**EX.NO:1 IMPLEMENTATION OF LIST ADT**

**PROGRAM:**

#include<stdio.h>

int index=0,list[50],size;

void create()

{

printf("Name:R.Sridevi");

printf("Roll.No:20UIT021");

printf("Program Name:Implementation of List ADT");

printf("Enter the size of List:\n");

scanf("%d",&size);

if(size<=0)

{

printf("Invalid Input\n");

create();

}

}

void insertFirst(int data)

{

int i;

if(size==index)

{

printf("Sorry List is Full..!\n");

}

else

{

for(i=(index-1);i>=0;i--)

{

list[i+1]=list[i];

}

list[0]=data;

index++;

}

}

void insertLast(int data)

{

if(index==size)

{

printf("Sorry List is Full\n");

}

else

{

list[index++]=data;

printf("Successfully Inserted.\n");

}

}

void display()

{

int i;

if(index==0)

{

printf("List is Empty");

}

else

{

printf("The Elements are:\n");

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

{

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

}

}

}

void insertAfter(int data ,int value)

{

int i=0,temp=-1;

if(index==size)

{

printf("Sorry List is Full\n");

}

else

{

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

{

if(list[i]==value)

{

temp=i;

break;

}

}

if(temp!=-1)

{

for(i=(index-1);i>temp;i--)

{

list[i+1]=list[i];

}

list[temp+1]=data;

index++;

}

else

{

printf("Element not Found");

}

}

}

void insertBefore(int data ,int value)

{

int i=0,temp=-1,flag;

if(index==size)

{

printf("Sorry List is Full\n");

}

else

{

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

{

if(list[i]==value)

{

temp=i;

break;

}

}

if(temp!=-1)

{

for(i=(index-1);i>=temp;i--)

{

if(list[i]==value)

{

list[i+1]=list[i];

list[i]=data;

}

else

{

list[i+1]=list[i];

}

}

index++;

}

else

{

printf("Element not Found");

}

}

}

void insertAtLocation(int data,int location)

{

int i=0,temp=-1;

if(index==size)

{

printf("Sorry List is Full\n");

}

else

{

if(location>0 & location<=index)

{

temp=0;

}

if(temp!=-1)

{

for(i=(index-1);i>=location-1;i--)

{

if(i==location-1)

{

list[i+1]=list[i];

list[i]=data;

}

else

{

list[i+1]=list[i];

}

}

index++;

}

else

{

printf("Invalid location");

}

}

}

void DeleteFirst()

{

int i;

if(index==0)

{

printf("Sorry List empty\n");

}

else

{

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

{

list[i]=list[i+1];

}

index--;

}

}

void DeleteLast()

{

int i;

if(index==0)

{

printf("Sorry List empty\n");

}

else

{

index--;

}

}

void DeleteAfter(int value)

{

int i=0,temp=-1;

if(index==0)

{

printf("Sorry List is empty\n");

}

else

{

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

{

if(list[i]==value)

{

temp=i;

break;

}

}

if(temp!=-1)

{

for(i=temp+1;i<index;i++)

{

list[i]=list[i+1];

}

index--;

}

else

{

printf("Element not Found");

}

}

}

void DeleteBefore(int value)

{

int i=0,temp=-1;

if(index==0)

{

printf("Sorry List is empty\n");

}

else

{

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

{

if(list[i]==value)

{

temp=i;

break;

}

}

if(temp!=-1)

{

for(i=temp-1;i<index;i++)

{

list[i]=list[i+1];

}

index--;

}

else

{

printf("Element not Found");

}

}

}

void DeleteAtLocation(int location)

{

int i=0,temp=-1;

if(index==0)

{

printf("Sorry List is empty\n");

}

else

{

if(location>0 & location<=index)

{

temp=0;

}

if(temp!=-1)

{

for(i=location-1;i<index;i++)

{

list[i]=list[i+1];

}

index--;

}

else

{

printf("Invalid location");

}

}

}

void search(int value)

{

int i=0,temp=-1;

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

{

if(list[i]==value)

{

temp=i;

break;

}

}

if(temp!=-1)

{

printf("Element Found");

}

else

{

printf("No element Found");

}

}

void main()

