ASSIGNMENT NO 2

PROBLEM STATEMENT:

To create ADT that implement the "set" concept.

a. Add (new Element) -Place a value into the set , b. Remove (element) Remove the

value

c. Contains (element) Return true if element is in collection, d. Size () Return number of

values in collection Iterator () Return an iterator used to loop over collection, e.

Intersection of two sets , f. Union of two sets, g. Difference between two sets, h. Subset

INPUT:

class SetADT:

def \_\_init\_\_(self):

self.elements = set()

def add(self, element):

self.elements.add(element)

def remove(self, element):

self.elements.discard(element)

def contains(self, element):

return element in self.elements

def size(self):

return len(self.elements)

def iterator(self):

return iter(self.elements)

def intersection(self, other\_set):

return self.elements.intersection(other\_set.elements)

def union(self, other\_set):

return self.elements.union(other\_set.elements)

def difference(self, other\_set):

return self.elements.difference(other\_set.elements)

def subset(self, other\_set):

return self.elements.issubset(other\_set.elements)

def main():

set1 = SetADT()

set2 = SetADT()

while True:

print("\nSet Operations Menu:")

print("1. Add element to Set 1")

print("2. Add element to Set 2")

print("3. Remove element from Set 1")

print("4. Remove element from Set 2")

print("5. Check if element is in Set 1")

print("6. Check if element is in Set 2")

print("7. Get size of Set 1")

print("8. Get size of Set 2")

print("9. Get intersection of Set 1 and Set 2")

print("10. Get union of Set 1 and Set 2")

print("11. Get difference of Set 1 and Set 2")

print("12. Check if Set 1 is subset of Set 2")

print("13. Exit")

choice = int(input("Enter your choice: "))

if choice == 1:

element = int(input("Enter element to add to Set 1: "))

set1.add(element)

print("Set 1:", set1.elements)

elif choice == 2:

element = int(input("Enter element to add to Set 2: "))

set2.add(element)

print("Set 2:", set2.elements)

elif choice == 3:

element = int(input("Enter element to remove from Set 1: "))

set1.remove(element)

print("Set 1:", set1.elements)

elif choice == 4:

element = int(input("Enter element to remove from Set 2: "))

set2.remove(element)

print("Set 2:", set2.elements)

elif choice == 5:

element = int(input("Enter element to check in Set 1: "))

print(element, "is in Set 1" if set1.contains(element) else "is not in Set 1")

elif choice == 6:

element = int(input("Enter element to check in Set 2: "))

print(element, "is in Set 2" if set2.contains(element) else "is not in Set 2")

elif choice == 7:

print("Size of Set 1:", set1.size())

elif choice == 8:

print("Size of Set 2:", set2.size())

elif choice == 9:

print("Intersection of Set 1 and Set 2:", set1.intersection(set2))

elif choice == 10:

print("Union of Set 1 and Set 2:", set1.union(set2))

elif choice == 11:

print("Difference of Set 1 and Set 2:", set1.difference(set2))

elif choice == 12:

print("Set 1 is subset of Set 2" if set1.subset(set2) else "Set 1 is not subset of Set 2")

elif choice == 13:

break

else:

print("Invalid choice. Please try again.")

if \_\_name\_\_ == "\_\_main\_\_":

main()

OUTPUT:

Set Operations Menu:

1. Add element to Set 1

2. Add element to Set 2

3. Remove element from Set 1

4. Remove element from Set 2

5. Check if element is in Set 1

6. Check if element is in Set 2

7. Get size of Set 1

8. Get size of Set 2

9. Get intersection of Set 1 and Set 2

10. Get union of Set 1 and Set 2

11. Get difference of Set 1 and Set 2

12. Check if Set 1 is subset of Set 2

13. Exit

Enter your choice: 1

Enter element to add to Set 1: 1

Set 1: {1}

Set Operations Menu:

1. Add element to Set 1

2. Add element to Set 2

3. Remove element from Set 1

4. Remove element from Set 2

5. Check if element is in Set 1

6. Check if element is in Set 2

7. Get size of Set 1

8. Get size of Set 2

9. Get intersection of Set 1 and Set 2

10. Get union of Set 1 and Set 2

11. Get difference of Set 1 and Set 2

12. Check if Set 1 is subset of Set 2

13. Exit

Enter your choice: 1

Enter element to add to Set 1: 2

Set 1: {1, 2}

Set Operations Menu:

1. Add element to Set 1

2. Add element to Set 2

3. Remove element from Set 1

4. Remove element from Set 2

5. Check if element is in Set 1

6. Check if element is in Set 2

7. Get size of Set 1

8. Get size of Set 2

9. Get intersection of Set 1 and Set 2

10. Get union of Set 1 and Set 2

11. Get difference of Set 1 and Set 2

12. Check if Set 1 is subset of Set 2

13. Exit

Enter your choice: 1

Enter element to add to Set 1: 3

Set 1: {1, 2, 3}

Set Operations Menu:

1. Add element to Set 1

2. Add element to Set 2

3. Remove element from Set 1

4. Remove element from Set 2

5. Check if element is in Set 1

6. Check if element is in Set 2

7. Get size of Set 1

8. Get size of Set 2

9. Get intersection of Set 1 and Set 2

10. Get union of Set 1 and Set 2

11. Get difference of Set 1 and Set 2

12. Check if Set 1 is subset of Set 2

13. Exit

Enter your choice: 2

Enter element to add to Set 2: 3

Set 2: {3}

Set Operations Menu:

1. Add element to Set 1

2. Add element to Set 2

3. Remove element from Set 1

4. Remove element from Set 2

5. Check if element is in Set 1

6. Check if element is in Set 2

7. Get size of Set 1

8. Get size of Set 2

9. Get intersection of Set 1 and Set 2

10. Get union of Set 1 and Set 2

11. Get difference of Set 1 and Set 2

12. Check if Set 1 is subset of Set 2

13. Exit

Enter your choice: 2

Enter element to add to Set 2: 4

Set 2: {3, 4}

Set Operations Menu:

1. Add element to Set 1

2. Add element to Set 2

3. Remove element from Set 1

4. Remove element from Set 2

5. Check if element is in Set 1

6. Check if element is in Set 2

7. Get size of Set 1

8. Get size of Set 2

9. Get intersection of Set 1 and Set 2

10. Get union of Set 1 and Set 2

11. Get difference of Set 1 and Set 2

12. Check if Set 1 is subset of Set 2

13. Exit

Enter your choice: 3

Enter element to remove from Set 1: 2

Set 1: {1, 3}

Set Operations Menu:

1. Add element to Set 1

2. Add element to Set 2

3. Remove element from Set 1

4. Remove element from Set 2

5. Check if element is in Set 1

6. Check if element is in Set 2

7. Get size of Set 1

8. Get size of Set 2

9. Get intersection of Set 1 and Set 2

10. Get union of Set 1 and Set 2

11. Get difference of Set 1 and Set 2

12. Check if Set 1 is subset of Set 2

13. Exit

Enter your choice: 4

Enter element to remove from Set 2: 2

Set 2: {3, 4}

Set Operations Menu:

1. Add element to Set 1

2. Add element to Set 2

3. Remove element from Set 1

4. Remove element from Set 2

5. Check if element is in Set 1

6. Check if element is in Set 2

7. Get size of Set 1

8. Get size of Set 2

9. Get intersection of Set 1 and Set 2

10. Get union of Set 1 and Set 2

11. Get difference of Set 1 and Set 2

12. Check if Set 1 is subset of Set 2

13. Exit

Enter your choice: 5

Enter element to check in Set 1: 4

4 is not in Set 1

Set Operations Menu:

1. Add element to Set 1

2. Add element to Set 2

3. Remove element from Set 1

4. Remove element from Set 2

5. Check if element is in Set 1

6. Check if element is in Set 2

7. Get size of Set 1

8. Get size of Set 2

9. Get intersection of Set 1 and Set 2

10. Get union of Set 1 and Set 2

11. Get difference of Set 1 and Set 2

12. Check if Set 1 is subset of Set 2

13. Exit

Enter your choice: 5

Enter element to check in Set 1: 2

2 is not in Set 1

Set Operations Menu:

1. Add element to Set 1

2. Add element to Set 2

3. Remove element from Set 1

4. Remove element from Set 2

5. Check if element is in Set 1

6. Check if element is in Set 2

7. Get size of Set 1

8. Get size of Set 2

9. Get intersection of Set 1 and Set 2

10. Get union of Set 1 and Set 2

11. Get difference of Set 1 and Set 2

12. Check if Set 1 is subset of Set 2

13. Exit

Enter your choice: 6

Enter element to check in Set 2: 2

2 is not in Set 2

Set Operations Menu:

1. Add element to Set 1

2. Add element to Set 2

3. Remove element from Set 1

4. Remove element from Set 2

5. Check if element is in Set 1

6. Check if element is in Set 2

7. Get size of Set 1

8. Get size of Set 2

9. Get intersection of Set 1 and Set 2

10. Get union of Set 1 and Set 2

11. Get difference of Set 1 and Set 2

12. Check if Set 1 is subset of Set 2

13. Exit

Enter your choice: 7

Size of Set 1: 2

Set Operations Menu:

1. Add element to Set 1

2. Add element to Set 2

3. Remove element from Set 1

4. Remove element from Set 2

5. Check if element is in Set 1

6. Check if element is in Set 2

7. Get size of Set 1

8. Get size of Set 2

9. Get intersection of Set 1 and Set 2

10. Get union of Set 1 and Set 2

11. Get difference of Set 1 and Set 2

12. Check if Set 1 is subset of Set 2

13. Exit

Enter your choice: 8

Size of Set 2: 2

Set Operations Menu:

1. Add element to Set 1

2. Add element to Set 2

3. Remove element from Set 1

4. Remove element from Set 2

5. Check if element is in Set 1

6. Check if element is in Set 2

7. Get size of Set 1

8. Get size of Set 2

9. Get intersection of Set 1 and Set 2

10. Get union of Set 1 and Set 2

11. Get difference of Set 1 and Set 2

12. Check if Set 1 is subset of Set 2

13. Exit

Enter your choice: 9

Intersection of Set 1 and Set 2: {3}

Set Operations Menu:

1. Add element to Set 1

2. Add element to Set 2

3. Remove element from Set 1

4. Remove element from Set 2

5. Check if element is in Set 1

6. Check if element is in Set 2

7. Get size of Set 1

8. Get size of Set 2

9. Get intersection of Set 1 and Set 2

10. Get union of Set 1 and Set 2

11. Get difference of Set 1 and Set 2

12. Check if Set 1 is subset of Set 2

13. Exit

Enter your choice: 10

Union of Set 1 and Set 2: {1, 3, 4}

Set Operations Menu:

1. Add element to Set 1

2. Add element to Set 2

3. Remove element from Set 1

4. Remove element from Set 2

5. Check if element is in Set 1

6. Check if element is in Set 2

7. Get size of Set 1

8. Get size of Set 2

9. Get intersection of Set 1 and Set 2

10. Get union of Set 1 and Set 2

11. Get difference of Set 1 and Set 2

12. Check if Set 1 is subset of Set 2

13. Exit

Enter your choice: 11

Difference of Set 1 and Set 2: {1}

Set Operations Menu:

1. Add element to Set 1

2. Add element to Set 2

3. Remove element from Set 1

4. Remove element from Set 2

5. Check if element is in Set 1

6. Check if element is in Set 2

7. Get size of Set 1

8. Get size of Set 2

9. Get intersection of Set 1 and Set 2

10. Get union of Set 1 and Set 2

11. Get difference of Set 1 and Set 2

12. Check if Set 1 is subset of Set 2

13. Exit

Enter your choice: 12

Set 1 is not subset of Set 2

Set Operations Menu:

1. Add element to Set 1

2. Add element to Set 2

3. Remove element from Set 1

4. Remove element from Set 2

5. Check if element is in Set 1

6. Check if element is in Set 2

7. Get size of Set 1

8. Get size of Set 2

9. Get intersection of Set 1 and Set 2

10. Get union of Set 1 and Set 2

11. Get difference of Set 1 and Set 2

12. Check if Set 1 is subset of Set 2

13. Exit

Enter your choice: 13