LEARN RISE SHINE
NAVTTC

Summer of Code
Artificial Intelligence
(Machine Learning & Deep Learning)

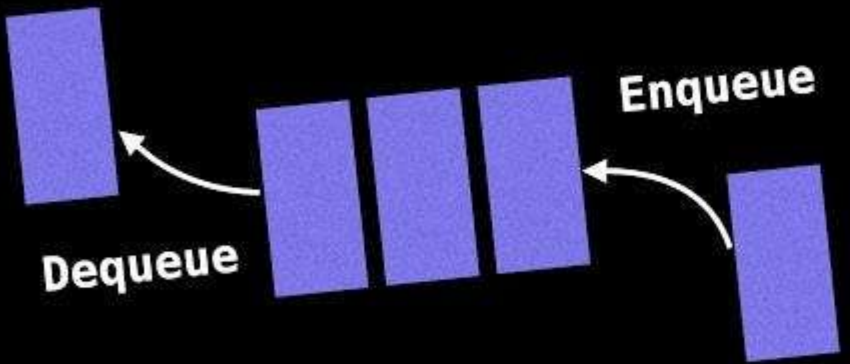
Instructor
Wajahat Ullah
- *Research Assistant* (DIP Lab)

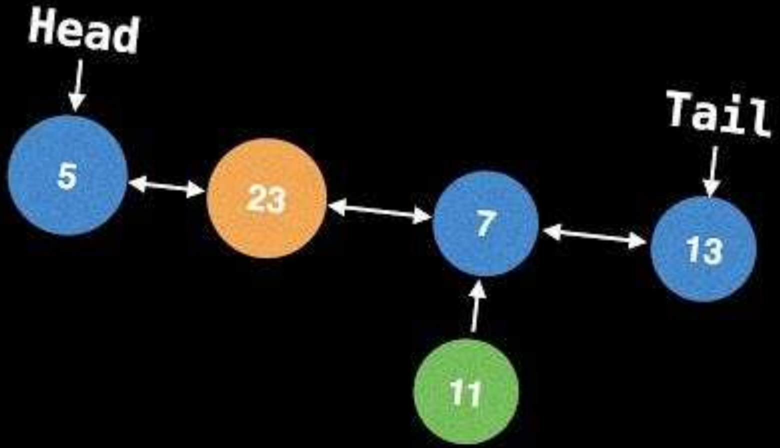
Duration
03 Months
(September – November)

Day 04 – Python Fundamentals (Data Structures)

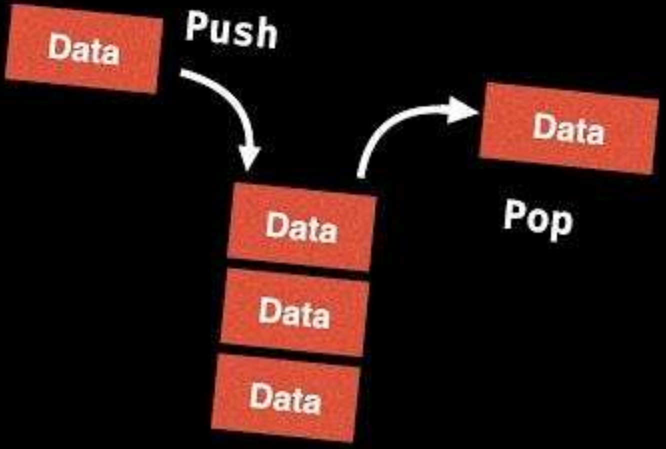
Objectives:

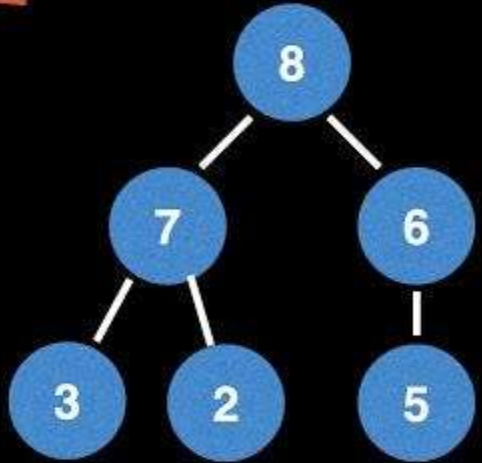
- What is a Data Structure?
- Built-in Data Structures in Python
- Strings, Lists, Tuples, Sets, Dictionaries
- Operations on Data Structures

