LEARN WEB

ale66

github.com/ale66/learn-web

SETS

- Sets are constructed from a sequence.
- Sets **cannot** have duplicated values
  - There are usually used to build sequence of unique items (e.g., set of identifiers such as IDs etc.).

```
1 my_list = ['Stelios', 'Tom', 'Tom', 'Stelios', 'Claudia']
2
3 my_set = set(my_list)
4
5 print(list(my_set))
6
7 # the set includes only the unique elements!
8 ['Stelios', 'Tom', 'Claudia']
```

SETS

ideal when we need to remove duplicated values

also ideal for *logical* operations

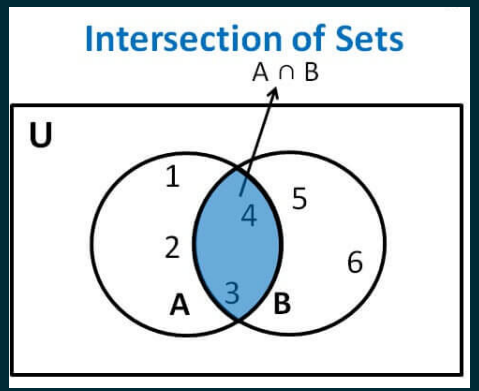
duplicates are eliminated

```
1  a = set([1, 2, 3, 4])
2
3  b = set([3, 4, 5, 6])
4
5  a.intersection(b)
6  set([3, 4])
```

```
1  c = a.intersection(b)
2
3  c.issubset(a)
4  True
```

```
1  a.issubset(b)
2  False
```

```
1  a.difference(b)
2
3  # will  return
4  set([1,2,5,6])
```



SETS: BASIC OPERATIONS

Create an empty set

Iterate over a set and print elements

```
 1  #Create a new empty set
 2  empty_set = set()
 3
 4  #Create a non empty set
 5  aset = set([0, 1, 2, 3, 4])
 6
 7  #Create a set
 8
 9  num_set = set([0, 1, 2, 3, 4, 5])
10
11  for element in num_set:
12    print(element)
```

SETS: BASIC OPERATIONS CONT'D

Add/remove data from a set

```
1 color_set = set()
2
3 color_set.add('Red')
4
5 #Add multiple items
6 color_set.update(['Blue', 'Green'])
7
8 # remove the last element
9 color_set.pop()
```

SETS: MORE BASIC OPERATIONS

```
1  x = set(['green', 'blue'])
2
3  y = set(['blue', 'yellow'])
4
5  z  = x & y       # or x.intersection(y)
```

```
1  'green', 'blue', 'yellow'
```

```
1  x = set(['green', 'blue'])
2
3  y = set(['blue', 'yellow'])
4
5  z = x | y        # or x.union(y)
```

Cardinality

```
1  colors = set(['green', 'blue'])
2
3  print(len(colors))
```

QUIZ 2: TRUE OR FALSE?

- Sets allow duplicated values
- Sets are unordered
- Sets are not indexed

SOLUTIONS!

- Sets allow duplicated values
  - False
- Sets are unordered
  - True
- Sets are not indexed
  - True

SUMMARY

Duplicates are eliminated

no ordering

no support for indexing

QUIZ 3!

Will it print True or False?


```
1  x = set(['Agatha Christie',
2           'J.R.R. Tolkien'])
3
4  y = set(['J.R.R. Tolkien',
5           'Virginia Woolf'])
6
7  z = set(['J.R.R. Tolkien'])
```

```
1  print(x.issubset(y))
```

```
1  print(y. issuperset(x)
```

```
1  print(z.issubset)
```

```
1  print(y.issuperset(z))
```

SOLUTION

Will it print True or False?

```
1  x = set(['Agatha Christie',
2           'J.R.R. Tolkien'])
3
4  y = set(['J.R.R. Tolkien',
5           'Virginia Woolf'])
6
7  z = set(['J.R.R. Tolkien'])
```

```
1  print(x.issubset(y))
2  False
```

```
1  print(y. issuperset(x)
2  False
```

```
1  print(z.issubset)
2  True
```

```
1  print(y.issuperset(z))
2  True
```