{

int choice,data,value;

create();

do

{

printf("\nMenu\n1.Insert First\n2.Insert Last\n3.Insert After\n4.Insert Before\n5.Insert at a Location\n6.Delete First\n7.Delete Last\n8.Delete After\n9.Delete Before\n10.Delete at a Location\n11.search\n12.Display\n13.Exit\n");

printf("\nEnter the choice: \n");

scanf("%d",&choice);

switch(choice)

{

case 1:

printf("Insert First\n");

printf("Enter the Element:\n");

scanf("%d",&data);

insertFirst(data);

break;

case 2:

printf("Insert Last\n");

printf("Enter the Element:\n");

scanf("%d",&data);

insertLast(data);

break;

case 3:

printf("Insert After\n");

printf("Enter the Data:\n");

scanf("%d",&data);

printf("Enter the element after which the insertion should happen:\n");

scanf("%d",&value);

insertAfter(data ,value);

break;

case 4:

printf("Insert Before\n");

printf("Enter the Data:\n");

scanf("%d",&data);

printf("Enter the element before which the insertion should happen:\n");

scanf("%d",&value);

insertBefore(data ,value);

break;

case 5:

printf("Insert at a Location\n");

printf("Enter the Data:\n");

scanf("%d",&data);

printf("Insert Location ?:\n");

scanf("%d",&value);

insertAtLocation(data ,value);

break;

case 6:

printf("Delete First\n");

DeleteFirst();

break;

case 7:

printf("Delete Last\n");

DeleteLast();

break;

case 8:

printf("Delete After\n");

printf("Enter the value:\n");

scanf("%d",&value);

DeleteAfter(value);

break;

case 9:

printf("Delete Before\n");

printf("Enter the value:\n");

scanf("%d",&value);

DeleteBefore(value);

break;

case 10:

printf("Delete at a Location\n");

printf("Enter the Location:\n");

scanf("%d",&value);

DeleteAtLocation(value);

break;

case 11:

printf("Search\n");

printf("Enter the Search element:\n");

scanf("%d",&value);

search(value);

break;

case 12:

printf("Display\n");

display();

break;

case 13:

printf("Bye\n");

break;

default:

printf("Invalid Input\n");

}

}while(choice!=13);

}

**OUTPUT:**

Name:R.Sridevi

Roll.No:20UIT021

Program Name:Implementation of List ADT

Enter the size of List:

5

Menu

1.Insert First

2.Insert Last

3.Insert After

4.Insert Before

5.Insert at a Location

6.Delete First

7.Delete Last

8.Delete After

9.Delete Before

10.Delete at a Location

11.search

12.Display

13.Exit

Enter the choice:

12

Display

Sorry...There are elements in list.

Menu

1.Insert First

2.Insert Last

3.Insert After

4.Insert Before

5.Insert at a Location

6.Delete First

7.Delete Last

8.Delete After

9.Delete Before

10.Delete at a Location

11.search

12.Display

13.Exit

Enter the choice:

2

Insert Last

Enter the Element:

10

Successfully Inserted.

Menu

1.Insert First

2.Insert Last

3.Insert After

4.Insert Before

5.Insert at a Location

6.Delete First

7.Delete Last

8.Delete After

9.Delete Before

10.Delete at a Location

11.search

12.Display

13.Exit

Enter the choice:

1

Insert First

Enter the Element:

20

Menu

1.Insert First

2.Insert Last

3.Insert After

4.Insert Before

5.Insert at a Location

6.Delete First

7.Delete Last

8.Delete After

9.Delete Before

10.Delete at a Location

11.search

12.Display

13.Exit

Enter the choice:

1

Insert First

Enter the Element:

30

Menu

1.Insert First

2.Insert Last

3.Insert After

4.Insert Before

5.Insert at a Location

6.Delete First

7.Delete Last

8.Delete After

9.Delete Before

10.Delete at a Location

11.search

12.Display

13.Exit

Enter the choice:

12

Display

The Elements are:

30

20

10

Menu

1.Insert First

2.Insert Last

3.Insert After

4.Insert Before

5.Insert at a Location

6.Delete First

7.Delete Last

8.Delete After

9.Delete Before

10.Delete at a Location

11.search

12.Display

13.Exit

Enter the choice:

3

Insert After

Enter the element:

40

Enter the element after which the insertion should happen:

30

Menu

1.Insert First

2.Insert Last

3.Insert After

4.Insert Before

5.Insert at a Location

6.Delete First

7.Delete Last

8.Delete After

9.Delete Before

10.Delete at a Location

11.search

12.Display

13.Exit

Enter the choice:

12

Display

The Elements are:

30

40

20

10

Menu

1.Insert First

2.Insert Last

3.Insert After

4.Insert Before

5.Insert at a Location

6.Delete First

7.Delete Last

8.Delete After

9.Delete Before

10.Delete at a Location

11.search

12.Display

13.Exit

Enter the choice:

3

Insert After

Enter the element:

50

Enter the element after which the insertion should happen:

10

Menu

1.Insert First

2.Insert Last

3.Insert After

4.Insert Before

5.Insert at a Location

6.Delete First

7.Delete Last

8.Delete After

9.Delete Before

10.Delete at a Location

11.search

12.Display

13.Exit

Enter the choice:

12

Display

The Elements are:

30

40

20

10

50

Menu

1.Insert First

2.Insert Last

3.Insert After

4.Insert Before

5.Insert at a Location

6.Delete First

7.Delete Last

8.Delete After

9.Delete Before

10.Delete at a Location

11.search

12.Display

13.Exit

Enter the choice:

3

Insert After

Enter the element:

90

Enter the element after which the insertion should happen:

40

Sorry List is Full

Menu

1.Insert First

2.Insert Last

3.Insert After

4.Insert Before

5.Insert at a Location

6.Delete First

7.Delete Last

8.Delete After

9.Delete Before

10.Delete at a Location

11.search

12.Display

13.Exit

Enter the choice:

6

Delete First

Menu

1.Insert First

2.Insert Last

3.Insert After

4.Insert Before

5.Insert at a Location

6.Delete First

7.Delete Last

8.Delete After

9.Delete Before

10.Delete at a Location

11.search

12.Display

13.Exit

Enter the choice:

12

Display

The Elements are:

40

20

10

50

Menu

1.Insert First

2.Insert Last

3.Insert After

4.Insert Before

5.Insert at a Location

6.Delete First

7.Delete Last

8.Delete After

9.Delete Before

10.Delete at a Location

11.search

12.Display

13.Exit

Enter the choice:

4

Insert Before

Enter the element:

35

Enter the elemeent before which the insertion should happen:

40

Menu

1.Insert First

2.Insert Last

3.Insert After

4.Insert Before

5.Insert at a Location

6.Delete First

7.Delete Last

8.Delete After

9.Delete Before

10.Delete at a Location

11.search

12.Display

13.Exit

Enter the choice:

12

Display

The Elements are:

35

40

20

10

50

Menu

1.Insert First

2.Insert Last

3.Insert After

4.Insert Before

5.Insert at a Location

6.Delete First

7.Delete Last

8.Delete After

9.Delete Before

10.Delete at a Location

11.search

12.Display

13.Exit

Enter the choice:

4

Insert Before

Enter the element:

90

Enter the elemeent before which the insertion should happen:

40

Sorry List is Full

Menu

1.Insert First

2.Insert Last

3.Insert After

4.Insert Before

5.Insert at a Location

6.Delete First

7.Delete Last

8.Delete After

9.Delete Before

10.Delete at a Location

11.search

12.Display

13.Exit

Enter the choice:

7

Delete Last

Menu

1.Insert First

2.Insert Last

3.Insert After

4.Insert Before

5.Insert at a Location

6.Delete First

7.Delete Last

8.Delete After

9.Delete Before

10.Delete at a Location

11.search

12.Display

13.Exit

Enter the choice:

12

Display

The Elements are:

35

40

20

10

Menu

1.Insert First

2.Insert Last

3.Insert After

4.Insert Before

5.Insert at a Location

6.Delete First

7.Delete Last

8.Delete After

9.Delete Before

10.Delete at a Location

11.search

12.Display

13.Exit

Enter the choice:

4

Insert Before

Enter the element:

35

Enter the elemeent before which the insertion should happen:

10

Menu

1.Insert First

2.Insert Last

3.Insert After

4.Insert Before

5.Insert at a Location

6.Delete First

7.Delete Last

8.Delete After

9.Delete Before

10.Delete at a Location

11.search

12.Display

13.Exit

Enter the choice:

12

Display

The Elements are:

35

40

20

35

10

Menu

1.Insert First

2.Insert Last

3.Insert After

4.Insert Before

5.Insert at a Location

6.Delete First

7.Delete Last

8.Delete After

9.Delete Before

10.Delete at a Location

11.search

12.Display

13.Exit

Enter the choice:

4

Insert Before

Enter the element:

90

Enter the elemeent before which the insertion should happen:

80

Sorry List is Full

Menu

1.Insert First

2.Insert Last

3.Insert After

4.Insert Before

5.Insert at a Location

6.Delete First

7.Delete Last

8.Delete After

9.Delete Before

10.Delete at a Location

11.search

12.Display

13.Exit

Enter the choice:

5

Insert at a Location

Enter the Data:

90

Insert Location ?:

1

Sorry List is Full

Menu

1.Insert First

2.Insert Last

3.Insert After

4.Insert Before

5.Insert at a Location

6.Delete First

7.Delete Last

8.Delete After

9.Delete Before

10.Delete at a Location

11.search

12.Display

13.Exit

Enter the choice:

8

Delete After

Enter the value:

35

Menu

1.Insert First

2.Insert Last

3.Insert After

4.Insert Before

5.Insert at a Location

6.Delete First

7.Delete Last

8.Delete After

9.Delete Before

10.Delete at a Location

11.search

12.Display

13.Exit

Enter the choice:

12

Display

The Elements are:

35

20

35

10

Menu

1.Insert First

2.Insert Last

3.Insert After

4.Insert Before

5.Insert at a Location

6.Delete First

7.Delete Last

8.Delete After

9.Delete Before

10.Delete at a Location

11.search

12.Display

13.Exit

Enter the choice:

8

Delete After

Enter the value:

35

Menu

1.Insert First

2.Insert Last

3.Insert After

4.Insert Before

5.Insert at a Location

6.Delete First

7.Delete Last

8.Delete After

9.Delete Before

10.Delete at a Location

11.search

12.Display

13.Exit

Enter the choice:

12

Display

The Elements are:

35

35

10

Menu

1.Insert First

2.Insert Last

3.Insert After

4.Insert Before

5.Insert at a Location

6.Delete First

7.Delete Last

8.Delete After

9.Delete Before

10.Delete at a Location

11.search

12.Display

13.Exit

Enter the choice:

8

Delete After

Enter the value:

90

Element not Found

Menu

1.Insert First

2.Insert Last

3.Insert After

4.Insert Before

5.Insert at a Location

6.Delete First

7.Delete Last

8.Delete After

9.Delete Before

10.Delete at a Location

11.search

12.Display

13.Exit

Enter the choice:

5

Insert at a Location

Enter the Data:

90

Insert Location ?:

1

Menu

1.Insert First

2.Insert Last

3.Insert After

4.Insert Before

5.Insert at a Location

6.Delete First

7.Delete Last

8.Delete After

9.Delete Before

10.Delete at a Location

11.search

12.Display

13.Exit

Enter the choice:

12

Display

The Elements are:

90

35

35

10

Menu

1.Insert First

2.Insert Last

3.Insert After

4.Insert Before

5.Insert at a Location

6.Delete First

7.Delete Last

8.Delete After

9.Delete Before

10.Delete at a Location

11.search

12.Display

13.Exit

Enter the choice:

5

Insert at a Location

Enter the Data:

40

Insert Location ?:

3

Menu

1.Insert First

2.Insert Last

3.Insert After

4.Insert Before

5.Insert at a Location

6.Delete First

7.Delete Last

8.Delete After

9.Delete Before

10.Delete at a Location

11.search

12.Display

13.Exit

Enter the choice:

12

Display

The Elements are:

90

35

40

35

10

Menu

1.Insert First

2.Insert Last

3.Insert After

4.Insert Before

5.Insert at a Location

6.Delete First

7.Delete Last

8.Delete After

9.Delete Before

10.Delete at a Location

11.search

12.Display

13.Exit

Enter the choice:

9

Delete Before

Enter the value:

35

Menu

1.Insert First

2.Insert Last

3.Insert After

4.Insert Before

5.Insert at a Location

6.Delete First

7.Delete Last

8.Delete After

9.Delete Before

10.Delete at a Location

11.search

12.Display

13.Exit

Enter the choice:

12

Display

The Elements are:

35

40

35

10

Menu

1.Insert First

2.Insert Last

3.Insert After

4.Insert Before

5.Insert at a Location

6.Delete First

7.Delete Last

8.Delete After

9.Delete Before

10.Delete at a Location

11.search

12.Display

13.Exit

Enter the choice:

9

Delete Before

Enter the value:

35

Menu

1.Insert First

2.Insert Last

3.Insert After

4.Insert Before

5.Insert at a Location

6.Delete First

7.Delete Last

8.Delete After

9.Delete Before

10.Delete at a Location

11.search

12.Display

13.Exit

Enter the choice:

12

Display

The Elements are:

40

35

10

Menu

1.Insert First

2.Insert Last

3.Insert After

4.Insert Before

5.Insert at a Location

6.Delete First

7.Delete Last

8.Delete After

9.Delete Before

10.Delete at a Location

11.search

12.Display

13.Exit

Enter the choice:

9

Delete Before

Enter the value:

190

Element not Found

Menu

1.Insert First

2.Insert Last

3.Insert After

4.Insert Before

5.Insert at a Location

6.Delete First

7.Delete Last

8.Delete After

9.Delete Before

10.Delete at a Location

11.search

12.Display

13.Exit

Enter the choice:

5

Insert at a Location

Enter the Data:

70

Insert Location ?:

4

Invalid location

Menu

1.Insert First

2.Insert Last

3.Insert After

4.Insert Before

5.Insert at a Location

6.Delete First

7.Delete Last

8.Delete After

9.Delete Before

10.Delete at a Location

11.search

12.Display

13.Exit

Enter the choice:

12

Display

The Elements are:

40

35

10

Menu

1.Insert First

2.Insert Last

3.Insert After

4.Insert Before

5.Insert at a Location

6.Delete First

7.Delete Last

8.Delete After

9.Delete Before

10.Delete at a Location

11.search

12.Display

13.Exit

Enter the choice:

10

Delete at a Location

Enter the Location:

4

Invalid location

Menu

1.Insert First

2.Insert Last

3.Insert After

4.Insert Before

5.Insert at a Location

6.Delete First

7.Delete Last

8.Delete After

9.Delete Before

10.Delete at a Location

11.search

12.Display

13.Exit

Enter the choice:

10

Delete at a Location

Enter the Location:

3

Menu

1.Insert First

2.Insert Last

3.Insert After

4.Insert Before

5.Insert at a Location

6.Delete First

7.Delete Last

8.Delete After

9.Delete Before

10.Delete at a Location

11.search

12.Display

13.Exit

Enter the choice:

12

Display

The Elements are:

40

35

Menu

1.Insert First

2.Insert Last

3.Insert After

4.Insert Before

5.Insert at a Location

6.Delete First

7.Delete Last

8.Delete After

9.Delete Before

10.Delete at a Location

11.search

12.Display

13.Exit

Enter the choice:

10

Delete at a Location

Enter the Location:

1

Menu

1.Insert First

2.Insert Last

3.Insert After

4.Insert Before

5.Insert at a Location

6.Delete First

7.Delete Last

8.Delete After

9.Delete Before

10.Delete at a Location

11.search

12.Display

13.Exit

Enter the choice:

12

Display

The Elements are:

35

Menu

1.Insert First

2.Insert Last

3.Insert After

4.Insert Before

5.Insert at a Location

6.Delete First

7.Delete Last

8.Delete After

9.Delete Before

10.Delete at a Location

11.search

12.Display

13.Exit

Enter the choice:

11

Search

Enter the Search element:

40

No element Found

Menu

1.Insert First

2.Insert Last

3.Insert After

4.Insert Before

5.Insert at a Location

6.Delete First

7.Delete Last

8.Delete After

9.Delete Before

10.Delete at a Location

11.search

12.Display

13.Exit

Enter the choice:

11

Search

Enter the Search element:

35

Element Found