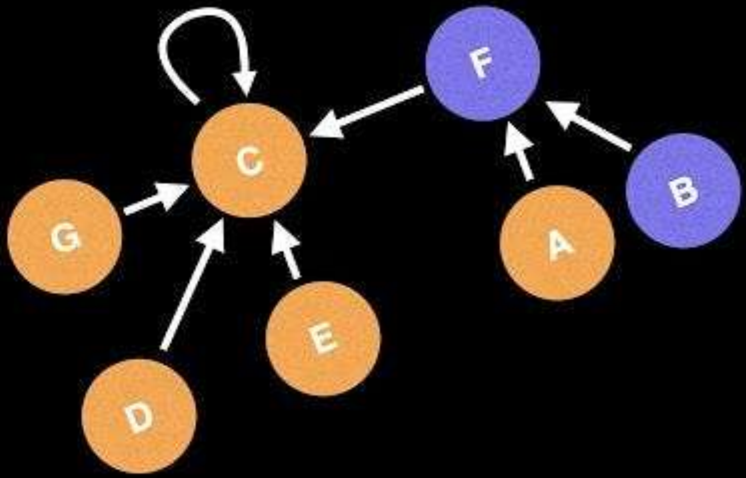


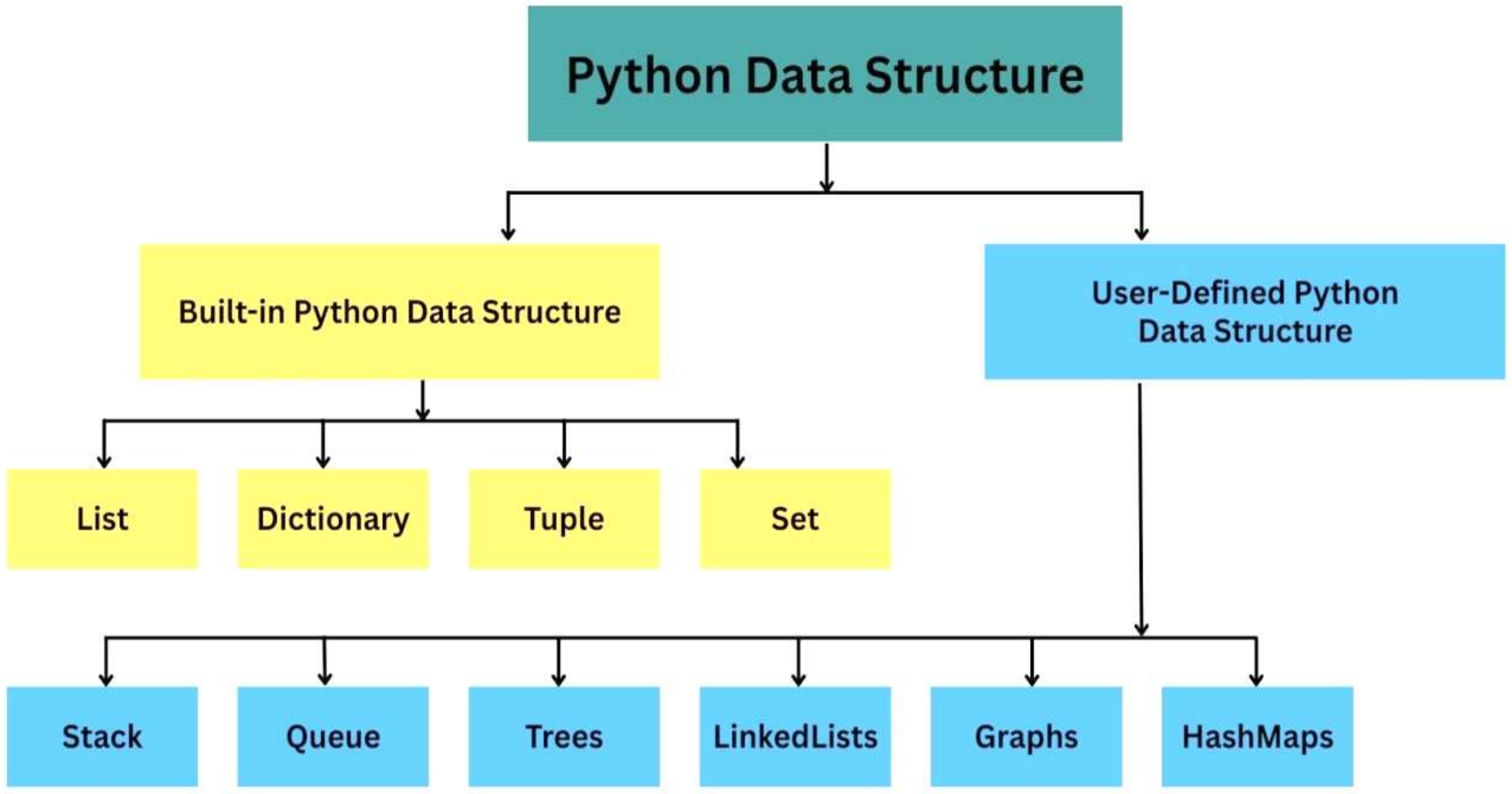


Data Structures









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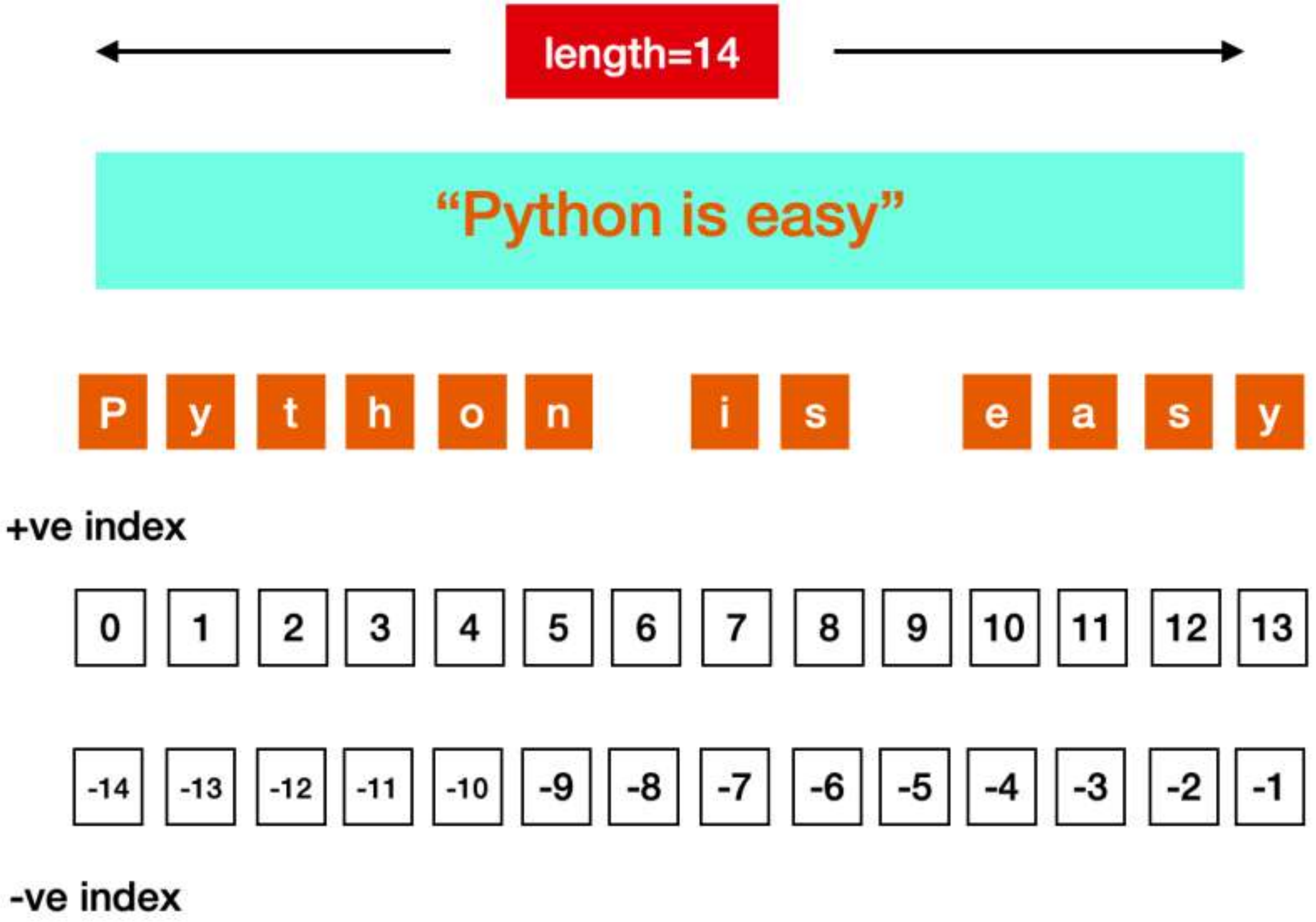
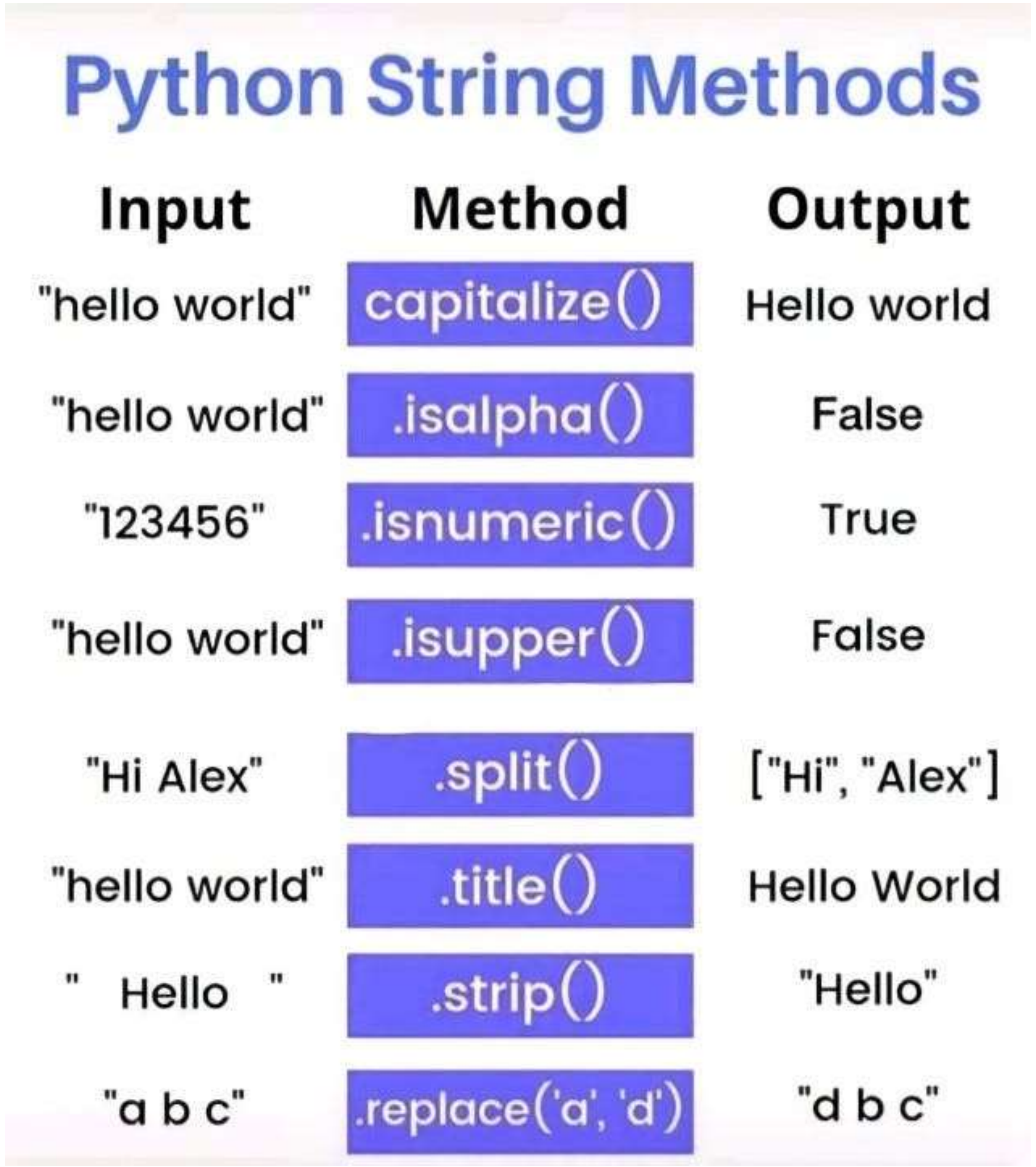
Python String

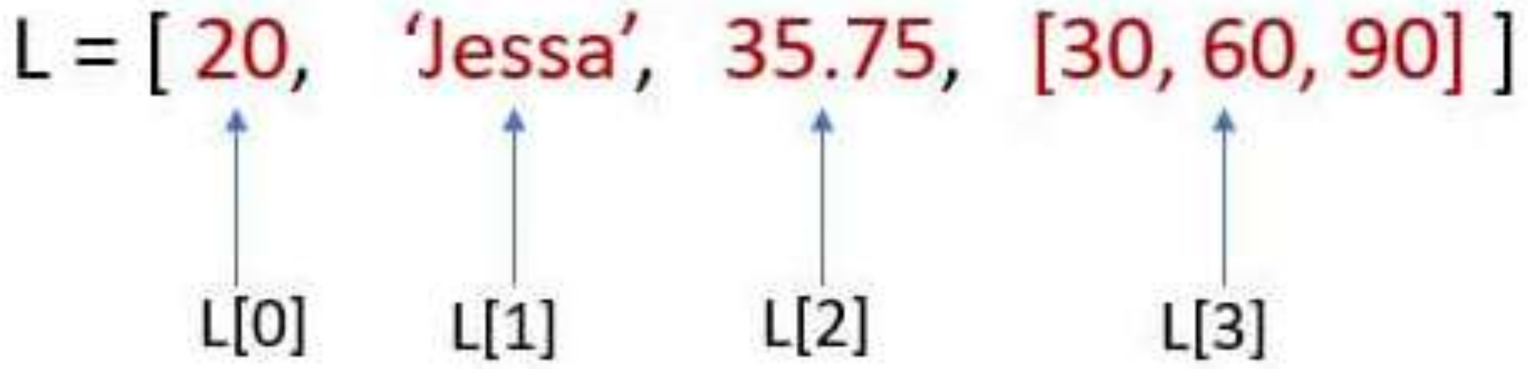




Python String Methods

Input	Method	Output
"hello world"	capitalize()	Hello world
"hello world"	.isalpha()	False
"123456"	.isnumeric()	True
"hello world"	.isupper()	False
"Hi Alex"	.split()	["Hi", "Alex"]
"hello world"	.title()	Hello World
" Hello "	.strip()	"Hello"
"a b c"	.replace('a', 'd')	"d b c"

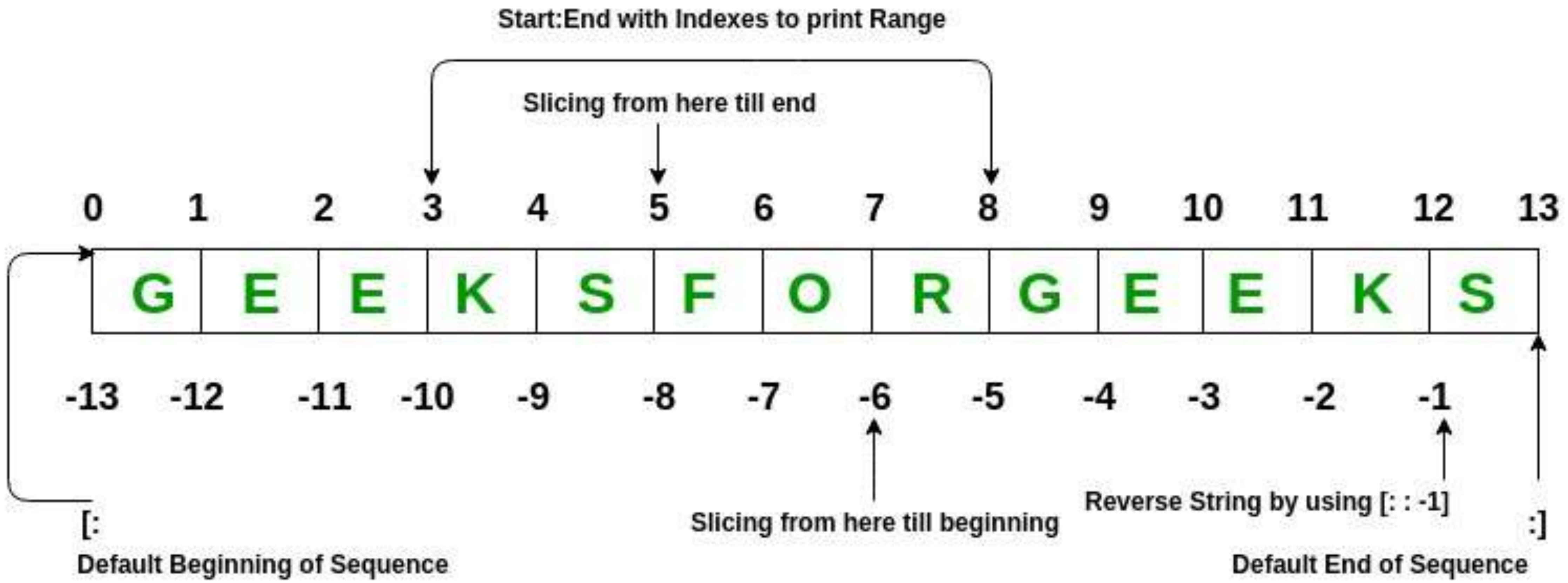
List in Python



```
L = [ 20,   'Jessa',   35.75,   [30, 60, 90] ]
```

- ✓ **Ordered**: Maintain the order of the data insertion.
- ✓ **Changeable**: List is mutable and we can modify items.
- ✓ **Heterogeneous**: List can contain data of different types
- ✓ **Contains duplicate**: Allows duplicates data

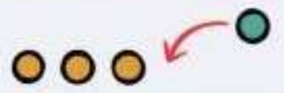
Accessing Items in a List

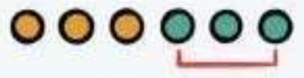

Start:End with Indexes to print Range
Slicing from here till end
0 1 2 3 4 5 6 7 8 9 10 11 12 13
G E E K S F O R G E E K S
-13 -12 -11 -10 -9 -8 -7 -6 -5 -4 -3 -2 -1
[:
Default Beginning of Sequence
Slicing from here till beginning
Reverse String by using [: : -1]
:]
Default End of Sequence

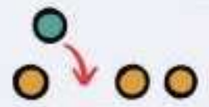
Python List Methods

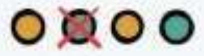
by levelupcoding.co

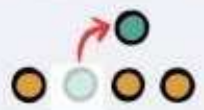
	Description	Code example	Diagram

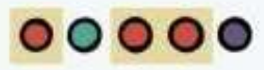
append()	Adds an element to the end of the list	`letters = ['a', 'b', 'c']`
		`letters.append('d')`
			

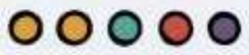
extend()	Adds the elements of a list to the end of another list	`letters = ['a', 'b', 'c']`
		`letters.extend(['d', 'e', 'f'])`
			

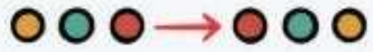
insert()	Adds an element at a specific index	`letters = ['a', 'b', 'c']`
		`letters.insert(1, 'x')`
			

remove()	Removes the first occurrence of an element	`letters = ['a', 'b', 'c', 'b']`
		`letters.remove('b')`
			

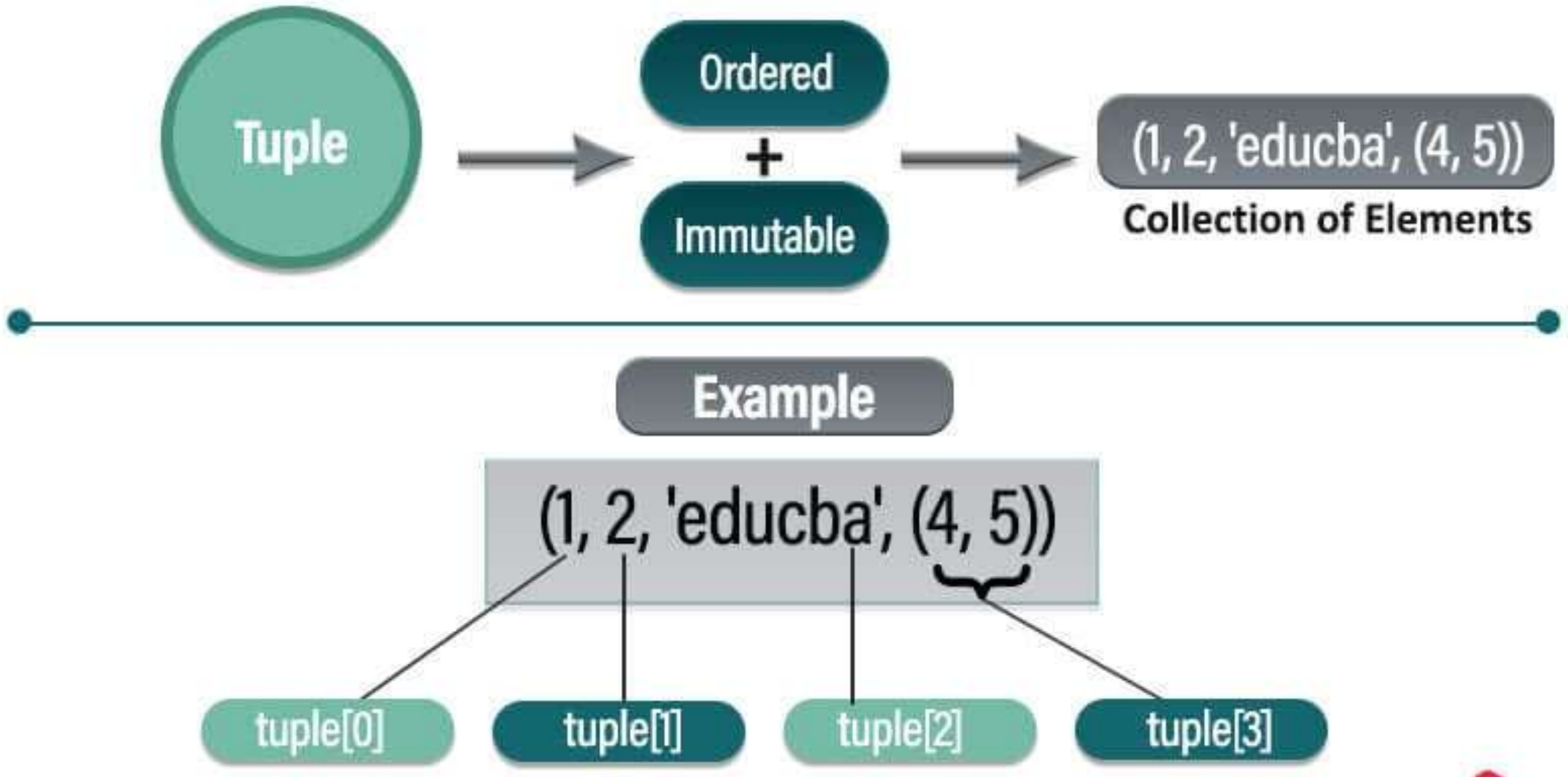
pop()	Removes and returns the element at a given index	`letters = ['a', 'b', 'c', 'd']`
		`letter = letters.pop(1)`
			

count()	Returns the number of times a value appears in a list	`letters = ['c', 'b', 'c', 'c', 'd']`
		`print(letters.count('c'))`
			

sort()
@NikkiSiapno
	Sorts the list in ascending order	`letters = ['c', 'a', 'd', 'a', 'b']`
		`letters.sort()`
			

reverse()
@ChrisStaud
	Reverses the order of elements in the list	`letters = ['a', 'b', 'c']`
		`letters.reverse()`
			

Tuples in Python



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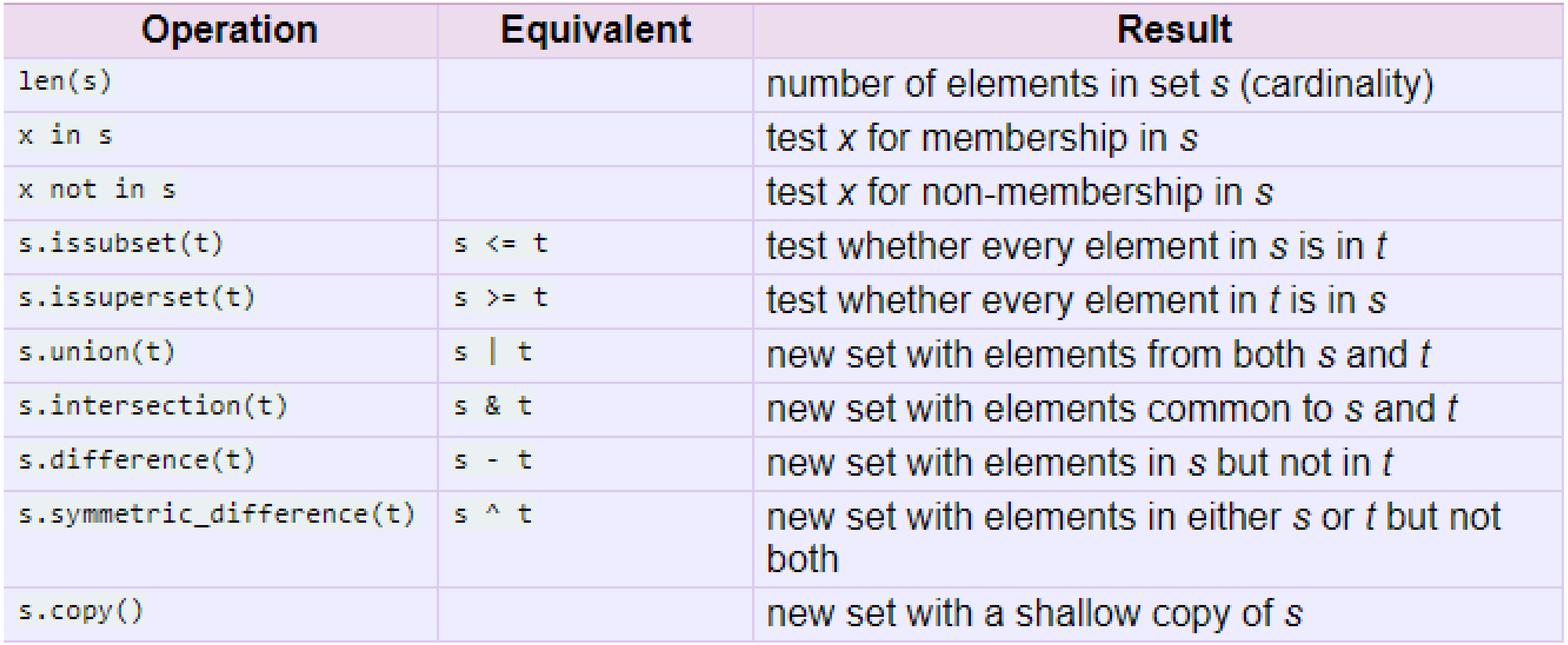
Set in Python

S = { 20,   'Jessa',   35.75}

- ✓ **Unordered**: Set doesn't maintain the order of the data insertion.
- ✓ **Unchangeable**: Set are immutable and we can't modify items.
- ✓ **Heterogeneous**: Set can contains data of all types
- ✓ **Unique**: Set doesn't allows duplicates items

Operations on Set

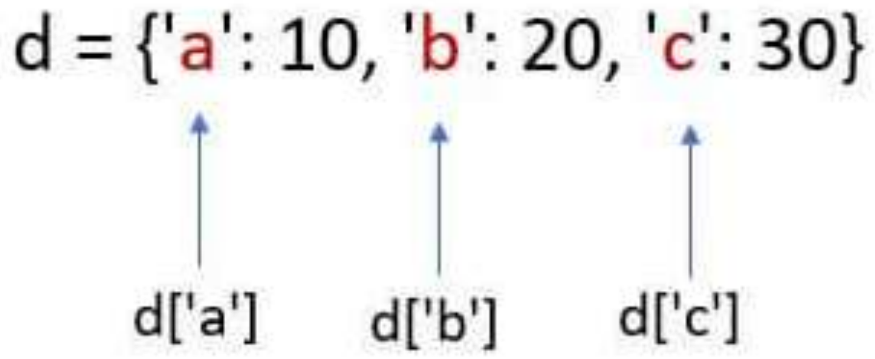


Operation	Equivalent	Result
`len(s)`		number of elements in set *s* (cardinality)
`x in s`		test *x* for membership in *s*
`x not in s`		test *x* for non-membership in *s*
`s.issubset(t)`	`s <= t`	test whether every element in *s* is in *t*
`s.issuperset(t)`	`s >= t`	test whether every element in *t* is in *s*
`s.union(t)`	`s | t`	new set with elements from both *s* and *t*
`s.intersection(t)`	`s & t`	new set with elements common to *s* and *t*
`s.difference(t)`	`s - t`	new set with elements in *s* but not in *t*
`s.symmetric_difference(t)`	`s ^ t`	new set with elements in either *s* or *t* but not both
`s.copy()`		new set with a shallow copy of *s*

