Python

Python Complex Data Structures

`[1,2,3,...]`	List
`{1,2,3,...}`	Set
`(1,2,3,...)`	Tuple
`{1:'a', 2:'b', 3:'c', ...}`	Dictionary

Recall:

- Sets are unordered and have no duplicates
- Tuples are immutable; you cannot change their entries
- We can nest these data structures flexibly

Python Complex Data Structure Creation

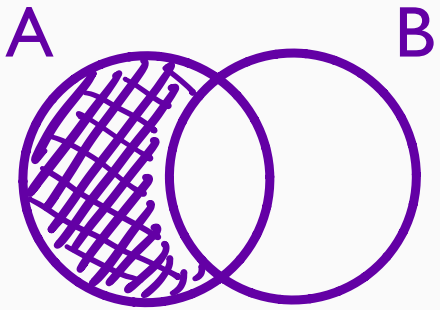
We can initialize empty data structures as follows:

`list()`	or `[]`	List
`set()`		Set
`tuple()`	or `()`	Tuple
`dict()`	or `{}`	Dictionary

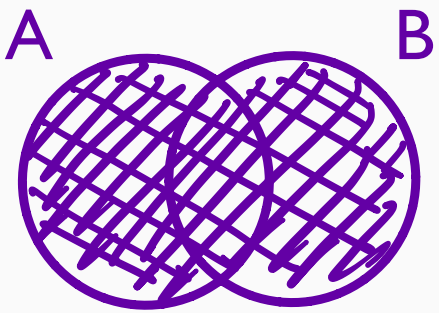
Python Sets

`len(set)`	Get number of items in set
`set.add()`	Add an item
`set.remove()`	Remove an item
`set_a - set_b`	Elements in a but not in b
	`set_a.difference(set_b)`
`set_a | set_b`	Elements in a and/or b
	`set_a.union(set_b)`
`set_a & set_b`	Elements in both a and b
	`set_a.intersection(set_b)`
`set_a ^ set_b`	Elements in a or b but not both
	`set_a.symmetric_difference(set_b)`
`set_a <= set_b`	Test if all elements in a are in b
	`set_a.issubset(set_b)`

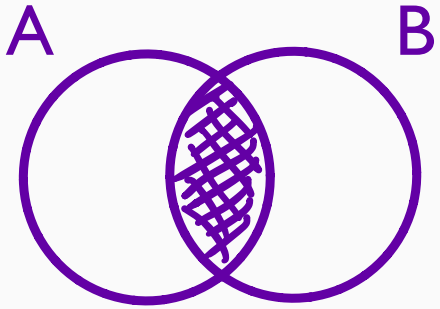
Python Sets



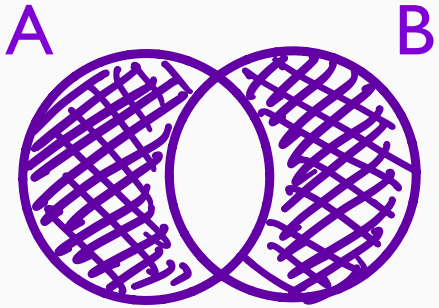
Difference: A - B



Union: A | B



Intersection: A & B



Symmetric Diff: A ^ B

Python Dictionaries

Recall that dictionaries have the structure:

```
dict = {key1 : val1, key2 : val2, ... }
```

We can access a specific value using its key:

```
dict[key1]
```

Similarly, we can assign a new value:

```
dict[key1] = val1_new
```

More generally:

`key in dict`	Check if key is in dictionary
`dict.pop(key)`	Remove key from dictionary
`dict.keys()`	Get a list of keys
`dict.values()`	Get a list of values
`dict.items()`	Get a list of (key,value) pairs

Python For and While Loops

We can create a while loop as follows:

```
while condition:
    do something as long as condition is met
```

We can create a for loop as follows:

```
for i in sequence:
    do something until no items left in sequence
```

The following tools are useful:

`break`	Exit the loop altogether
`continue`	Return to top of loop and continue
`range(start, stop, step)`	Create a list of integers
`for k,v in dict.items():`	Iterate over a dictionary