**PRACTICAL NO: 02.**

**SET OPERATIONS USING ADT:**

#include <iostream>

#include<list>

#include<cstdlib>

using namespace std;

class set{

private:

int num,flag=1;

public:

list<int>l,l1,u,I,d;

list<int>::iterator t,t1,t2,t3,t4;

void add();

void delete1(int);

void search(int);

void searchB(int);

void display();

void union1();

void Intersection();

void insert();

void Differerence();

};

void set::insert()

{

int n,m;

cout<<"\nSET A:\n";

cout<<"How many Elements You want Add in Set A:\n";

cin>>n;

cout<<"Enter Elements\n";

for(int i=0;i<n;i++)

{

cin>>num;

l.push\_back(num);

}

cout<<"\nSET B:\n";

cout<<"How many Elements You want Add in Set B:\n";

cin>>m;

cout<<"Enter Elements\n";

for(int i=0;i<m;i++)

{

cin>>num;

l1.push\_back(num);

}

}

void set::add()

{

char c;

cout<<"In Which Set do you want Add Element (A/B)\n";

cin>>c;

if(c=='A' ||c=='a')

{

cout<<"Enter Elements\n";

cin>>num;

l.push\_back(num);

cout<<"\nElement Inserted\n";

}

else if(c=='B' ||c=='b')

{

cout<<"Enter Elements\n";

cin>>num;

l1.push\_back(num);

cout<<"\nElement Inserted\n";

}

else

cout<<"Invalid Set!!!";

}

void set::display()

{

cout<<"The Elements for Set A:\n{\t";

for(t=l.begin();t!=l.end();t++)

{

cout<<\*t<<"\t";

}

cout<<"}";

cout<<"\n\n";

cout<<"The Elements for Set B:\n{\t";

for(t1=l1.begin();t1!=l1.end();t1++)

{

cout<<\*t1<<"\t";

}

cout<<"}";

}

void set::search(int key)

{

for(t=l.begin(),t1=l1.begin();t!=l.end();t++,t1++)

{

if(\*t==key | \*t1==key)

{

cout<<"The Element is Present\n";

flag=1;

break;

}

else

flag=0;

}

if(flag==0)

{

cout<<"The Element is not Present\n";

}

}

void set::delete1(int key)

{

if(l.empty()&& l1.empty())

{

cout<<"The Set A & Set B is Empty\n";

}

else

{

search(key);

if(flag==1)

{

l.remove(key);

l1.remove(key);

cout<<"Element Deleted\n";

}

else

cout<<"Element not Deleted\n";

}

}

void set::union1()

{

int flag=0;

for(t=l.begin();t!=l.end();t++)

{

u.push\_back(\*t);

}

for(t1=l1.begin();t1!=l1.end();t1++)

{

for(t2=u.begin();t2!=u.end();t2++)

{

if(\*t1==\*t2)

{

flag=0;

break;

}

else

flag=1;

}

if(flag==1)

{

u.push\_back(\*t1);

}

}

cout<<"The Union Set of A & B is : {\t";

for(t2=u.begin();t2!=u.end();t2++)

{

cout<<\*t2<<"\t";

}

cout<<"}";

}

void set::Intersection()

{

for(t=l.begin();t!=l.end();t++)

{

for(t1=l1.begin();t1!=l1.end();t1++)

{

if(\*t==\*t1)

{

I.push\_back(\*t);

break;

}

}

}

if(I.empty())

{

cout<<"There is no Common element in Set A & Set B\n";

}

else

{

cout<<"The Intersection Set of A & B is : {\t";

for(t3=I.begin();t3!=I.end();t3++)

{

cout<<\*t3<<"\t";

}

cout<<"}";

}

}

void set::Differerence()

{

int flag=0;

for(t=l.begin();t!=l.end();t++)

{

for(t1=l1.begin();t1!=l1.end();t1++)

{

if(\*t==\*t1)

{

flag=0;

break;

}

else

flag=1;

}

if(flag==1)

{

d.push\_back(\*t);

}

}

if(d.empty())

{

cout<<"The Set A & Set B are Equal\n";

}

else

{

cout<<"The Difference Set of A & B is : {\t";

for(t4=d.begin();t4!=d.end();t4++)

{

cout<<\*t4<<"\t";

}

cout<<"}";

}

}

int main()

