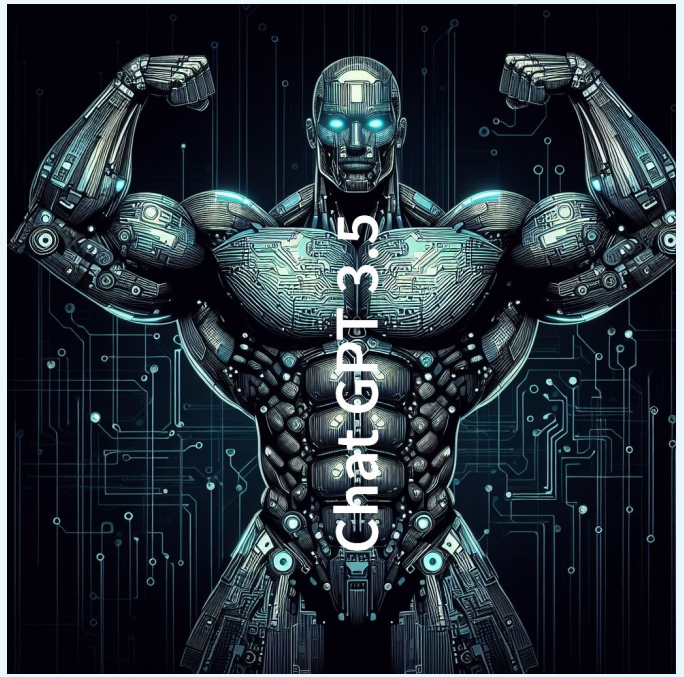
Empower Your Skills, Boost Your Productivity for a Prosperous Pakistan

Pak Angels Essential Generative AI Training

The session will start on 7:00 PM.

THE RISE OF GENERATIVE AI

A GAME - CHANGER



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Module 3: Python For Beginners

- ✔ What is Python? Why should we use it?
- ✔ Master variables, data types & operators in Python
- ✔ Make decisions with if-else statements in Python
- ✔ Automate tasks with loops (for & while) in Python
- ✔ Conquer lists, tuples, sets & dictionaries in Python
- ✔ Set up your dev environment with GitHub using VSCode
- ✔ Get a taste of problem-solving with LeetCode
- ✔ Questions ?

What is Python?

- ✔ **Python** is one of the most popular programming languages in the world.
- ✔ **Versatile:** It's used in web development, **data science, artificial intelligence**, scientific computing, automation, and more.
- ✔ **High Demand:** Many top tech companies like Google, Facebook, and Netflix use Python in their technology stacks.
- ✔ Python is **equipped with a rich ecosystem of libraries and frameworks**, such as TensorFlow, PyTorch, and Hugging Face's Transformers, which are essential for developing generative models like GPT-4, BERT, and StyleGAN.
- ✔ **Its simple and readable syntax** allows researchers and developers to easily implement and experiment with complex AI models.

Thank You!

Hello Word Code


```java
public class HelloWorld {

    public static void main(String[] args) {

        System.out.println("Hello World");

    }
}
```

```cpp
#include <iostream>

int main() {
    std::cout << "Hello World" <<
std::endl;
    return 0;
}
```

Hello Word Code

```
print("Hello World")
```

```
console.log("Hello World");
```

Hello Word Code

```
print("Hello World")
```

```
console.log("Hello World");
```

```
public class HelloWorld {

    public static void main(String[] args) {

        System.out.println("Hello World");

    }
}
```

```
#include <iostream>

int main() {
    std::cout << "Hello World" <<
std::endl;
    return 0;
}
```

Practical Demo Python

Muhammad Talha

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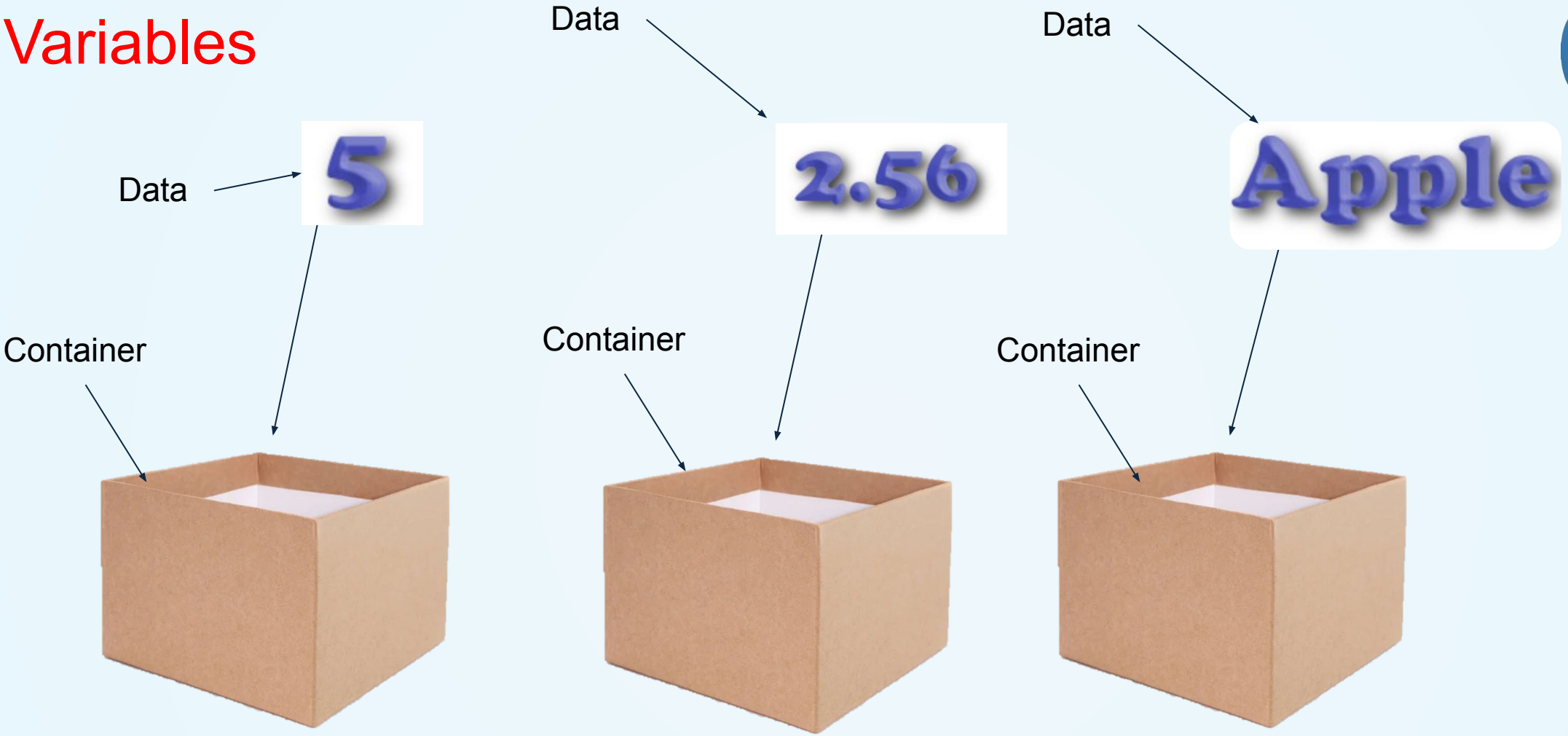
Content

- ✔ Print Statement
- ✔ Comments
- ✔ Variables and their Data types
- ✔ Operators in Python
- ✔ Make decisions with if-else statements in Python
- ✔ Loops (for & while) in Python
- ✔ Conquer lists, tuples, sets & dictionaries in Python

