Loops: for and while

Day 6 - Python Basics

Shaida Muhammad

Monday, March 10, 2025   ShaidaSherpao@gmail.com

Agenda

1   What are loops?

2   for loop

3   while loop

4   break and continue

5   Hands-on practice

What are Loops?

- **Definition:** Loops are used to repeat a block of code multiple times.
- **Why use loops?**
  - Avoid repetitive code.
  - Perform tasks on collections (e.g., lists, tuples).
- **Types of loops in Python:**
  - `for` loop
  - `while` loop

for Loop

- **Syntax:**

```
for variable in sequence:
    # Code to execute
```

- **Example:**

```
for i in range(5):
    print(i)
```

- **Output:**

```
0
1
2
3
4
```

- **Explanation:**
  - `range(5)` generates numbers from 0 to 4.
  - The loop runs 5 times, printing each number.

range() Function

- **Purpose:** Generates a sequence of numbers.
- **Syntax:**
  - `range(stop)`
  - `range(start, stop)`
  - `range(start, stop, step)`
- **Examples:**

```
for i in range(3):       # 0, 1, 2
    print(i)
for i in range(1, 4):    # 1, 2, 3
    print(i)
for i in range(1, 10, 2): # 1, 3, 5, 7, 9
    print(i)
```

while Loop

- **Syntax:**

```
while condition:
    # Code to execute
```

- **Example:**

```
count = 0
while count < 5:
    print(count)
    count += 1
```

- **Output:**

```
0
1
2
3
4
```

- **Explanation:**
  - The loop runs as long as the condition (count < 5) is True.

break and continue

- **break:** Exits the loop immediately.

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

- **Output:**

```
0
1
2
3
4
```

- **continue:** Skips the rest of the loop and moves to the next iteration.

```
for i in range(5):
    if i == 2:
        continue
    print(i)
```

- **Output:**

```
0
1
3
4
```

Hands-On Practice

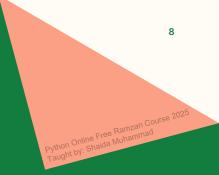- **Task 1:** Use a `for` loop to print numbers from 1 to 10.

```
for i in range(1, 11):
    print(i)
```

- **Task 2:** Use a `while` loop to print numbers from 1 to 10.

```
count = 1
while count <= 10:
    print(count)
    count += 1
```

- **Task 3:** Use a `for` loop to print even numbers from 1 to 20.

```
for i in range(2, 21, 2):
    print(i)
```

- **Task 4:** Use `break` to stop a loop when a condition is met.

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

- **Task 5:** Use `continue` to skip printing a specific number.

```
for i in range(5):
    if i == 2:
        continue
    print(i)
```

Recap

- **`for loop`**: Iterates over a sequence.
- **`while loop`**: Runs as long as a condition is True.
- **`break`**: Exits the loop.
- **`continue`**: Skips to the next iteration.

Homework

1. Write a program to print the multiplication table of a number using a for loop.
2. Write a program to find the sum of all numbers from 1 to 100 using a while loop.
3. Write a program to print all odd numbers between 1 and 50 using continue.

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Q&A

- Do you have any questions?
- Share your thoughts.

Closing

Next class: Lists