{

set s;

int ch,key;

s.insert();

while(1)

{

cout<<"\n\n-----------------------------\n";

cout<<"\nSet Theory\n";

cout<<"\n\n-----------------------------\n";

cout<<"1.Add Element\n";

cout<<"2.Delete Element\n";

cout<<"3.Search Element\n";

cout<<"4.Display\n";

cout<<"5.Union\n";

cout<<"6.Intersection\n";

cout<<"7.Difference\n";

cout<<"8.Exit\n";

cout<<"Enter Your Choice: ";

cin>>ch;

switch(ch)

{

case 1:

s.add();

break;

case 2:

cout<<"Enter which Element to Deleted: ";

cin>>key;

s.delete1(key);

break;

case 3:

cout<<"Enter the Element to be Searched : ";

cin>>key;

s.search(key);

break;

case 4:

cout<<endl;

s.display();

break;

case 5:

s.union1();

break;

case 6:

s.Intersection();

break;

case 7:

s.Differerence();

break;

case 8:

cout<<"Exiting...";

exit(1);

break;

default:

cout<<"Invalid Choice";

}

}

return 0;

}

**OUTPUT:**

SET A:

How many Elements You want Add in Set A:

5

Enter Elements

10 20 30 40 50

SET B:

How many Elements You want Add in Set B:

5

Enter Elements

43

35

10

50

34

-----------------------------

Set Theory

-----------------------------

1.Add Element

2.Delete Element

3.Search Element

4.Display

5.Union

6.Intersection

7.Difference

8.Exit

Enter Your Choice: 4

The Elements for Set A:

{ 10 20 30 40 50 }

The Elements for Set B:

{ 43 35 10 50 34 }

-----------------------------

Set Theory

-----------------------------

1.Add Element

2.Delete Element

3.Search Element

4.Display

5.Union

6.Intersection

7.Difference

8.Exit

Enter Your Choice: 1

In Which Set do you want Add Element (A/B)

A

Enter Elements

23

Element Inserted

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Set Theory

-----------------------------

1.Add Element

2.Delete Element

3.Search Element

4.Display

5.Union

6.Intersection

7.Difference

8.Exit

Enter Your Choice: 4

The Elements for Set A:

{ 10 20 30 40 50 23 }

The Elements for Set B:

{ 43 35 10 50 34 }

-----------------------------

Set Theory

-----------------------------

1.Add Element

2.Delete Element

3.Search Element

4.Display

5.Union

6.Intersection

7.Difference

8.Exit

Enter Your Choice: 2

Enter which Element to Deleted: 10

The Element is Present

Element Deleted

-----------------------------

Set Theory

-----------------------------

1.Add Element

2.Delete Element

3.Search Element

4.Display

5.Union

6.Intersection

7.Difference

8.Exit

Enter Your Choice: 4

The Elements for Set A:

{ 20 30 40 50 23 }

The Elements for Set B:

{ 43 35 50 34 }

-----------------------------

Set Theory

-----------------------------

1.Add Element

2.Delete Element

3.Search Element

4.Display

5.Union

6.Intersection

7.Difference

8.Exit

Enter Your Choice: 3

Enter the Element to be Searched : 35

The Element is Present

-----------------------------

Set Theory

-----------------------------

1.Add Element

2.Delete Element

3.Search Element

4.Display

5.Union

6.Intersection

7.Difference

8.Exit

Enter Your Choice: 5

The Union Set of A & B is : { 20 30 40 50 23 43 35 34 }

-----------------------------

Set Theory

-----------------------------

1.Add Element

2.Delete Element

3.Search Element

4.Display

5.Union

6.Intersection

7.Difference

8.Exit

Enter Your Choice: 6

The Intersection Set of A & B is : { 50 }

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Set Theory

-----------------------------

1.Add Element

2.Delete Element

3.Search Element

4.Display

5.Union

6.Intersection

7.Difference

8.Exit

Enter Your Choice: 7

The Difference Set of A & B is : { 20 30 40 23 }

-----------------------------

Set Theory

-----------------------------

1.Add Element

2.Delete Element

3.Search Element

4.Display

5.Union

6.Intersection

7.Difference

8.Exit

Enter Your Choice: 8

Exiting...

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Process exited after 106.4 seconds with return value 1

Press any key to continue . . .