Welcome to Python Programming!

Teaching Assistant of Introduction to Numerical Analysis Class

Class Date: 2024-2025

Instructor: Dr. Mina Zarei

Class Link: Telegram group.

Exercise class time: **Monday at 9:30 P002 Class** (determined by student vote)

Session 1 (Install Python in VS Code)

Follow the instructions in the GitHub link.

link: www.github.com/AliSeif96/Introduction-to-Numerical-Analysis/).

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session 2 (Basic training)

1. Variables and Data Types
2. Taking Input from the User
3. Conditionals (if, elif, else)
4. Loops
5. Functions

1. Variables and Data Types

Python allows you to store data in variables.

In [2]:
```
name = "Alice"       # Assign a string value "Alice" to the variable `name`.
age = 25             # Assign an integer value 25 to the variable `age`.
height = 5.5         # Assign a float value 5.5 (decimal number) to the variable `height`.
is_student = True    # Assign a boolean value `True` to the variable `is_student`.

print("Name:", name)# Print the value of `name` with a label "Name:".
print("Age:", age)  # Print the value of `age` with a label "Age:".
print("Height:", height)# Print the value of `height` with a label "Height:".
print("Is a student:", is_student)# Print the value of `is_student` with a label "Is a student:".
```

```
Name: Alice
Age: 25
Height: 5.5
Is a student: True
```

2. Taking Input from the User

Use the input() function to get user input.

In [ ]:
```
# Prompt the user to enter their name and store the input as a string in the variable `user_name`.
user_name = input("Enter your name: ")  # The `input` function always returns a string.

# Print a greeting message that includes the user's name.
# Use a combination of string concatenation and comma-separated values for formatting.
print("Hello ", user_name + "!")  # `user_name + "!"` appends "!" to the user's name.
```

```
Hello  ali!
```

3. Conditionals (if, elif, else)

Control the flow of the program using conditions.

In [16]:
```
# Categorizing a person based on their age using if-elif-else statements

if age < 18:                            # Check if the age falls into the "minor" category
    print("You are a minor.")           # This executes if the age is less than 18
elif age >= 18 and age < 60:            # Using `and` to combine two conditions: age >= 18 and age < 60
    print("You are an adult.")          # This executes if age is between 18 and 59 (inclusive)
else:                                   # If the age does not match the above conditions, it falls into the "senior citizen" category
    print("You are a senior citizen.")  # This executes for ages 60 and above
```

```
You are an adult.
```

4. Loops

Use loops to repeat a block of code.

a. For loop

In [2]:
```
# Print a heading to indicate the counting starts.
print("\nCounting from 1 to 5:")

# Start a for loop that iterates through numbers generated by range(1, 6, 1).
for i in range(1, 6, 1):  # range(start, stop, step): starts at 1, stops before 6, increments by 1.
    print(i)  # Print the current number in each iteration.
```

```
Counting from 1 to 5:
1
2
3
4
5
```

b. While loop

In [3]:
```
# Print a heading to indicate the countdown starts.
print("\nCountdown from 5:")

# Initialize the countdown variable with the starting value 5.
count = 5

# Start a while loop that runs as long as count is greater than 0.
while count > 0:
    print(count)  # Print the current value of count.
    count -= 1  # Decrease the value of count by 1 in each iteration.
```

```
Countdown from 5:
5
4
3
2
1
```

5. Functions

Functions allow us to reuse blocks of code.

In [5]:
```
# Define a function to greet the user by name and display a welcome message.
def greet(name):
    """This function greets the user."""  # Docstring explaining what the function does.
    print(f"Welcome {name}")  # Print a formatted welcome message with the user's name.

# Call the function with the user's name ("ali") as an argument.
greet("ali")

# Define a function to perform operations on two numbers and return results.
def factor32(num, ali_age):
    return num + 1, ali_age + 6  # Increment num by 1 and ali_age by 6, and return both values.

# Call factor32 with arguments 18 and 22, and unpack the results into variables a and _.
a, _ = factor32(18, 22)  # The second value is ignored by assigning it to _.
print(a)  # Print the value of a (result of num + 1).

# Call factor32 with arguments 17 and 21, and unpack the results into variables a and b.
```

```python
a, b = factor32(17, 21)
print(a, b)  # Print both a (num + 1) and b (ali_age + 6).
```

```
Welcome ali
19
18 27
```