Sets Assignment

June 18, 2021

1 Sets Assignment

1.1 Problem 1

Create lists a_list, b_list and c_list by selecting 50 random numbers for each from the integers from 1 to 250 inclusive. Print the lists.

[11]:
```
import random
start = 1
stop = 250
limit = 50

a_list = [random.randint(start, stop) for iter in range(limit)]
b_list = [random.randint(start, stop) for iter in range(limit)]
c_list = [random.randint(start, stop) for iter in range(limit)]

print (a_list)
print (b_list)
print (c_list)
```

```
[178, 170, 125, 48, 83, 202, 35, 80, 93, 126, 173, 28, 187, 72, 239, 107, 234,
67, 125, 140, 75, 212, 131, 122, 39, 212, 113, 203, 37, 70, 104, 134, 109, 47,
61, 225, 11, 119, 40, 86, 79, 143, 224, 88, 201, 236, 177, 230, 38, 63]
[102, 6, 153, 213, 240, 243, 23, 234, 163, 15, 118, 6, 194, 37, 159, 151, 70,
49, 183, 38, 229, 219, 13, 211, 24, 76, 237, 145, 206, 150, 98, 88, 229, 205,
105, 123, 88, 83, 158, 220, 136, 37, 94, 188, 120, 219, 148, 139, 200, 37]
[239, 210, 208, 231, 227, 4, 214, 76, 83, 66, 138, 92, 96, 20, 148, 14, 192,
126, 68, 24, 174, 136, 58, 34, 227, 38, 230, 208, 64, 243, 214, 221, 145, 172,
13, 235, 96, 247, 177, 106, 24, 206, 22, 59, 96, 226, 6, 174, 221, 75]
```

1.2 Problem 2

Convert the lists from Problem 1 into corresonding sets a, b, and c. Print the sets.

[12]:
```
a = set(a_list)
b = set(b_list)
c = set(c_list)
print("a is",a)
print("b is",b)
```

```
print("c is",c)
```

```
a is {131, 134, 11, 140, 143, 28, 35, 37, 38, 39, 40, 170, 173, 47, 48, 177,
178, 187, 61, 63, 67, 70, 72, 201, 202, 75, 203, 79, 80, 83, 212, 86, 88, 93,
224, 225, 230, 104, 234, 107, 236, 109, 239, 113, 119, 122, 125, 126}
b is {6, 136, 139, 13, 15, 145, 148, 150, 23, 151, 153, 24, 158, 159, 163, 37,
38, 49, 183, 188, 194, 70, 200, 76, 205, 206, 211, 83, 213, 88, 219, 220, 94,
98, 229, 102, 105, 234, 237, 240, 243, 118, 120, 123}
c is {4, 6, 136, 138, 13, 14, 145, 20, 148, 22, 24, 34, 38, 172, 174, 177, 58,
59, 192, 64, 66, 68, 75, 76, 206, 208, 210, 83, 214, 92, 221, 96, 226, 227, 230,
231, 106, 235, 239, 243, 247, 126}
```

1.3 Problem 3

Compute the union of a and b and print it.

[14]:
```
union = a.union(b)
print("Union of a and b is",union)
```

```
Union of a and b is {6, 11, 13, 15, 23, 24, 28, 35, 37, 38, 39, 40, 47, 48, 49,
61, 63, 67, 70, 72, 75, 76, 79, 80, 83, 86, 88, 93, 94, 98, 102, 104, 105, 107,
109, 113, 118, 119, 120, 122, 123, 125, 126, 131, 134, 136, 139, 140, 143, 145,
148, 150, 151, 153, 158, 159, 163, 170, 173, 177, 178, 183, 187, 188, 194, 200,
201, 202, 203, 205, 206, 211, 212, 213, 219, 220, 224, 225, 229, 230, 234, 236,
237, 239, 240, 243}
```

1.4 Problem 4

Compute the intersection of b and c and print it.

[15]:
```
intersection = b.intersection(c)
print("Intersection of b and c is",intersection)
```

```
Intersection of b and c is {6, 38, 136, 76, 13, 206, 145, 83, 148, 243, 24}
```

1.5 Problem 5

Define U as the smallest appropriate universe for this problem set. Create it explicitly as a set. Print it.

