



# **Basic Programming III:**

## **Array and Other Data Types**

# Profile



 [linkedin.com/in/romansyasetyo/](https://www.linkedin.com/in/romansyasetyo/)



**“Programming isn't about what you know; it's about what you can figure out.”**

**- Chris Pine**

# Table of Content

## What will We Learn Today?

1. What is Array
2. Array Manipulation
3. Array Iteration

Hands on using Google Colab







# What is Array?





# What is Array?

- **Sequential collection** of components (elements)
- The collection of data is **indexed**, or numbered, and it starts at 0
- Position number is formally called the subscript or index
  1. First element is subscript 0 (zero), sometimes called the zeroth element.
  2. The highest element index is one less than the total number of elements in the array. Total Element =  $(N(\text{max}) - 1)$
- In Python Libraries, **Numpy** contains more advanced manipulation for arrays





# Data Structures

## Primitive Data Types

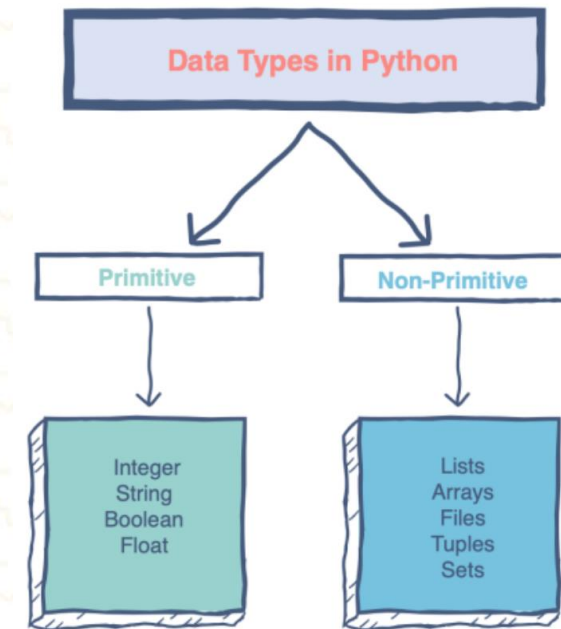
Basic data structures in Python containing pure and simple data values

Integers (1, 3, -5), Float (2.0, 5.77), String ('red', 'blue'), Boolean (TRUE,FALSE)

## Non-Primitive Data Types

Non-primitive data types not only store values, but a collection of values in different formats

[1, 3, 5.76, 7.68]



# List

PYnative.com

## List in Python

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

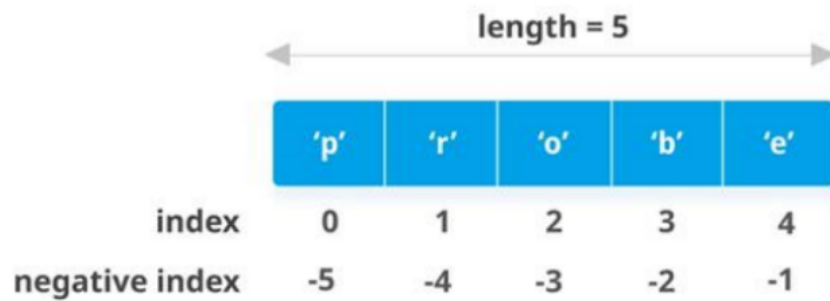
↑      ↑      ↑      ↑

L[0]   L[1]   L[2]   L[3]

- ✓ **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



# List



List = [ 0, 1, 2, 3, 4, 5]

0	1	2	3	4	5
---	---	---	---	---	---

List[0] = 0

List[0:] = [0,1,2,3,4,5]

List[1] = 1

List[:] = [0,1,2,3,4,5]

List[2] = 2

List[2:4] = [2, 3]

List[3] = 3

List[1:3] = [1, 2]

List[4] = 4

List[:4] = [0, 1, 2, 3]

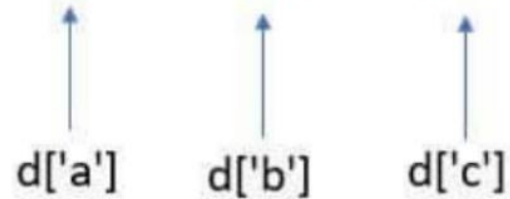
List[5] = 5

# Dictionary

## Dictionary in Python PYnative.com

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

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

  
d['a']      d['b']      d['c']

- ✓ **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

```
dictionary = { 'name' : 'Ariel',  
               'hobbies': ['painting', 'singing', 'cooking'] }
```

```
print(dictionary["name"])
```