TUPLES

A data structure similar to lists

Main difference: tuples are *immutable*

Their application is faster than lists

```
1 mytuple = (10, 20, 30)
2
3 mytuple[0]
```

FUNCTIONS FOR TUPLES

There are two functions available only:

- `index` to find the occurrence of a value
- `count` to count the number of occurrences of a value

TUPLES IN DICTIONARIES

```
1 my_protected_dictionary = dict([('jan', 1), ('feb', 2), ('march', 3)])
2
3 my_protected_dictionary['feb’]
4 2
```

Often tuples are used as keys to dictionaries

Tuples are useful because they are

- are faster than lists
- protect the data from change

TUPLE UNPACKING

```
1 data  = (1,2,3)
2
3 x, y, z = data
```

Slicing is similar to lists

```
1 my_tuple = (1, 2, 3, 4, 5)
2
3 print(mytuple[2:])
4
5 (3, 4, 5)
```

WORKING WITH TUPLES

```
1  tuplex = (4, 6, 2, 8, 3, 1)
```

Since tuples are immutable we can not add new elements

tuple merge, with the + operator, can add elements and create a new tuple

```
1  # notice the extra ','
2  tuplex = tuplex + (9,)
3
4  print(tuplex)
```

Another workaround

```
1 tuplex = (4, 6, 2, 8, 3, 1)
2
3 listx = list(tuplex)
4
5 #Add an item in the list
6 listx.append(30)
7
8 #Make the list tuplex
9 tuplex = tuple(listx)
```

THE `count()` METHOD

```
1 tuplex = (2, 4, 5, 6, 2, 3, 4, 4, 7)
2
3 # find the np. of times it appears in the tuple:
4 count = tuplex.count(4)
```

COMPARISON, A

	Lists	Dictionaries	Sets	Tuples
When to use?	• Collection of data that does not need random access. • When you need to iterate and modify items.	• You need a key to value data association. • Fast lookup, based on a key. • When data needs to be modified	• When you want to eliminate duplicated values. • When you need uniqueness of elements	• To ensure immutability. • Can be used in combination with other data structure, for example a tuple could represent a key in a dictionary
Duplicated values?	Yes	No duplicated keys, Yes duplicated values	**No**	Yes (faster than lists)
Mutable?	Yes	Yes	Yes	No!
Slicing?	alist[0:2] (by index) * Remember index starts from zero	Not available	Not available (you need to create a loop and extract data)	Not available
When to use?	• Collection of data that does not need random access. • When you need to iterate and modify items.	• You need a key to value data association. • Fast lookup, based on a key. • When data needs to be modified.	• When you want to eliminate duplicated values. • When you need uniqueness of elements.	• To ensure immutability. • Can be used in combination with other data structure, for example a tuple could represent a key in a dictionary.

COMPARISON, B

	Lists	Dictionaries	Sets	Tuples
Create a new	alist = [10,20,30,40]	adict ={'**name**':Tom', '**email**':'tom@msn.com'}	aset={10,20,30,40}	atuple=(10,20,30)
Create an empty	alist = list() or alist = []	adict = dict() or adict = {}	aset=set()	atuple=() *Useless, you cannot add!
Add a value	alist.append(50) This will make: alist = [10,20,30,40,50]	Add a new key/value adict['city']='London'	aset.add(50)	You cannot add! Indirectly, you need to convert to a list
Remove a value	alist.remove(40) This will make: alist = [10,20,30]	Delete key and value adict.pop('email')	Delete the first element of the set aset.pop()	You cannot delete! Indirectly, you need to convert to a list
Update a value	alist[1] = 200 This will make alist = [10,200,30,40]	adict['city']='Athens'	Best way is to convert to list, update and make it a set again	You cannot update! Indirectly, you need to convert to a list
Access an element	If you want to access element 20, you will use the element index number 0 1 2 3 alist = [10,20,30,40] **alist[1]**	If you want to access an **element by key you use the key** adict['email'] it will extract the values for key 'email'	You have to use a loop to iterate	x,y,z = atuple So x = 10, y =20, z=30 Or index: atuple[
Loops	for element in **alist**: print(element)	for **key,value** in adict.**items()**: print(**key,value**)	for element in **aset**: print(element	for element in **atuple**: print(element) # We prefer to extract using variable