break;
default:
printf("Error! operator is not correct");
break;
}
}
```