Variables

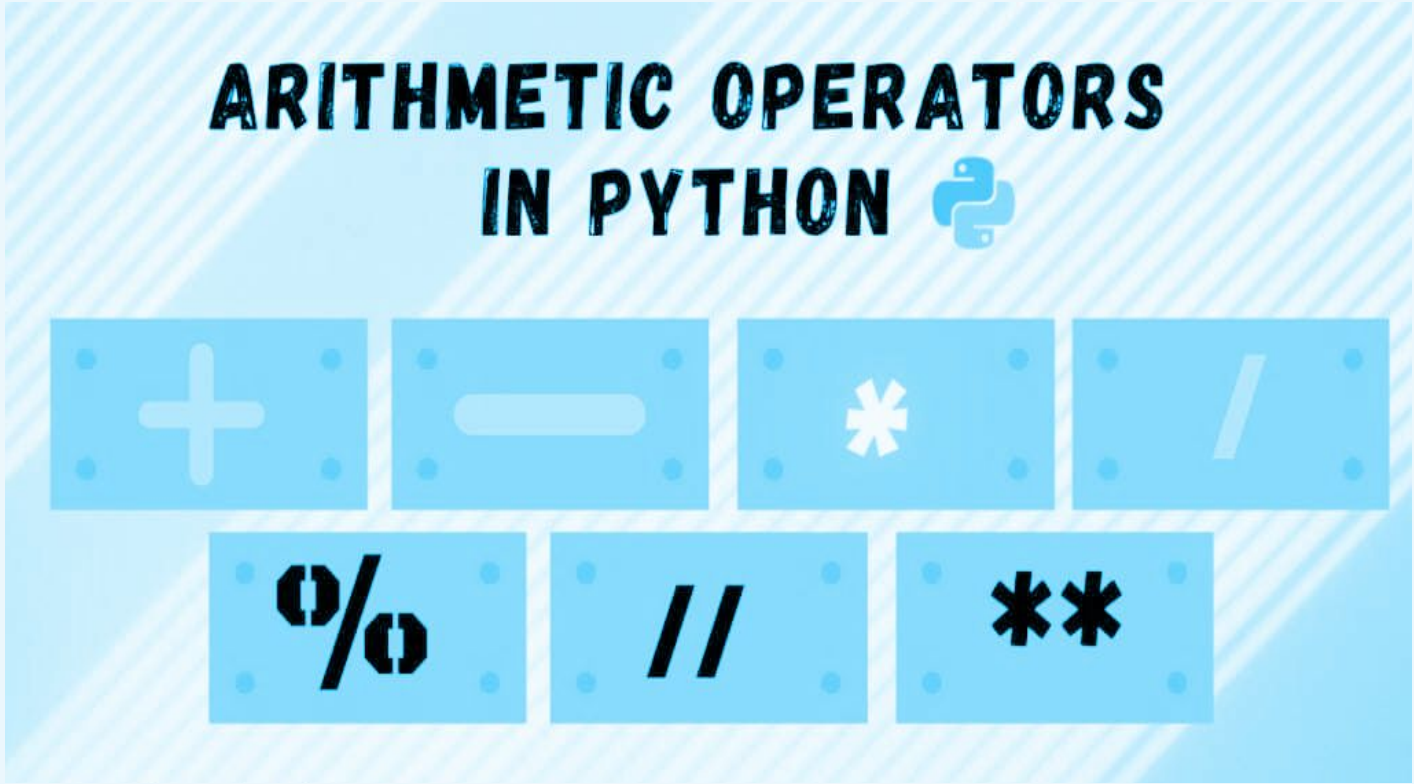


Muhammad Talha

Rules For Naming Variable

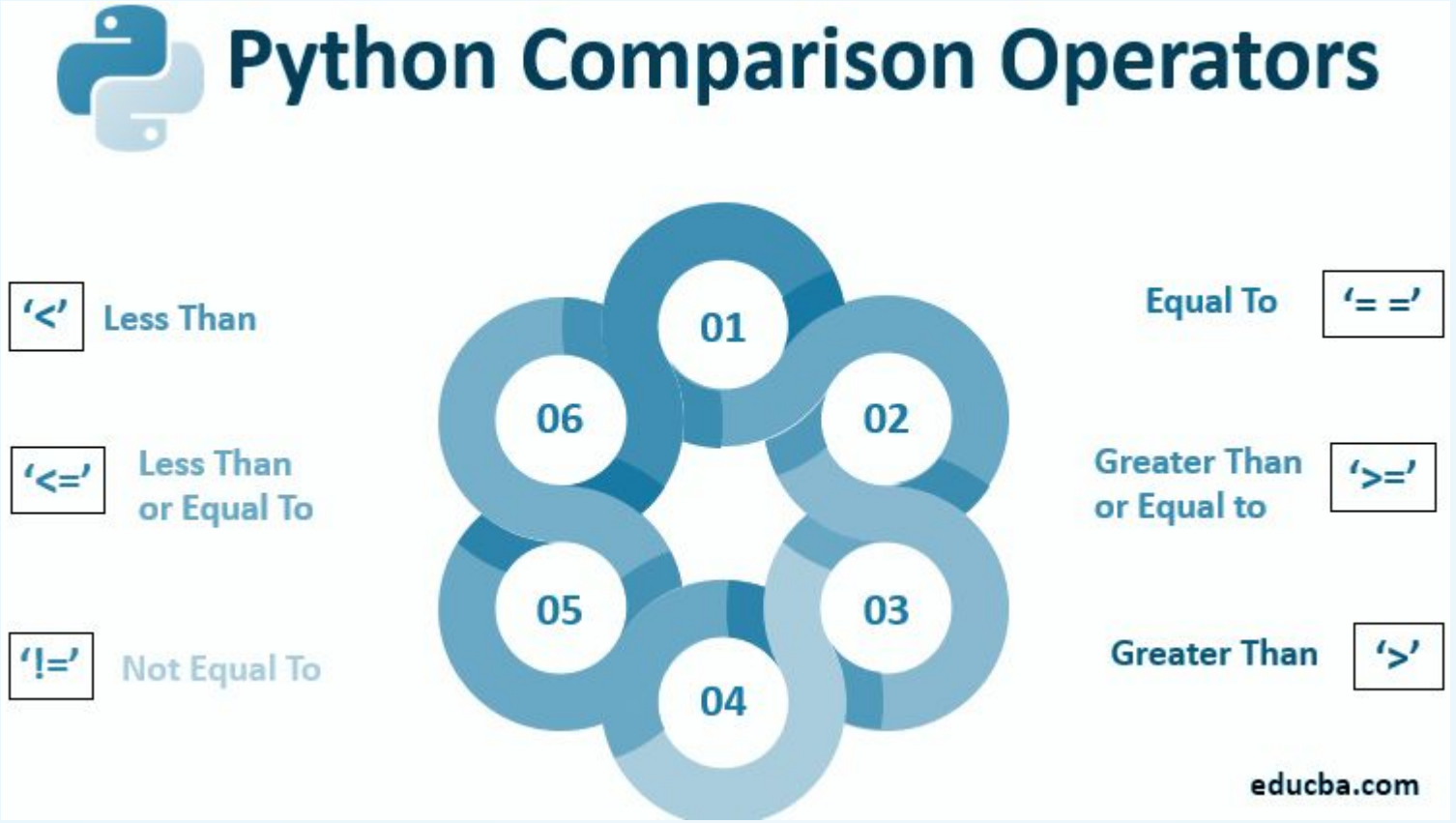
- ✔ A variable name **must start with a letter or the underscore character**
- ✔ There must be **no white space** in a variable name
- ✔ A variable name **cannot start with a number**
- ✔ A variable name can only contain **characters (A-Z, a-z, 0-9, and _)**. No special characters are allowed i.e. @icode , Python$ are the invalid variables.
- ✔ Variable names are **case-sensitive** (age, Age and AGE are three different variables)
- ✔ **Keywords** cannot be used as variable names.

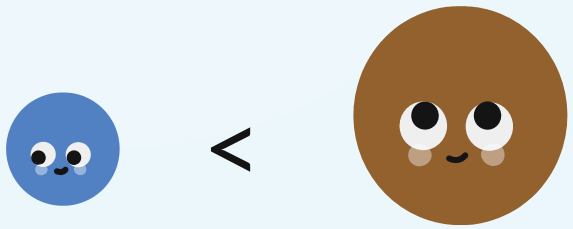
Operators



What Are Logical Operators In Python?

Operator	Description	Example
AND	Returns True if both operands are True	A and B
OR	Returns True if either of the operands are True	A or B
NOT	Retruns True if the operand in False	not A


Python Comparison Operators
'<' Less Than
'<=' Less Than or Equal To
'!=' Not Equal To
01
02
03
04
05
06
Equal To '= ='
Greater Than or Equal to '>='
Greater Than '>'
educba.com



True

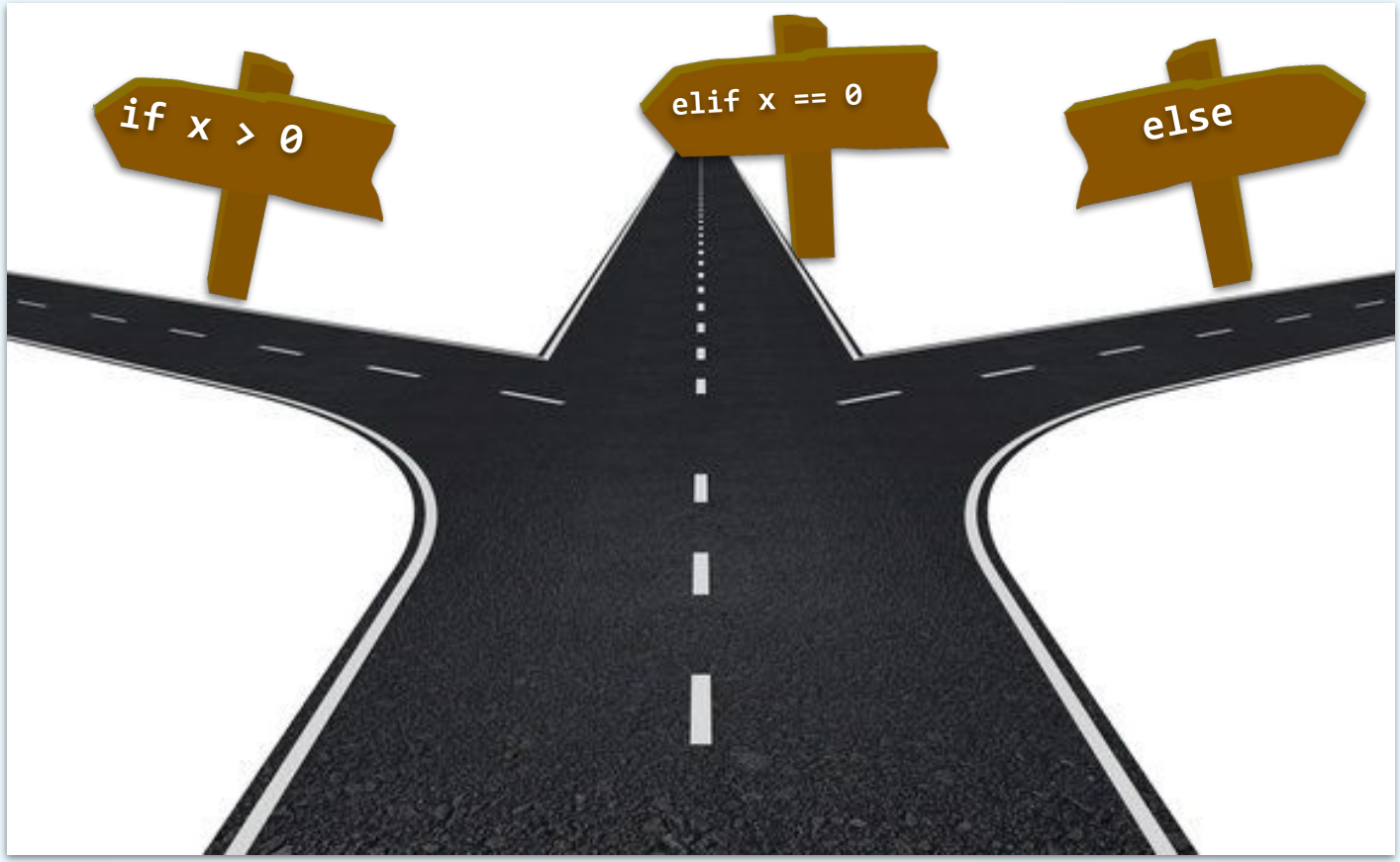
Conditional Statement (If - Elif - Else)

- ✔ If-Statements take a condition and only runs a block of code if the condition evaluates to `True`.
- ✔ Elif-Statements take a condition and only tests it if the prior If-Statement (and all prior Elif-Statements) evaluate to `False`. It is optional.
- ✔ Else-Statements take no condition and runs a block of code if the prior If-Statement (and Elif-Statements, if there are any) evaluate to `False`.

Still confused? Don't worry! We'll practice on these next slides! :)

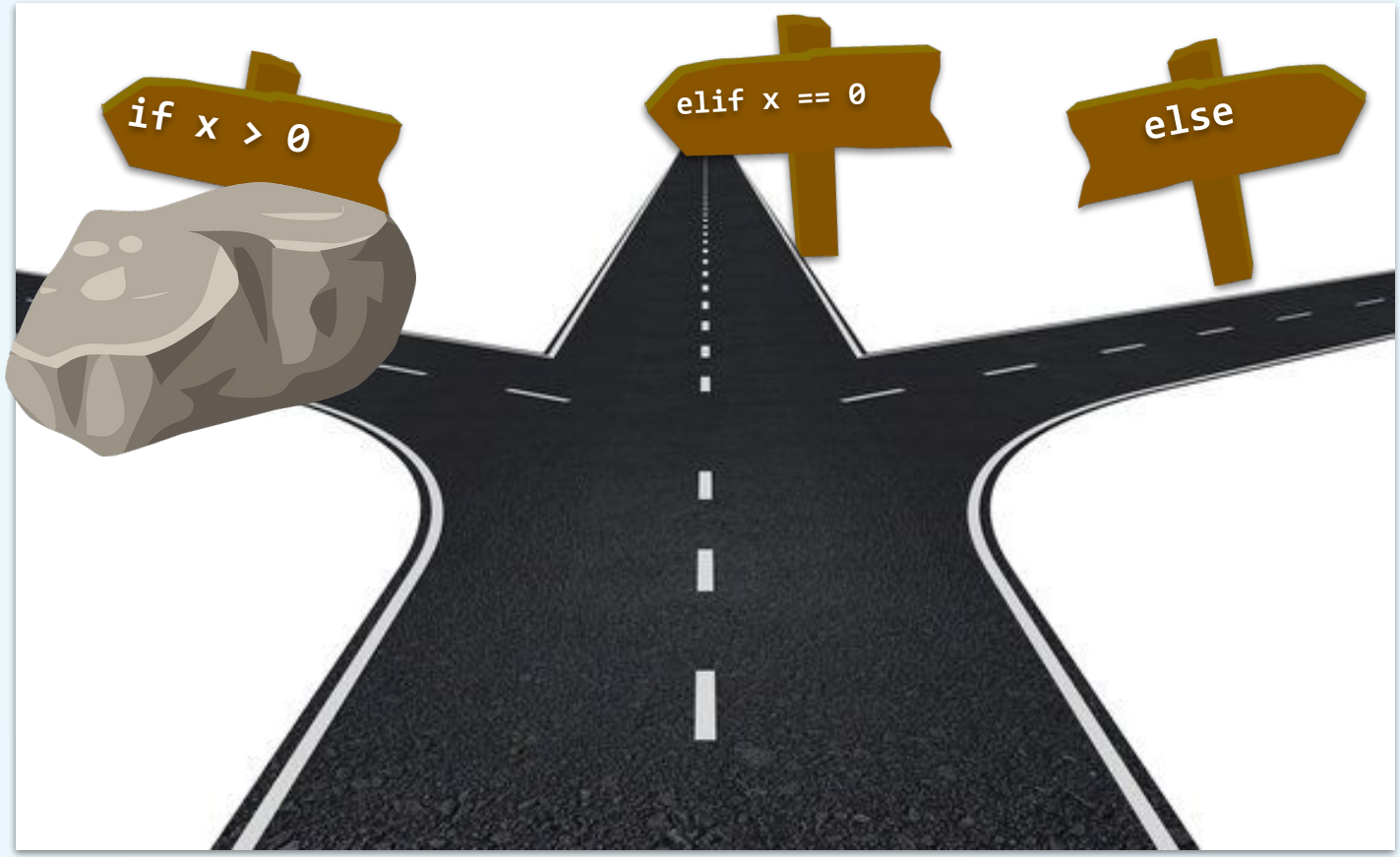
Lets Run through an Example

Suppose x = -8



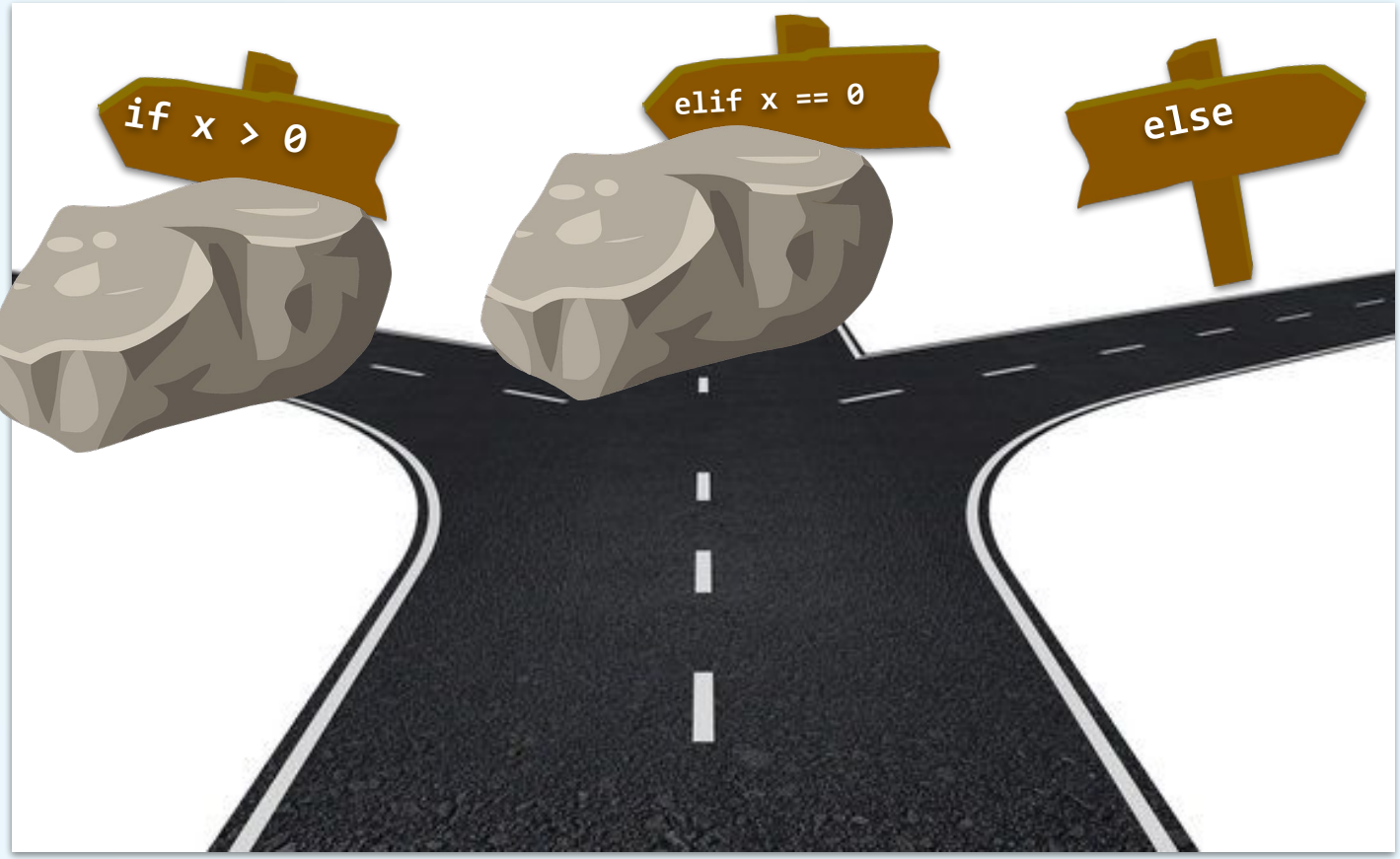
Lets Run through an Example

Suppose x = -8



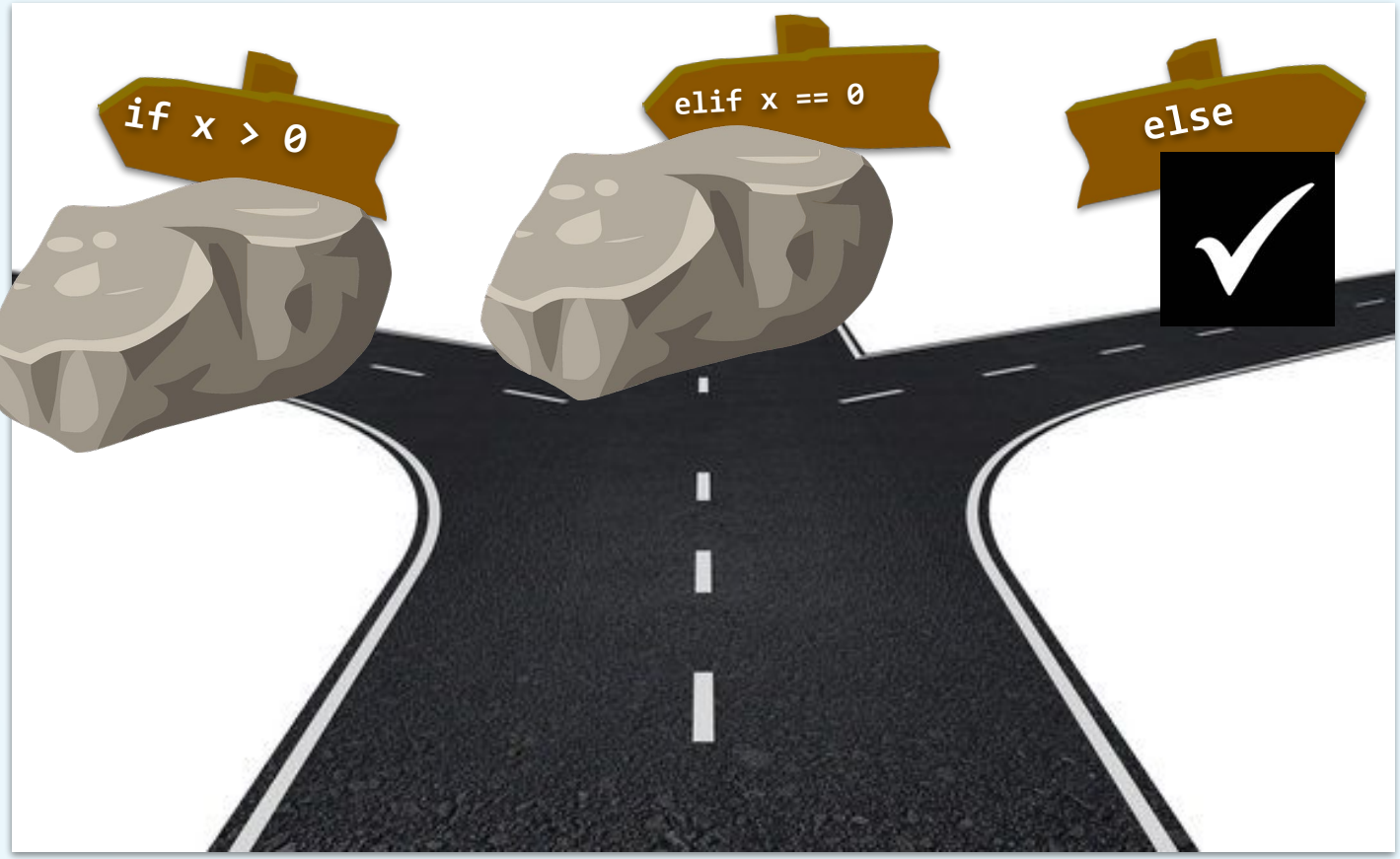
Lets Run through an Example

Suppose x = -8



Lets Run through an Example

Suppose x = -8

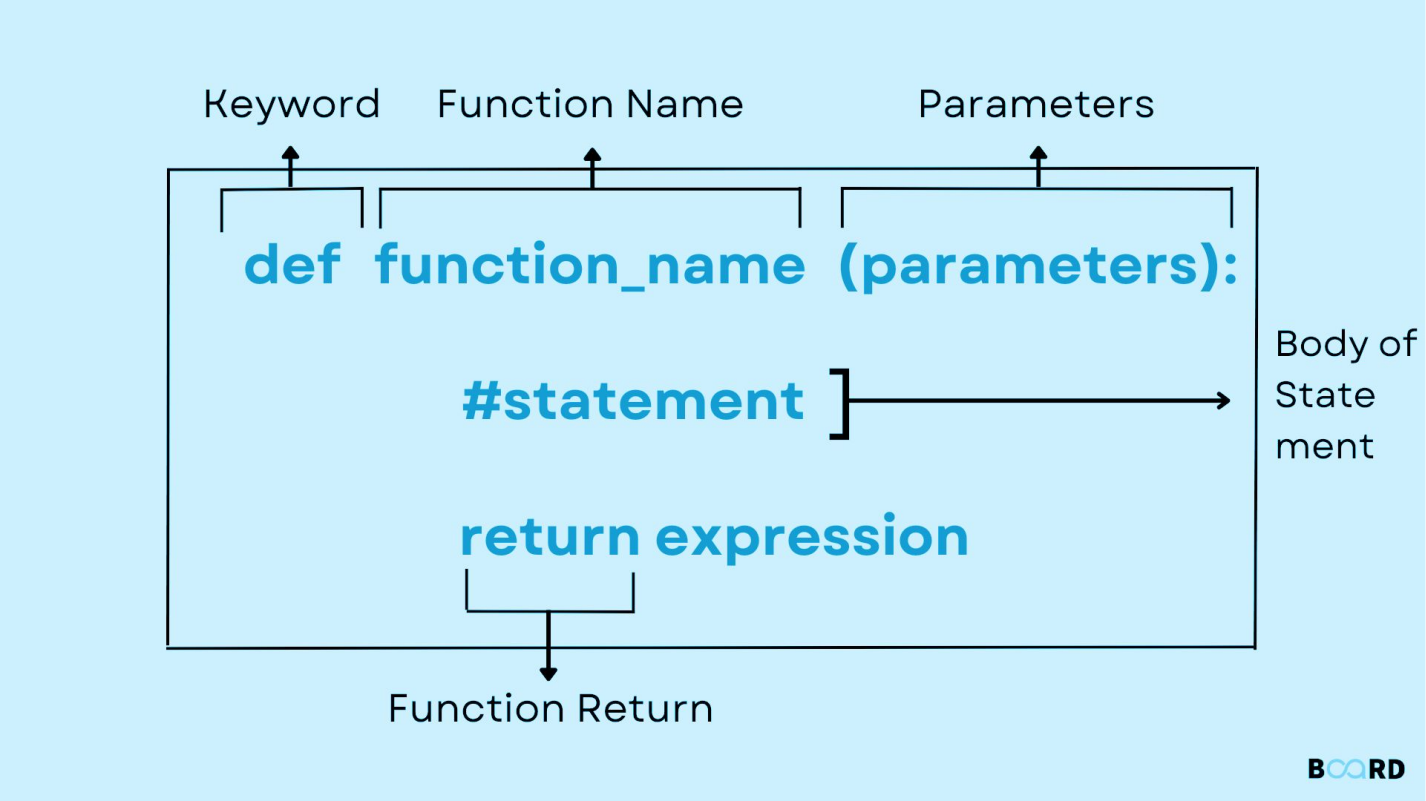


Loop Structures

- ✔ Used for Repetition of Task

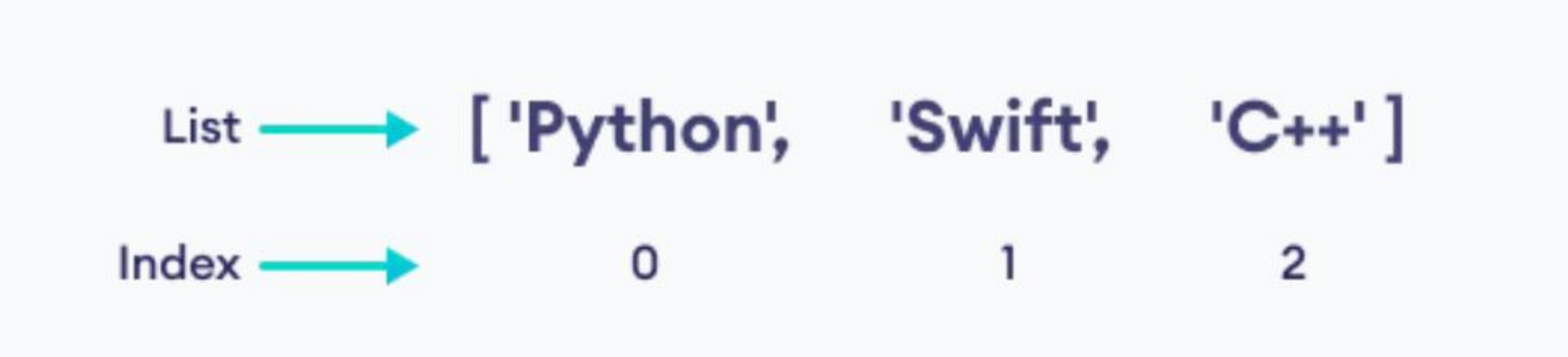
Functions

- ✔ Built-in Methods like max(), min(), math.sqrt()
- ✔ User Defined Methods



List [ ]

It is used to store multiple Items in a single variable



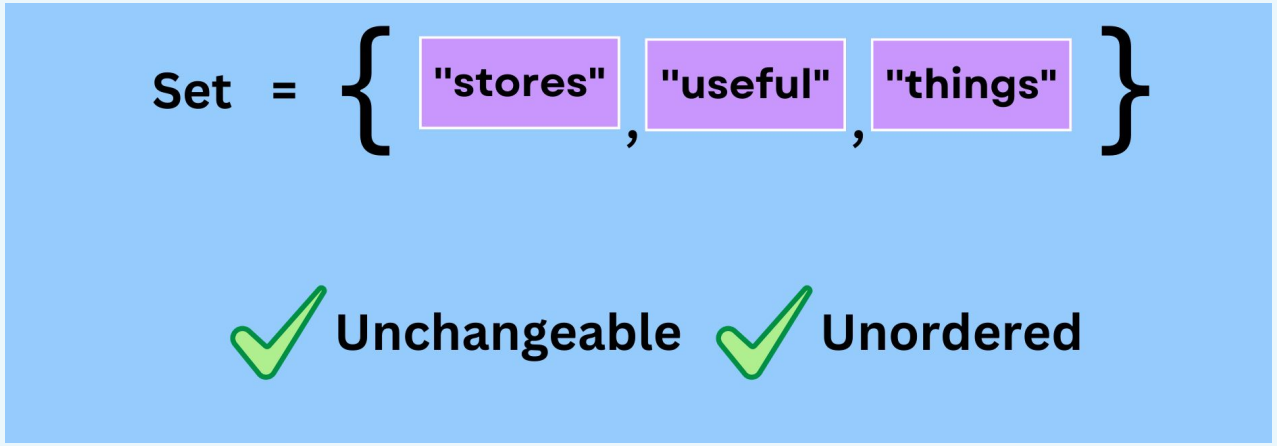
Neg Index	-3	-2	-1

Tuple ( )

A tuple is a collection similar to List.
The primary difference is that we cannot modify a tuple once it is created.

Set { }

A set is a collection of unique data, meaning that elements within a set cannot be duplicated.
Cannot Use Indexes to fetch items.

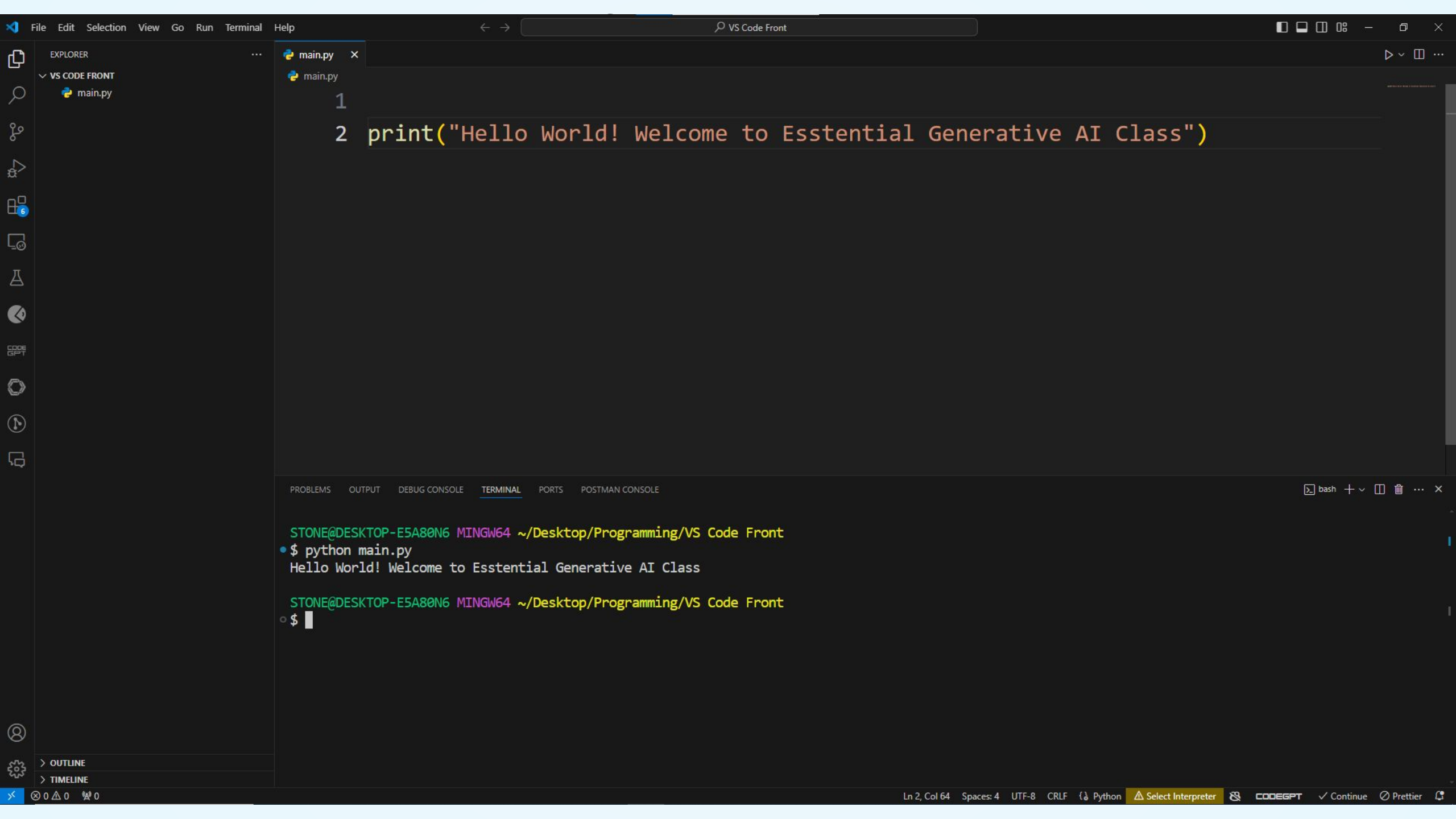


Dictionary { }

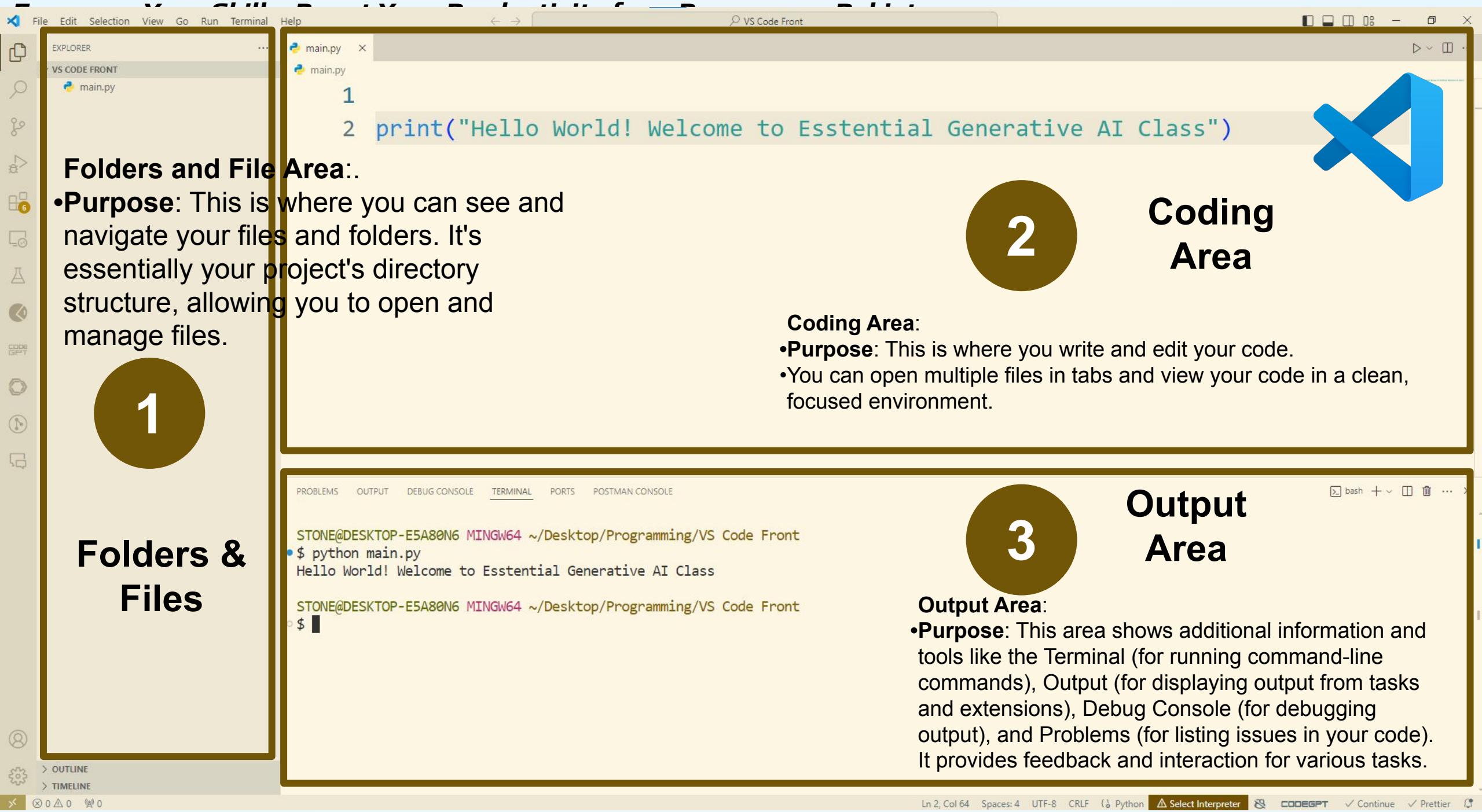
A Dictionary is a **key-value** pair (consisting of a key and a value)
Keys are always unique.

Let's Create a Simple Calculator

Let's Create a Simple Calculator


File Edit Selection View Go Run Terminal Help
VS Code Front
EXPLORER
VS CODE FRONT
main.py
main.py
main.py
1
2 print("Hello World! Welcome to Esstential Generative AI Class")
PROBLEMS OUTPUT DEBUG CONSOLE TERMINAL PORTS POSTMAN CONSOLE
bash
STONE@DESKTOP-E5A80N6 MINGW64 ~/Desktop/Programming/VS Code Front
$ python main.py
Hello World! Welcome to Esstential Generative AI Class
STONE@DESKTOP-E5A80N6 MINGW64 ~/Desktop/Programming/VS Code Front
$
OUTLINE
TIMELINE
Ln 2, Col 64 Spaces: 4 UTF-8 CRLF Python Select Interpreter CODEGPT Continue Prettier


File Edit Selection View Go Run Terminal Help
VS Code Front
EXPLORER
VS CODE FRONT
main.py
main.py
main.py
1
print("Hello World! Welcome to Esstential Generative AI Class")
2
Coding Area
1
Folders & Files
PROBLEMS OUTPUT DEBUG CONSOLE TERMINAL PORTS POSTMAN CONSOLE
bash
STONE@DESKTOP-E5A80N6 MINGW64 ~/Desktop/Programming/VS Code Front
$ python main.py
Hello World! Welcome to Esstential Generative AI Class
STONE@DESKTOP-E5A80N6 MINGW64 ~/Desktop/Programming/VS Code Front
$
3
Output Area
OUTLINE
TIMELINE
Ln 2, Col 64 Spaces: 4 UTF-8 CRLF Python Select Interpreter CODEGPT Continue Prettier



Folders and File Area:.

- **Purpose**: This is where you can see and navigate your files and folders. It's essentially your project's directory structure, allowing you to open and manage files.

1

Folders & Files

2

Coding Area

Coding Area:

- **Purpose**: This is where you write and edit your code.
- You can open multiple files in tabs and view your code in a clean, focused environment.

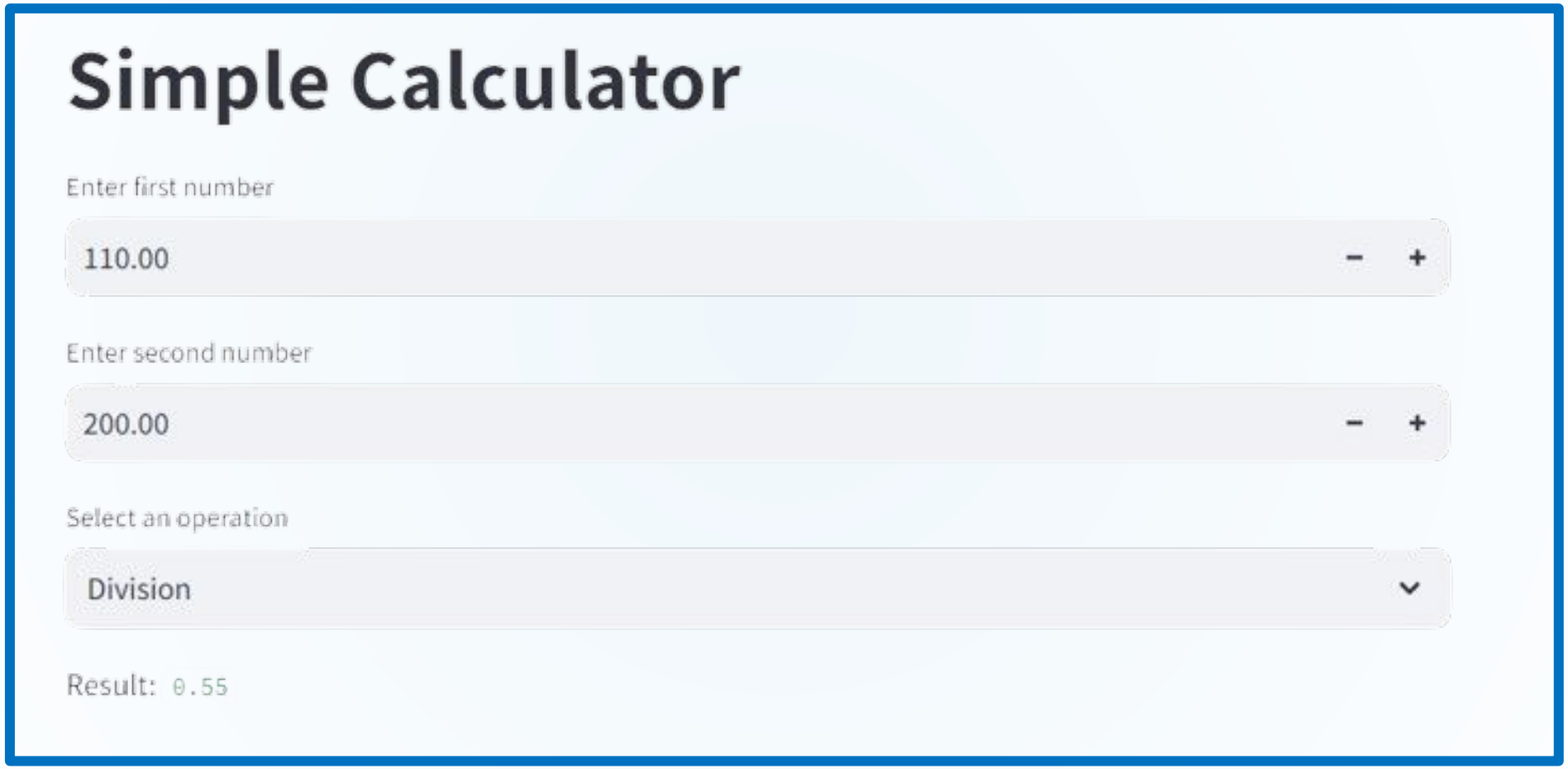
3

Output Area

Output Area:

- **Purpose**: This area shows additional information and tools like the Terminal (for running command-line commands), Output (for displaying output from tasks and extensions), Debug Console (for debugging output), and Problems (for listing issues in your code). It provides feedback and interaction for various tasks.

Create a Simple Calculator using Python and Streamlit for the Graphical Interface



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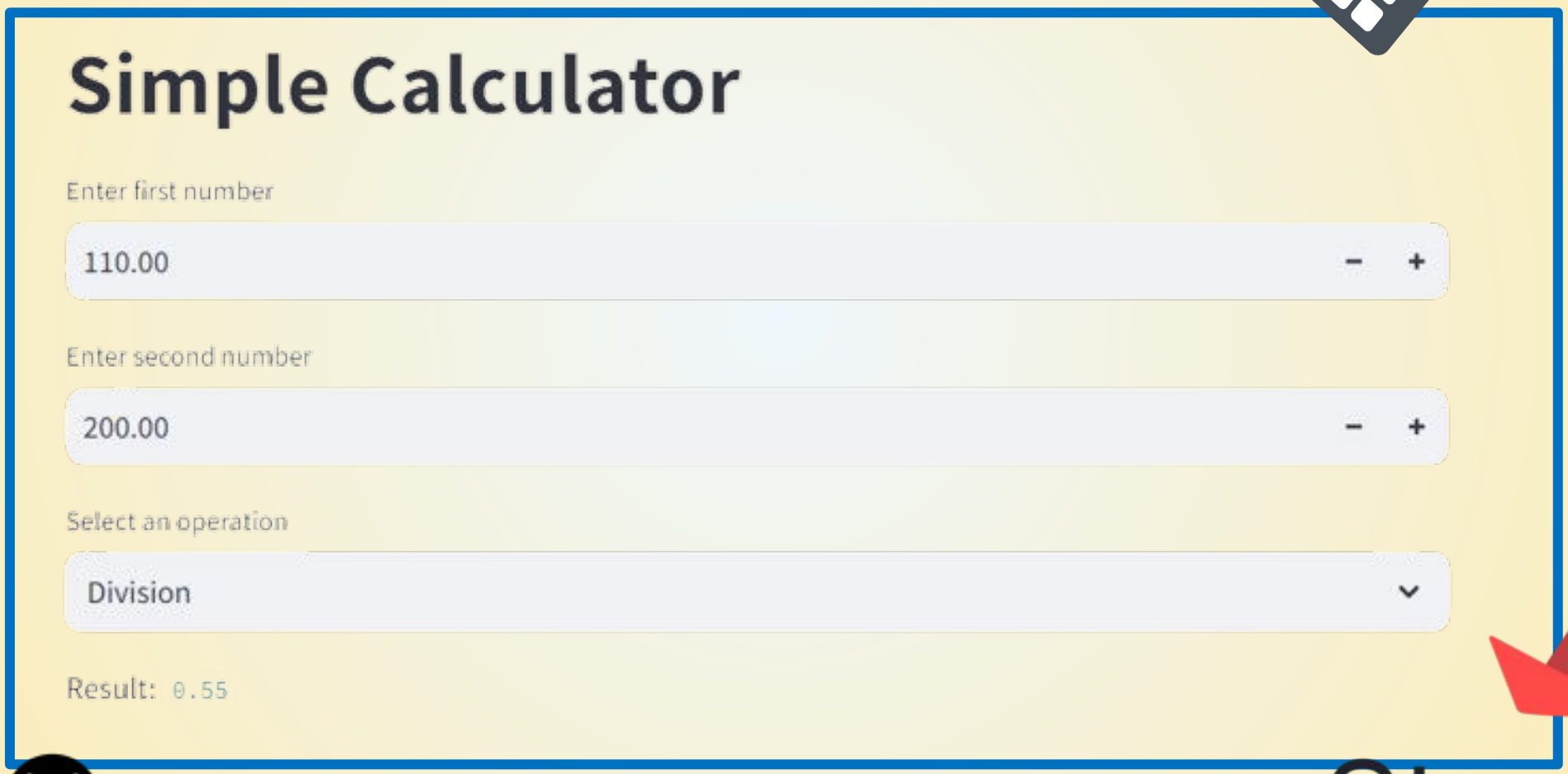
Create a Simple Calculator



git GitHub Streamlit

Streamlit (cal-pro.streamlit.app)

```python
# Input fields for numbers
num1 = st.number_input("Enter first number")
num2 = st.number_input("Enter second number")

# Dropdown menu for operation selection
operation = st.selectbox("Choose an operation", ("Add", "Subtract", "Multiply", "Divide"))

# Perform the calculation based on the selected operation
if operation == "Add":
    result = num1 + num2
elif operation == "Subtract":
    result = num1 - num2        You, 5 hours ago • Initial commit
elif operation == "Multiply":
    result = num1 * num2
elif operation == "Divide":
    if num2 != 0:
        result = num1 / num2
    else:
        result = "Error! Division by zero."

# Display the result
st.write("Result:", result)
```

Creating Calculator with Python using Streamlit for UI (youtube.com)

Practical Demo GitHub

Development Environment Setup

What is GitHub?

- GitHub is a platform for hosting and sharing code using Git, a version control system.

What is Version Control?

- Version control helps manage changes to your codebase, allowing multiple people to work on a project simultaneously and track changes over time.

https://code.visualstudio.com/download

https://github.com/

https://git-scm.com/downloads

Importance of Version Control

Collaboration:

- Multiple developers can work on the same project without conflicts.

History and Tracking:

- Track every change made to the codebase and revert to previous versions if needed.

Backup and Recovery:

- Keeps a backup of your project on a remote server, preventing data loss.

