EXPERIMENT NO. 2

AIM: To implement basic Fuzzy Set Operations (Union, Intersection, Complement, Set Difference).

```
/*
Two Fuzzy Sets are given:
A={0.9/2 + 0.4/4 + 0.4/6 + 0.7/8 + 0/10}
B={0.2/2 + 0.8/4 + 0.5/6 + 0.3/8 + 1/10}.
Implement basic Fuzzy Set Operations (Union, Intersection, Complement, Set Difference).
*/
```

PROGRAM:

```
import java.util.Scanner;

class Fuzzyset
{
Scanner sc = new Scanner(System.in);
int len;
Fuzzyset(int len)
{
this.len=len;
}
float[] Fuzzyset_comp (float mA[])
{
float[] cA=new float[10];
for(int i=0;i<len;i++)
{
cA[i]=1.0f-mA[i];
}
return cA;
}
float[] Union_intersec(float A[], float B[], String op)
{
float Union_intersec[]=new float[10];
```

```
for(int i=0;i<len;i++)
{
Union_intersec[i]=(op=="max")?((A[i]>B[i])?A[i]:B[i]):((A[i]>B[i])?B[i]:A[i]);
}
return Union_intersec;
}
float[] scan_set()
{
float S[]=new float[10];
for(int i=0;i<len;i++)
{
S[i]=sc.nextFloat();
}
return S;
}

void Fuzzyset_print(float E[],float m[])
{
System.out.print("{"+m[0]+"/"+E[0]);
for(int i=1;i<len;i++)
{
System.out.print("+"+m[i]+"/"+E[i]);
}
System.out.println("}");
}
}

class Fuzzyset_op
{
public static void main(String args[])
{
```

```
Scanner sc=new Scanner(System.in);
System.out.print("Enter the no. of elements(max 10):-");
Fuzzyset FZ = new Fuzzyset(sc.nextInt());
System.out.print("Enter the elements of Fuzzy set A & B:-");
float E[]=FZ.scan_set();
System.out.print("Enter the membership value of elements Fuzzy set A:-");
float mA[]=FZ.scan_set();
System.out.print("Enter the membership value of elements Fuzzy set B:-");
float mB[]=FZ.scan_set();

System.out.print("\nFuzzy Set A:-");
FZ.Fuzzyset_print(E, mA);
System.out.print("\nFuzzy Set B:-");
FZ.Fuzzyset_print(E, mB);

System.out.print("\nComplement of Fuzzy Set A:-\n~A:-");
FZ.Fuzzyset_print(E, FZ.Fuzzyset_comp(mA));
System.out.print("\nComplement of Fuzzy Set B:-\n~B:-");
FZ.Fuzzyset_print(E, FZ.Fuzzyset_comp(mB));

System.out.print("\nUnion of Fuzzy Sets A & B:-\n A U B:-");
FZ.Fuzzyset_print(E, FZ.Union_intersec(mA,mB,"max"));
System.out.print("\nIntersection of Fuzzy Sets A & B:-\n A n B:-");
FZ.Fuzzyset_print(E, FZ.Union_intersec(mA,mB,"min"));

System.out.print("\nSet-difference of Fuzzy Sets A & B:-\n A|B:-");
FZ.Fuzzyset_print(E, FZ.Union_intersec(mA,FZ.Fuzzyset_comp(mB),"min"));
System.out.print("\nSet-difference of Fuzzy Sets B & A:-\n B|A:-");
FZ.Fuzzyset_print(E, FZ.Union_intersec(mB,FZ.Fuzzyset_comp(mA),"min"));
}
}
```

OUTPUT:

```
ce-306pc6@ce306pc6-System-Product-Name:~$ javac Fuzzyset_op.java
ce-306pc6@ce306pc6-System-Product-Name:~$ java Fuzzyset_op
Enter the no. of elements(max 10):-5
Enter the elements of Fuzzy set A & B:-2 4 6 8 10
Enter the membership value of elements Fuzzy set A:-0.9 0.4 0.4 0.7 0
Enter the membership value of elements Fuzzy set B:-0.2 0.8 0.5 0.3 1.0

Fuzzy Set A:-{0.9/2.0+0.4/4.0+0.4/6.0+0.7/8.0+0.0/10.0}

Fuzzy Set B:-{0.2/2.0+0.8/4.0+0.5/6.0+0.3/8.0+1.0/10.0}

Complement of Fuzzy Set A:-
~A:-{0.100000024/2.0+0.6/4.0+0.6/6.0+0.3/8.0+1.0/10.0}

Complement of Fuzzy Set B:-
~B:-{0.8/2.0+0.19999999/4.0+0.5/6.0+0.7/8.0+0.0/10.0}

Union of Fuzzy Sets A & B:-
 A U B:-{0.9/2.0+0.8/4.0+0.5/6.0+0.7/8.0+1.0/10.0}

Intersection of Fuzzy Sets A & B:-
 A n B:-{0.2/2.0+0.4/4.0+0.4/6.0+0.3/8.0+0.0/10.0}

Set-difference of Fuzzy Sets A & B:-
 A|B:-{0.8/2.0+0.19999999/4.0+0.4/6.0+0.7/8.0+0.0/10.0}

Set-difference of Fuzzy Sets B & A:-
 B|A:-{0.100000024/2.0+0.6/4.0+0.5/6.0+0.3/8.0+1.0/10.0}
ce-306pc6@ce306pc6-System-Product-Name:~$
```

```
ce-306pc6@ce306pc6-System-Product-Name:~$ gedit Fuzzyset_op.java
ce-306pc6@ce306pc6-System-Product-Name:~$ javac Fuzzyset_op.java
ce-306pc6@ce306pc6-System-Product-Name:~$ java Fuzzyset_op
Enter the no. of elements(max 10):-4
Enter the elements of Fuzzy set A & B:-2 4 6 8
Enter the membership value of elements Fuzzy set A:-1 0.3 0.5 0.2
Enter the membership value of elements Fuzzy set B:-0.5 0.4 0.1 1

Fuzzy Set A:-{1.0/2.0+0.3/4.0+0.5/6.0+0.2/8.0}

Fuzzy Set B:-{0.5/2.0+0.4/4.0+0.1/6.0+1.0/8.0}

Complement of Fuzzy Set A:-
~A:-{0.0/2.0+0.7/4.0+0.5/6.0+0.8/8.0}

Complement of Fuzzy Set B:-
~B:-{0.5/2.0+0.6/4.0+0.9/6.0+0.0/8.0}

Union of Fuzzy Sets A & B:-
 A U B:-{1.0/2.0+0.4/4.0+0.5/6.0+1.0/8.0}

Intersection of Fuzzy Sets A & B:-
 A n B:-{0.5/2.0+0.3/4.0+0.1/6.0+0.2/8.0}

Set-difference of Fuzzy Sets A & B:-
 A|B:-{0.5/2.0+0.3/4.0+0.5/6.0+0.0/8.0}

Set-difference of Fuzzy Sets B & A:-
 B|A:-{0.0/2.0+0.4/4.0+0.1/6.0+0.8/8.0}
ce-306pc6@ce306pc6-System-Product-Name:~$
```

Conclusion: Thus the Fuzzy Set Operations (Union, Intersection, Complement, Set Difference) for the given two Fuzzy Sets

A={0.9/2 + 0.4/4 + 0.4/6 + 0.7/8 + 0/10}

B={0.2/2 + 0.8/4 + 0.5/6 + 0.3/8 + 1/10}.

Has been successfully implemented.