# Loops in Python: A Complete Guide

Loops in Python are used to repeat a block of code multiple times until a specific condition is met. Python has two main types of loops: for loop and while loop.

## 1. Why Use Loops?

- To automate repetitive tasks  
- To iterate over sequences (like lists, tuples, or strings)  
- To reduce code duplication  
- To perform tasks until a condition is satisfied

## 2. Types of Loops

1. For Loop  
2. While Loop

## 3. For Loop

The for loop is used for iterating over a sequence (list, tuple, string, or range). It executes a block of code for each element in the sequence.

### Syntax:

for variable in sequence:  
 # Block of code

### Common Use Cases of For Loop:

- Iterating through elements of a list or tuple  
- Repeating a block of code a fixed number of times  
- Working with the range() function

## 4. While Loop

The while loop repeats a block of code as long as a specified condition is true.

### Syntax:

while condition:  
 # Block of code

## 5. For Loop vs While Loop

|  |  |  |
| --- | --- | --- |
| Feature | For Loop | While Loop |
| Use Case | Used for iterating over a sequence | Used when the number of iterations is not known beforehand |
| Condition Check | Automatically iterates over a sequence | Condition is checked before each iteration |
| Control | Easier for finite iteration | Flexible for conditional iteration |

## 6. Loop Control Statements

Python provides control statements to alter the loop execution. These include:

1. break – Exits the loop prematurely  
2. continue – Skips the current iteration and continues with the next iteration  
3. pass – Does nothing, acts as a placeholder

## 7. Nested Loops

A loop inside another loop is called a nested loop. It allows you to perform more complex iterations.

## 8. Infinite Loops

An infinite loop occurs when the condition in a loop never becomes false. Be cautious with while loops to avoid infinite loops.

## 9. Practical Use Cases of Loops

- Reading files line by line  
- Iterating over lists, dictionaries, and other collections  
- Automating tasks (e.g., web scraping, data processing)  
- Generating patterns

## 10. Conclusion

Loops are an essential concept in Python programming. Understanding when and how to use for and while loops effectively can help you write efficient, clean, and readable code.