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While Loop in Python

What is a while loop in Python?

A while loop is used when you want to repeat a block of code as long as a condition is true.

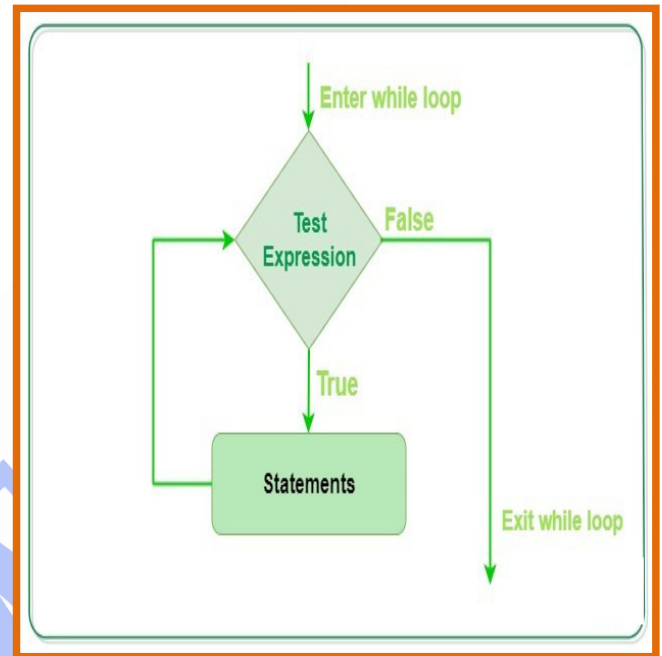
- In simple words:
It keeps running **again and again** until a certain condition becomes **false**.

Why do we use While Loop?

- To repeat something again and again.
- It runs while a condition is true.
- We don't know how many times it will run.
- Stops when the condition becomes false.

Great for things like:

- Waiting for correct input.
- Trying until it works.
- Counting up or down with a stop condition.



Syntax:

while condition:
code to execute

- **condition** → is checked before each loop run.
- If the condition is **True**, the loop runs.
- If it becomes **False**, the loop stops.

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Rules of While Loop

Rule Number	Rule Description	Example or Reminder
1	Start with a condition	while condition:
2	Loop runs only if condition is True	Stops when condition becomes False
3	Make sure something changes inside the loop	So it doesn't run forever
4	Use indentation for the loop block	All loop code must be indented
5	Can use break to exit early	if something: break
6	Can use continue to skip to next loop	Skips the rest of current loop cycle
7	Avoid infinite loops unless needed	Example: while True: needs a break inside

Solved Example 1: Print numbers from 1 to 5 using a while loop

```
i = 1
while i <= 5:
    print(i)
    i = i + 1
```

Output:

1
2
3
4
5

Explanation:

- The loop starts with i = 1.
- It runs until i becomes greater than 5.
- Each time, i increases by 1.
- When i becomes 6, the condition (i <= 5) becomes false, and the loop stops.

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Solved Example 2: Print Even Numbers from 2 to 10

```
i = 2  
while i <= 10:  
    print(i)  
    i = i + 2
```

Output:

2
4
6
8
10

Explanation:

Here, i increases by 2 each time, so it prints only even numbers.

Solved Example 3: Countdown from 5 to 1

```
i = 5  
while i >= 1:  
    print(i)  
    i = i - 1
```

Output:

5
4
3
2
1

Explanation:

The loop decreases i by 1 each time until it reaches 0.

Solved Example 4: Sum numbers from 1 to 10

```
total = 0  
num = 1  
while num <= 10:  
    total += num  
    num += 1  
print("Sum is:", total)
```

Sum is: 55

=== Code Execution Successful ===

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Solved Example 5: Sum of First 10 Natural Numbers

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```
i = 1
sum = 0
while i <= 10:
    sum = sum + i
    i = i + 1
print("The sum is:", sum)
```

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Output:
The sum is: 55

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Difference between For and While loop

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Feature	For loop	While loop
Used when:	You know how many times	You don't know how many times
Counts or checks?	Counts steps	Checks a condition
Stops when:	It finishes the list/range	The condition becomes False
Updates:	Updates automatically	You must update it yourself
Loop danger:	Usually safe	Can run forever if not careful
Example:	for i in range(5):	while i < 5:

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Assignment

Ques 1 - Write a program that keeps asking the user to enter a password until they enter the correct one (e.g., "python123").



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Ques 2 - Write a program to print all even numbers from 2 to 20 using a while loop.



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Ques 3 - Write a program to reverse a number using a while loop.
Example: If input is 1234, output should be 4321.



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Ques 4 - Write a program to find the factorial of a number using a while loop.
Example: Input = 5 → Output = 120



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