Output: 'Ariel'

# Tuple

## Tuples in Python

PYnative.com

```
T = ( 20, 'Jessa', 35.75, [30, 60, 90] )
```

T[0]

T[1]

T[2]

T[3]

- ✓ **Ordered**: Maintain the order of the data insertion.
- ✓ **Unchangeable**: Tuples are immutable and we can't modify items.
- ✓ **Heterogeneous**: Tuples can contains data of types
- ✓ **Contains duplicate**: Allows duplicates data



# Tuple

`tuple = ('a', 1, 'e', 12.5, 'i', 'o', 9)`

REVERSE INDEX

-7      -6      -5      -4      -3      -2      -1

a	1	e	12.5	i	o	9
---	---	---	------	---	---	---

FORWARD INDEX

0      1      2      3      4      5      6

## Accessing Elements

`tuple[0] = 'a'`

`tuple[4] = 'i'`

`tuple[-2] = 'o'`

`tuple[-6] = 1`

`tuple[-5+6] = tuple[1] = 1`

# Set

## Set in Python

PYnative.com

```
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



# Array Manipulation





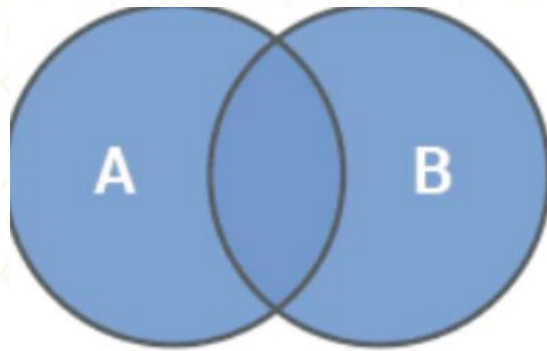
# Array Manipulation : List

- Mengganti elemen di dalam list
- List slicing
- List extension
  - Append
  - Extend
  - Insert
  - Combine
- List deletion

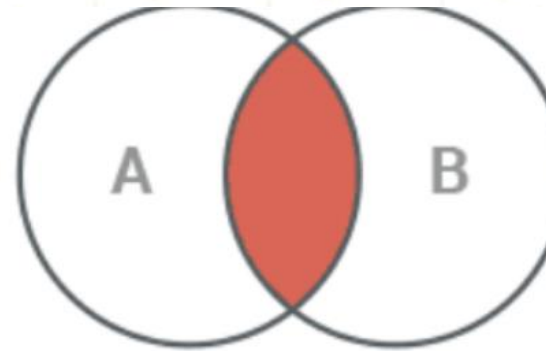




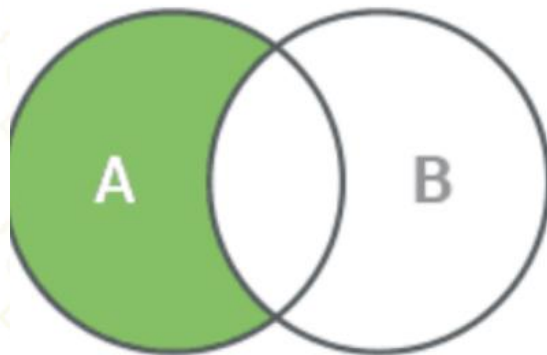
# Array Manipulation : Set



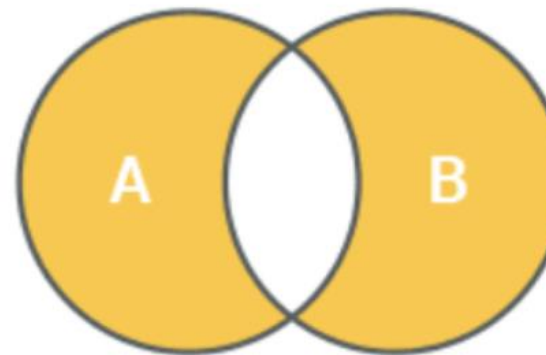
*Union*



*Intersection*



*Difference*



*Symmetric Difference*



# Array Iteration





# Array Iteration

Memberikan perintah di Python seperti yang telah diajarkan di sesi Basic Programming II : Iteration untuk membuat sebuah array

- Basic Iteration
- List Comprehension

Contoh : Membuat sebuah list berisi nilai kuadrat dari angka 1 hingga 10





**Google Colab**

**<https://colab.research.google.com/>**





# Thank You