Dictionary in Python

PYnative.com

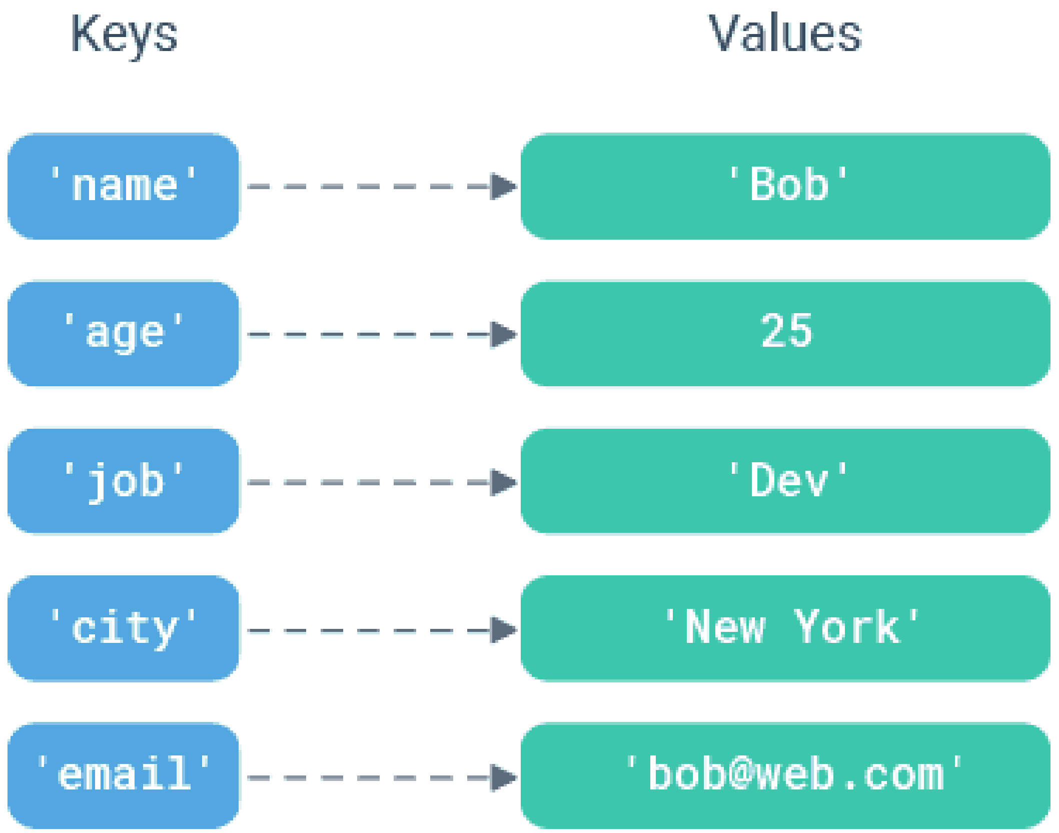
Unordered collections of unique values stored in (Key-Value) pairs.

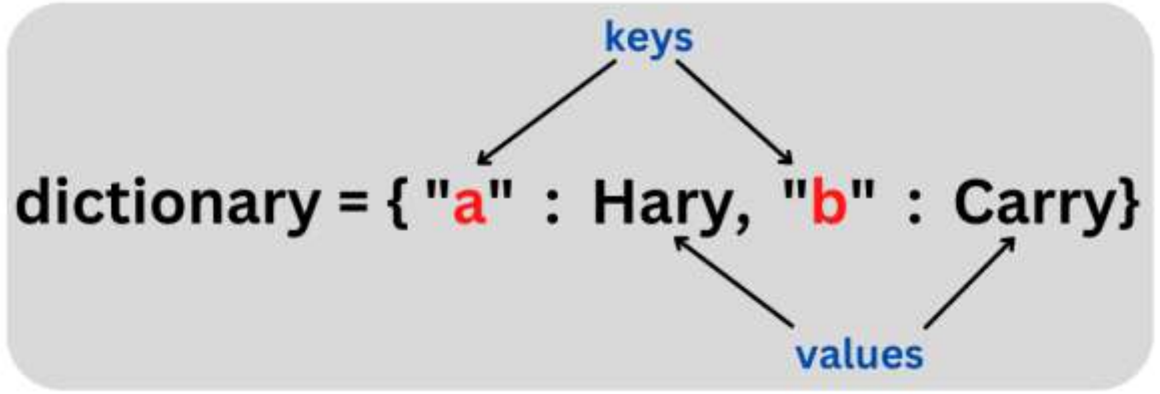


```
d = {'a': 10, 'b': 20, 'c': 30}
```

- ✓ **Unordered**: The items in dict are stored without any index value
- ✓ **Unique**: Keys in dictionaries should be Unique
- ✓ **Mutable**: We can add/Modify/Remove key-value after the creation

Dictionary in Python





Happy Coding