VARIABLES AND DATA TYPES

PYTHON BASICS

prepared by:

Gyro A. Madrona

Electronics Engineer

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.

Python

Data Cleaning

Data Visualization

Numerical Computation

Data Visualization

https://www.python.org/
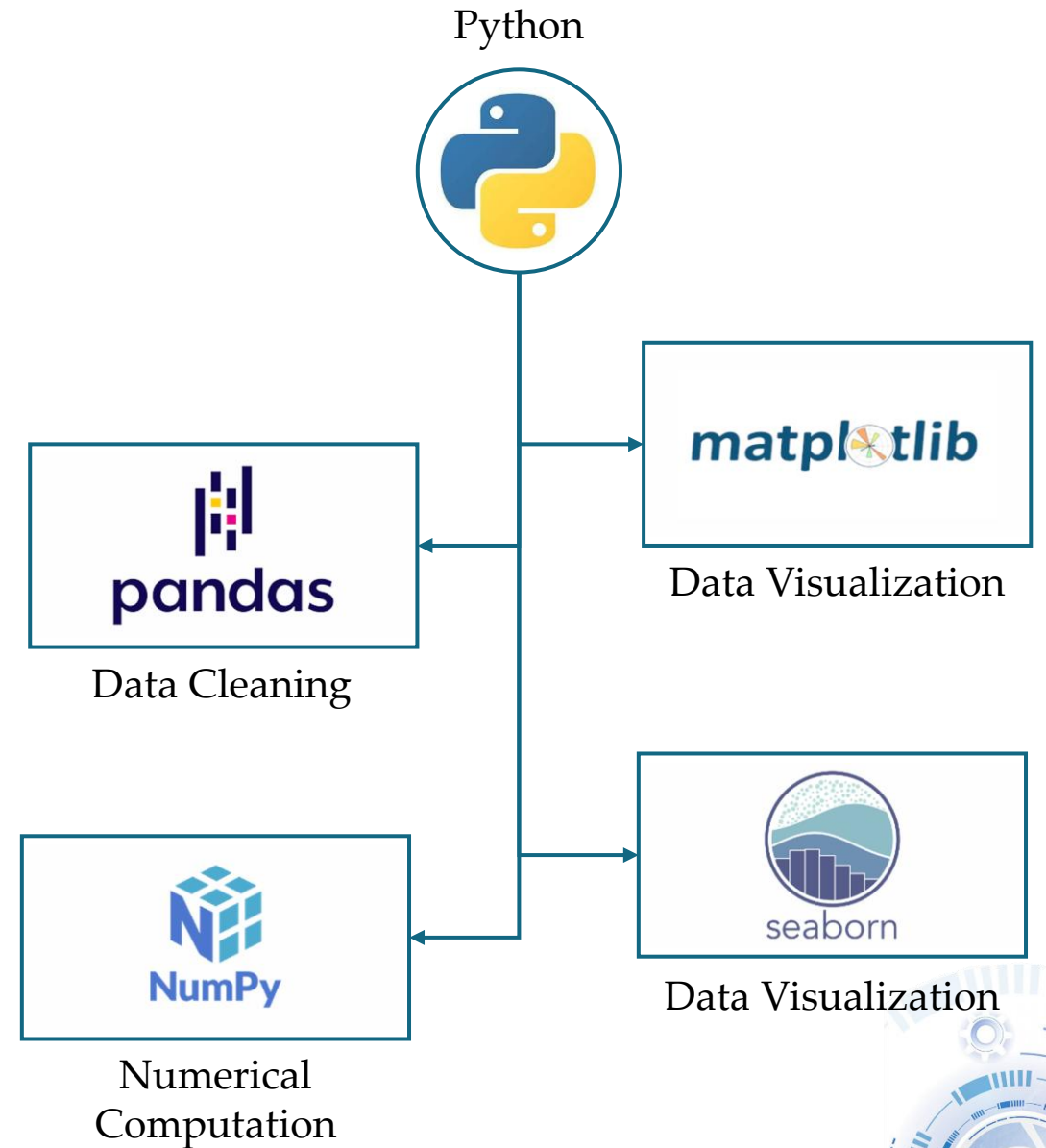
VARIABLES

FRUIT CONTAINER ANALOGY

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

location	quantity	label
1		
2	400	apple
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`, `double`, `str`).

2. **Name (identifier)** – a unique name assigned to the variable.

3. **Value** – The actual data stored in memory.

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

VARIABLE DECLARATION

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

IDENTIFIERS

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 Identifiers

// contains only letters
age

// starts with an underscore
_salary

// contains letters and a digit
grade1

// uses an underscore instead of space
total_price

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<u>Invalid Identifiers</u>

// 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.

INTEGER

Example

```
age = 25

total_students = 34
```

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

BOOLEAN

Example

```
is_active = True

is_active = False
```

Boolean **(bool)** is used to store Boolean values

(**True** or **False**).

FLOATING POINT

Example

```
pi = 3.14

height = 1.7
```

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

STRING

Example

```
message = "Hello, World!"

message = 'Hello, World!'
```

String represent sequences of characters

enclosed in **double quotes** or **single quote** .

DATA STRUCTURES

LIST

Example

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

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

A **list** is an ordered and heterogeneous collection of elements, defined using square brackets **[ ]** .

TUPLE

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

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

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

DICTIONARY

A **dictionary** collection of is an unordered and indexed **key-value** pairs. It is defined using curly braces **{ }** by colons **:** .

Example

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


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

LABORATORY