Union of Fuzzy sets

```
A = dict()
B = dict()
Y = dict()

A = {"x1": 0.1, "x2": 0.7, "x3": 1, "x4": 0}
B = {"x1": 0.4, "x2": 0.3, "x3": 0.2, "x4": 1}

print('The First Fuzzy Set is :', A)
print('The Second Fuzzy Set is :', B)

for A_key, B_key in zip(A, B):
  A_value = A[A_key]
  B_value = B[B_key]

  if A_value > B_value:
    Y[A_key] = A_value
  else:
    Y[B_key] = B_value

print('Fuzzy Set Union is :', Y)
```

```
The First Fuzzy Set is : {'x1': 0.1, 'x2': 0.7, 'x3': 1, 'x4': 0}
The Second Fuzzy Set is : {'x1': 0.4, 'x2': 0.3, 'x3': 0.2, 'x4': 1}
Fuzzy Set Union is : {'x1': 0.4, 'x2': 0.7, 'x3': 1, 'x4': 1}
```

Intersecton of Fuzzy sets

```
z = dict()


print('The First Fuzzy Set is :', A)
print('The Second Fuzzy Set is :', B)


for A_key, B_key in zip(A, B):
    A_value = A[A_key]
    B_value = B[B_key]

    if A_value < B_value:
        z[A_key] = A_value
    else:
        z[B_key] = B_value
print('Fuzzy Set Intersection is :', z)
```

```
The First Fuzzy Set is : {'x1': 0.1, 'x2': 0.7, 'x3': 1, 'x4': 0}
The Second Fuzzy Set is : {'x1': 0.4, 'x2': 0.3, 'x3': 0.2, 'x4': 1}
Fuzzy Set Intersection is : {'x1': 0.1, 'x2': 0.3, 'x3': 0.2, 'x4': 0}
```

Complement of Fuzzy set

```
compl = dict()

print('The Fuzzy Set is :', A)

for A_key in A:
  compl[A_key]= 1-A[A_key]

print('Fuzzy Set Complement is :', compl)
```

```
The Fuzzy Set is : {'x1': 0.1, 'x2': 0.7, 'x3': 1, 'x4': 0}
Fuzzy Set Complement is : {'x1': 0.9, 'x2': 0.30000000000000004, 'x3': 0, 'x4': 1}
```

```
def cartesian():
    n = int(input("\nEnter number of elements in first set (A): "))
    A = []
    B = []
    print("Enter elements for A:")
    for i in range(0, n):
```

```
            ele = float(input())
            A.append(ele)
        m = int(input("\nEnter number of elements in second set (B): "))
        print("Enter elements for B:")
        for i in range(0, m):
            ele = float(input())
            B.append(ele)
        print("A = {"+str(A)[1:-1]+"}")
        print("B = {"+str(B)[1:-1]+"}")
        cart_prod = []
        cart_prod = [[0 for j in range(m)]for i in range(n)]
        for i in range(n):
            for j in range(m):
                cart_prod[i][j] = min(A[i],B[j])
        print("A x B = ")
        for i in range(n):
            for j in range(m):
                print(cart_prod[i][j],end="  ")
            print("\n")
        return


    def minmax():
        r1 = int(input("Enter number of rows of first relation (R1): "))
        c1 = int(input("Enter number of columns of first relation (R1): "))
        rel1=[[0 for i in range(c1)]for j in range(r1)]
        print("Enter the elments for R:")
        for i in range(r1):
            for j in range(c1):
                rel1[i][j]=float(input())

        r2 = int(input("Enter number of rows of second relation (R2): "))
        c2 = int(input("Enter number of columns of second relation (R2): "))
        rel2=[[0 for i in range(c2)]for j in range(r2)]
        print("Enter the elments for R:")
        for i in range(r2):
            for j in range(c2):
                rel2[i][j]=float(input())

        print("\nR1 = ")
        for i in range(r1):
            for j in range(c1):
                print(rel1[i][j],end=" ")
            print("\n")
        print("\nR2 = ")
        for i in range(r2):
            for j in range(c2):
                print(rel2[i][j],end=" ")
            print("\n")


        col=0
        comp=[]
        for i in range(r1):
            comp.append([])
            for j in range(c2):
                l=[]
                for k in range(r2):
                    l.append(min(rel1[i][k],rel2[k][j]))
                comp[i].append(max(l))

        print("\nR1 composition R2 =")
        for i in range(r1):
            for j in range(c2):
                print(comp[i][j],end=" ")
            print("\n")
        return

    ch=1
    while ch==1:
        print("MENU:\n----\n1->Cartesian Product\n2->Minmax Composition\n3->Exit")
        op=int(input("Enter Your Choice: "))
        if op==1:
            cartesian()
        elif op==2:
            minmax()
        elif op==3:
```

```
        break
    else:
        print("Wrong Choice!")
    ch=int(input("Do you wish to continue (1-Yes | 0-No): "))
    print("\n")
```

```
MENU:
----
1->Cartesian Product
2->Minmax Composition
3->Exit
Enter Your Choice: 1

Enter number of elements in first set (A): 2
Enter elements for A:
0.2
0.4

Enter number of elements in second set (B): 2
Enter elements for B:
0.5
0.6
A = {0.2, 0.4}
B = {0.5, 0.6}
A x B =
0.2  0.2

0.4  0.4

Do you wish to continue (1-Yes | 0-No): 1


MENU:
----
1->Cartesian Product
2->Minmax Composition
3->Exit
Enter Your Choice: 2
Enter number of rows of first relation (R1): 2
Enter number of columns of first relation (R1): 2
Enter the elments for R:
0.1
0.3
0.5
0.7
Enter number of rows of second relation (R2): 2
Enter number of columns of second relation (R2): 2
Enter the elments for R:
0.2
0.4
0.6
0.8

R1 =
0.1 0.3

0.5 0.7


R2 =
0.2 0.4

0.6 0.8
```