



VARIABLES AND DATA TYPES

PYTHON BASICS

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TOPIC OUTLINE

Python

Variables

Data Types

Data Structures

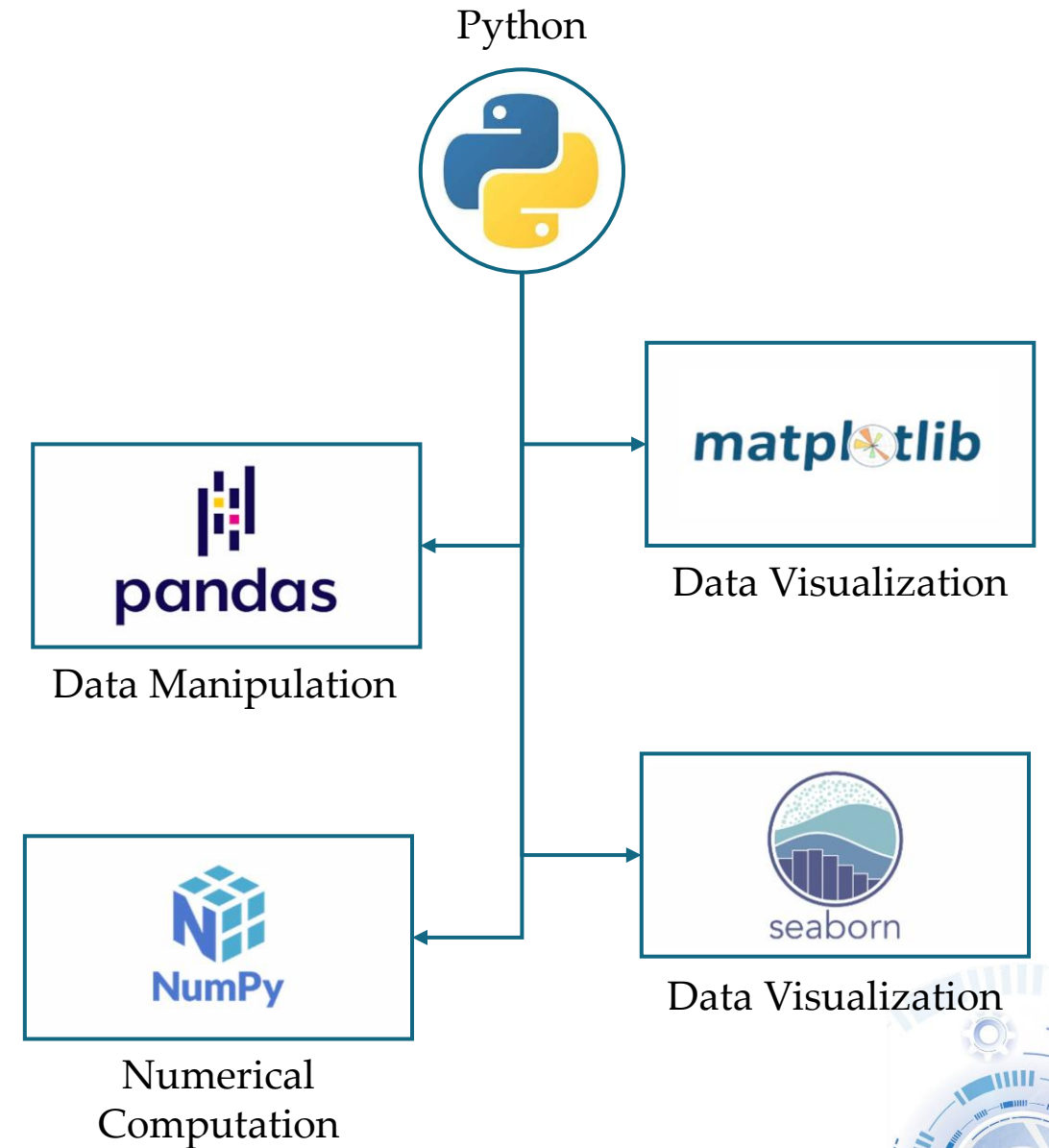


PYTHON



PYTHON

Python is a powerful and versatile programming language widely used in data analytics due to its simplicity, readability, and extensive library support. It enables data analysts to perform various tasks, from data cleaning and manipulation to statistical analysis and visualization.



