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School Nova *Computer Science*

Lists, Tuples, Sets, Dictionaries

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Overview



List:

[2, 4, 6]

ordered (index) and **mutable**;

can contain **any object**

can be nested

Tuple:

(2, 4, 6)

ordered (index) and **immutable**;

can contain **any object**

can be nested

Set:

{2, 4, 6}

unordered (no index) and **mutable**;

contains **unique** and **immutable** objects

can **NOT** be nested

Dictionary:

{"two": 2, "four": 4}

unordered and **mutable**; **BUT**

can be indexed a "key"; "keys" must be **immutable**

can contain **any object**

can be nested

Type conversion

```
name = "School Nova"  
print(list(name))  
print(tuple(name))  
print(set(name))  
# can't use dictionary(name)!
```

Output:

```
['S', 'c', 'h', 'o', 'o', 'l', ' ', 'N', 'o', 'v', 'a']  
('S', 'c', 'h', 'o', 'o', 'l', ' ', 'N', 'o', 'v', 'a')  
{'a', 'o', 'c', ' ', 'l', 'h', 'N', 'v', 'S'}
```



Empty and single item data structures

Empty:

`empty_list = []`

`empty_list = list()`

`empty_tuple = ()`

`empty_tuple = tuple()`

~~`empty_set = {}`~~

`empty_set = set()`

`empty_dictionary = {}`

~~`empty_dictionary = dictionary()`~~

Single item:

`X = [1]`

`X = (1)` # this is just an integer!

`X = (1,)` # this is a tuple

`X = 1,` # this is also a tuple

`X = {1}`

`X = {"one": 1}`

Lists versus tuples, p1



Very similar BUT

because lists are **mutable** and tuples are **immutable**

you can **NOT** do some things with tuples

that you can do with lists.

Cannot change tuples in any way (for example, cannot append or extend, cannot change individual elements).

Can change mutable objects inside tuples (nested tuples); for example:

```
nested_tuple = (1, 2, [5, 6])
```

```
nested_tuple[2][1] = 7 # replaces 6 with 7
```

Lists versus tuples, p2



Why ever use tuples if there are lists??

- 1) Tuples are faster.
- 2) Tuples make sense when individual elements never change (for example, chess board or geographical coordinates).
- 3) Tuples, unlike lists, can be used when immutable objects must be used: for example, elements of a set or dictionary keys (see the Overview slides above).