Branching and Merging:

- Experiment with new features or fix bugs in isolated branches before merging them into the main codebase.

Step 1: Sign in to GitHub
Step 2: Create a New Repository

1. Once logged in, click on the **"+"** icon at the top right of the page and select **"New repository"** from the dropdown menu.

2. Alternatively, you can go to your profile page and click on the **"Repositories"** tab, then click the green **"New"** button.

Step 3: Configure Your New Repository

1. **Repository Name**: Enter a name for your repository. This name should be unique within your GitHub account.
2. **Description** (optional):
3. **Public/Private**:
4. **Initialize this repository with a README**: This file usually contains information about your project.
5. **Add .gitignore** (optional): Select a .gitignore template that matches the type of project you're creating. This file tells Git which files (or patterns) it should ignore.
6. **Choose a license** (optional): If you want to, you can select a license for your project. This defines how others can use your project.

Step 4: Create Repository

1.click the green **"Create repository"** button.

Step 5: Push Code to the Repository (using Git)

1. **Clone the Repository**: Open a terminal (or Git Bash on Windows) and run the following commands:

```
# Clone the repository to your local machine
git clone https://github.com/your-username/your-repository.git

# Change directory to your repository
cd your-repository

# Add your files to the repository
git add .

# Commit the changes
git commit -m "Initial commit"

# Push the changes to GitHub
git push origin main
```

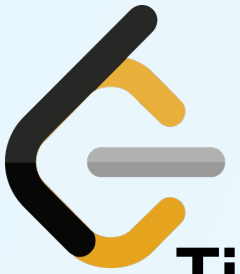
Replace `your-username` and `your-repository` with your GitHub username and the repository name you chose.

And that's it!

You've successfully created a GitHub repository and

pushed your first code to it.

LeetCode



Benefits of Using LeetCode

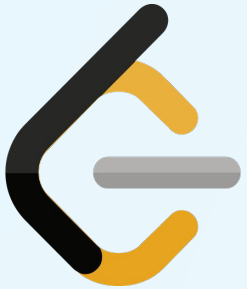
Title: Benefits of LeetCode for Career Development

1.Skill Enhancement

1. Strengthens problem-solving skills
2. Deepens understanding of algorithms and data structures

2.Interview Preparation

1. Real-world interview questions from top tech companies

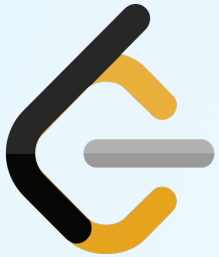


Let's take a little Taste of

Problem Solving

- Contains Duplicate
- Palindrome Number

https://leetcode.com/



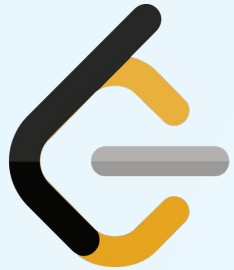
LeetCode

Let's take a little Taste of

Problem Solving

Contains Duplicate

https://leetcode.com/



LeetCode

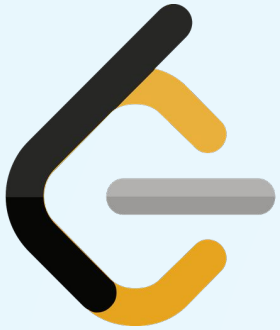
Contains Duplicate

nums = [1, 2, 3, 1]

217. Contains Duplicate

Easy | Topics | Companies

Given an integer array `nums`, return `true` if any value appears **at least twice** in the array, and return `false` if every element is distinct.



LeetCode

Example 1:

```
Input: nums = [1,2,3,1]
Output: true
```

Example 2:

```
Input: nums = [1,2,3,4]
Output: false
```

Example 3:

```
Input: nums = [1,1,1,3,3,4,3,2,4,2]
Output: true
```

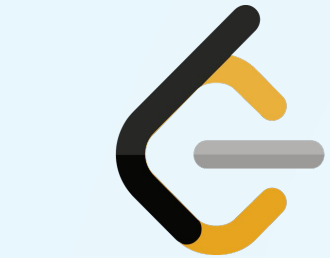
LeetCode

Contains Duplicate

Approach 1: Brute Force

nums = [1, 2, 3, 1]

The brute force approach compares each element with every other element in the array to check for duplicates. If any duplicates are found, it returns `true`. This approach is straightforward but has a time complexity of O(n^2), making it less efficient for large arrays.



LeetCode

Contains Duplicate

Approach 1: Brute Force

nums = [1, 2, 3, 1]

```python
class Solution:
    def containsDuplicate(self, nums: List[int]) -> bool:
        n = len(nums)
        for i in range(n - 1):
            for j in range(i + 1, n):
                if nums[i] == nums[j]:
                    return True
        return False
```

LeetCode

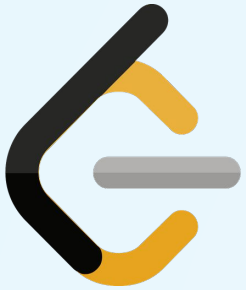
Contains Duplicate

Approach 2: Sorting

nums = [1, 2, 3, 1]

The sorting approach sorts the array in ascending order and then checks for adjacent elements that are the same. If any duplicates are found, it returns `true`.

Sorting helps in bringing duplicates together, simplifying the check. However, sorting has a time complexity of O(n log n).



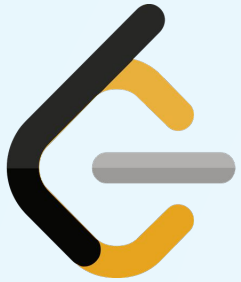
LeetCode

Contains Duplicate

Approach 2: Sorting

nums = [1, 2, 3, 1]

```python
class Solution:
    def containsDuplicate(self, nums: List[int]) -> bool:
        nums.sort()
        n = len(nums)
        for i in range(1, n):
            if nums[i] == nums[i - 1]:
                return True
        return False
```



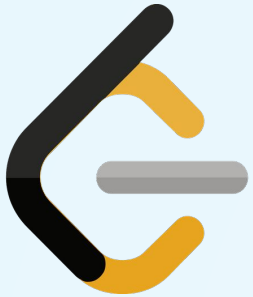
LeetCode

Contains Duplicate

Approach 3: Hash Set

nums = [1, 2, 3, 1]

The hash set approach uses a hash set data structure to store encountered elements. It iterates through the array, checking if an element is already in the set. If so, it returns `true`. Otherwise, it adds the element to the set. This approach has a time complexity of O(n) and provides an efficient way to check for duplicates.



LeetCode

Contains Duplicate

Approach 3: Hash Set

nums = [1, 2, 3, 1]

```python
class Solution:
    def containsDuplicate(self, nums: List[int]) -> bool:
        seen = set()
        for num in nums:
            if num in seen:
                return True
            seen.add(num)
        return False
```

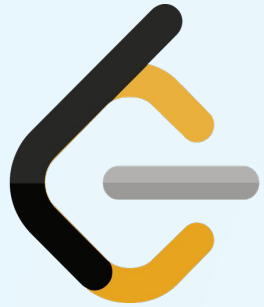
LeetCode

Contains Duplicate

Approach 4: Hash Map

nums = [1, 2, 3, 1]

The hash map approach is similar to the hash set approach but also keeps track of the count of occurrences for each element. It uses a hash map to store the elements as keys and their counts as values. If a duplicate element is encountered (count greater than or equal to 1), it returns `true`. This approach provides more information than just the presence of duplicates and has a time complexity of O(n).



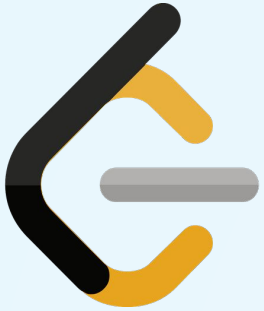
LeetCode

Contains Duplicate

Approach 4: Hash Map

nums = [1, 2, 3, 1]

In this approach, we iterate through the array and store each element as a key in a hash map. The value associated with each key represents the count of occurrences of that element. If we encounter an element that already exists in the hash map with a count greater than or equal to 1, we return `true`, indicating that a duplicate has been found. Otherwise, we update the count of that element in the hash map. If we complete the iteration without finding any duplicates, we return `false`.



LeetCode

Contains Duplicate

Approach 4: Hash Map

nums = [1, 2, 3, 1]

```python
class Solution:
    def containsDuplicate(self, nums: List[int]) -> bool:
        seen = {}
        for num in nums:
            if num in seen and seen[num] >= 1:
                return True
            seen[num] = seen.get(num, 0) + 1
        return False
```

Regards,
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Regards,
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