<https://www.python.org/>

VARIABLES



FRUIT CONTAINER ANALOGY

A variable is like a storage container that holds a specific type of fruit.

location	quantity	label
1		apple
2	400	
3		
4	200	orange
5		
.		
.		
.		
.		
1000	100	grape



VARIABLE

A **variable** is a named storage location in memory that **holds a value** of a specific data type.

1. **Data type** – Defines what kind of data it can store (e.g., **int**, **float**, **str**).
2. **Name (identifier)** – a unique name assigned to the variable.
3. **Value** – The actual data stored in memory.

address	value	name
0001h		apple
0002h	400	
0003h		
0004h	200	orange
0005h		
.		
.		
.		
.		
.		
FFFFh	100	grape



VARIABLE DECLARATION

syntax

name = value

example

apple = 400

pie = 3.14

grade = 'A'

Python dynamically infers variable types based on assigned values without requiring explicit declarations.

address	value	name
0001h		
0002h	400	apple
0003h		
0004h	200	orange
0005h		
.		
.	3.14	pie
.		
.	'A'	grade
.		
FFFFh	100	grape



IDENTIFIER

A variable is identified by a unique name, called an identifier.

- It can contain letters, digits, and underscores.
- It cannot have “space”.
- It cannot start with a digit.
- It cannot be a reserved keyword (**int**, **return**, **class**).
- It is case-sensitive (e.g., **age** and **Age** are different variables)

valid identifier

contains only letters

age

starts with an underscore

_salary

contains letters and a digit

grade1

uses an underscore instead of space

total_price



IDENTIFIER

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invalid identifier

starts with a digit

1stRank

uses a reserved keyword

class

contains a space

total price



DATA TYPES



DATA TYPES

Python data types are the classification or categorization of data items. It represents the kind of value that tells what operations can be performed on a particular data.

The type () function is used to check the type of an object.

example

```
type (3)
```

```
# returns int
```



INTEGER

Integer (int) is used to store integer values (whole numbers).

example

```
age = 25
```

```
total_students = 34
```

```
type (age)
```

```
type (total_students)
```



BOOLEAN

example

```
is_active = True
```

```
is_active = False
```

```
type(is_active)
```

Boolean (bool) is used to store Boolean values
(True or False).



FLOATING POINT

Floating point (float) is used to store floating-point numbers (decimal values).

example

```
pi = 3.14
```

```
height = 1.7
```

```
type(pi)
```

```
type(height)
```



STRING

String (str) represent sequences of characters enclosed in double quotes or single quote .

example

```
message = "Hello, World!"
```

```
message = 'Hello, World!'
```

```
type(message)
```



DATA STRUCTURES



LIST

List (list) is an ordered and heterogeneous collection of elements, defined using square brackets [].

example

```
fruits = ["apple", "orange", "grapes"]
```

```
my_list = [1,2,3, "Python", 5.5]
```

```
type(fruits)
```

```
type(my_list)
```



TUPLE

Tuple (tuple) is an ordered, immutable, and heterogeneous collection of elements. It is defined using parentheses ().

example

```
fruits = ("apple", "orange", "grapes")
```

```
my_list = (1,2,3, "Python", 5.5)
```

```
type(fruits)
```

```
type(my_list)
```



DICTIONARY

Dictionary (dict) is collection of is an unordered and indexed key-value pairs separated by :. It is defined using curly braces { }.

example

```
employee = {"name" : "Ada",  
            "position" : "analyst"}
```

```
employee = {"name" : "Ada",  
            "age" : 25,  
            "city" : "New York"}
```

```
type(employee)
```



LABORATORY