[24]:
```
U = a.union(b.union(c))
print("U is",U)
```

```
U is {4, 6, 11, 13, 14, 15, 20, 22, 23, 24, 28, 34, 35, 37, 38, 39, 40, 47, 48,
49, 58, 59, 61, 63, 64, 66, 67, 68, 70, 72, 75, 76, 79, 80, 83, 86, 88, 92, 93,
94, 96, 98, 102, 104, 105, 106, 107, 109, 113, 118, 119, 120, 122, 123, 125,
126, 131, 134, 136, 138, 139, 140, 143, 145, 148, 150, 151, 153, 158, 159, 163,
170, 172, 173, 174, 177, 178, 183, 187, 188, 192, 194, 200, 201, 202, 203, 205,
206, 208, 210, 211, 212, 213, 214, 219, 220, 221, 224, 225, 226, 227, 229, 230,
231, 234, 235, 236, 237, 239, 240, 243, 247}
```

1.6 Problem 6

Define a function comp(s). Its single parameter s is a set and it returns the complement of its input.

[34]:
```
def comps(s):
    return s

print("Complement of set a is",comps(set(a_list)))
```

```
Complement of set a is {131, 134, 11, 140, 143, 28, 35, 37, 38, 39, 40, 170,
173, 47, 48, 177, 178, 187, 61, 63, 67, 70, 72, 201, 202, 75, 203, 79, 80, 83,
212, 86, 88, 93, 224, 225, 230, 104, 234, 107, 236, 109, 239, 113, 119, 122,
125, 126}
```

1.7 Problem 7

Using the function comp(), compute the complement of the set a and call it a_comp. Using an appropriate method or operation show that a_comp really is the complement of a.

[35]:
```
a_comp=comps(set(a_list))
print("Intersection between set a and a_comp is" ,a_comp & set(a_list))
```

```
Intersection between set a and a_comp is {131, 134, 11, 140, 143, 28, 35, 37,
38, 39, 40, 170, 173, 47, 48, 177, 178, 187, 61, 63, 67, 70, 72, 201, 202, 75,
203, 79, 80, 83, 212, 86, 88, 93, 224, 225, 230, 104, 234, 107, 236, 109, 239,
113, 119, 122, 125, 126}
```

1.8 Problem 8

Show that for these particular sets, the associativity of the operations union and intersection can be verfied. Note that you don't need to visually examine the results. Just test for equality.

[36]:
```
set_a=set(a_list)
set_b=set(b_list)
set_c=set(c_list)
print("Value of set_a U (set_b U set_c)",set_a|(set_b|set_c))
print("Value of (set_a U set_b)U set_c",(set_a|set_b)|set_c)
print("Value of set_a  (set_b  set_c)",set_a&(set_b&set_c))
print("Value of (set_a U set_b)  set_c",(set_a&set_b)&set_c)
```

```
Value of set_a U (set_b U set_c) {4, 6, 11, 13, 14, 15, 20, 22, 23, 24, 28, 34,
35, 37, 38, 39, 40, 47, 48, 49, 58, 59, 61, 63, 64, 66, 67, 68, 70, 72, 75, 76,
79, 80, 83, 86, 88, 92, 93, 94, 96, 98, 102, 104, 105, 106, 107, 109, 113, 118,
119, 120, 122, 123, 125, 126, 131, 134, 136, 138, 139, 140, 143, 145, 148, 150,
151, 153, 158, 159, 163, 170, 172, 173, 174, 177, 178, 183, 187, 188, 192, 194,
200, 201, 202, 203, 205, 206, 208, 210, 211, 212, 213, 214, 219, 220, 221, 224,
225, 226, 227, 229, 230, 231, 234, 235, 236, 237, 239, 240, 243, 247}
Value of (set_a U set_b)U set_c {4, 6, 11, 13, 14, 15, 20, 22, 23, 24, 28, 34,
35, 37, 38, 39, 40, 47, 48, 49, 58, 59, 61, 63, 64, 66, 67, 68, 70, 72, 75, 76,
```

```
79, 80, 83, 86, 88, 92, 93, 94, 96, 98, 102, 104, 105, 106, 107, 109, 113, 118,
119, 120, 122, 123, 125, 126, 131, 134, 136, 138, 139, 140, 143, 145, 148, 150,
151, 153, 158, 159, 163, 170, 172, 173, 174, 177, 178, 183, 187, 188, 192, 194,
200, 201, 202, 203, 205, 206, 208, 210, 211, 212, 213, 214, 219, 220, 221, 224,
225, 226, 227, 229, 230, 231, 234, 235, 236, 237, 239, 240, 243, 247}
Value of set_a  (set_b  set_c) {83, 38}
Value of (set_a U set_b)  set_c {83, 38}
```

[0]: