✅ What is a Loop?

Loops are used to **repeat a block of code** multiple times until a certain condition is met.

🔹 Types of Loops in Python:

1. **for loop**: Iterates over a sequence (list, tuple, string, range, etc.)
2. **while loop**: Repeats as long as a condition is `True`

✅ `for` Loop

Used to iterate over a sequence directly.

```
fruits = ["apple", "banana", "cherry"]

for fruit in fruits:
    print(fruit)
```

```
apple
banana
cherry
```

Iterating over string

```
for char in "Python":
    print(char)
```

```
P
y
t
h
o
n
```

using range()

```
# range(start, stop, step)
for i in range(1, 6):
    print(i)
```

```
1
2
3
4
5
```

With step size

```
for i in range(0, 10, 2):
    print(i)
```

```
0
2
4
6
8
```

✅ `while` Loop

Executes a block repeatedly **while the condition is True**.

```
count = 1
while count <= 5:
    print("Count:", count)
    count += 1
```

```
➡ Count: 1
    Count: 2
    Count: 3
    Count: 4
    Count: 5
```

⌄ Example 2: Sum of numbers

```
total = 0
num = 1

while num <= 5:
    total += num
    num += 1

print("Total sum:", total)
```

```
➡ Total sum: 15
```

✅ Loop Control Statements:

1. **break**: Exit the loop immediately
2. **continue**: Skip the current iteration and continue
3. **pass**: Placeholder statement, does nothing

⌄ Using breaks

```
for i in range(1, 10):
    if i == 5:
        break
    print(i)
```

```
➡ 1
  2
  3
  4
```

⌄ Using continue

```
for i in range(1, 6):
    if i == 3:
        continue
    print(i)
```

```
➡ 1
  2
  4
  5
```

⌄ Using **pass**

```
for i in range(1, 4):
    if i == 2:
        pass  # Placeholder: we can add code later
    print("Iteration:", i)
```

```
➡ Iteration: 1
    Iteration: 2
```

```
    Iteration: 3
```

✅ Nested Loops:

A loop inside another loop.

```python
for i in range(1, 4):
    for j in range(1, 3):
        print(f"i={i}, j={j}")
```

```
i=1, j=1
i=1, j=2
i=2, j=1
i=2, j=2
i=3, j=1
i=3, j=2
```

Summary

Loop Type	Usage
for	Iterates over a sequence
while	Repeats while condition is True
break	Exits the loop
continue	Skips current iteration
pass	Placeholder, does nothing