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Dichi Academy
Data Science Module 1 - Data with Python

Iterative Structures (Loop)

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Introduction to loop statements

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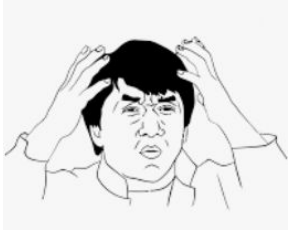
A loop statement in programming allows you to repeats a block of code based on a condition or set of values.

It help you automate and run code iteratively until the condition is false.

```
print("Programming is fun!")
```

100 times {

```
print("Programming is fun!")
print("Programming is fun!")
...
print("Programming is fun!")
```



```
count = 0
while count < 100:
    print("Programming is fun!")
    count = count + 1
```

“While” statement

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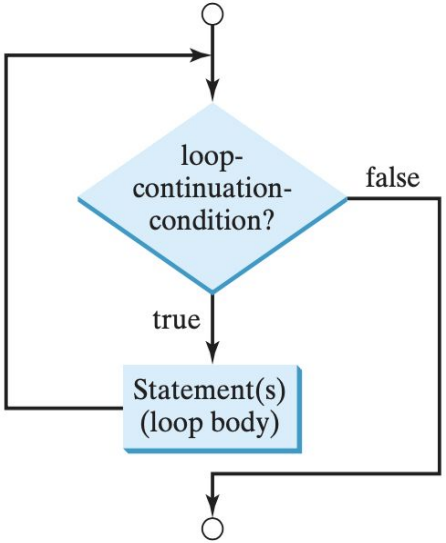
```
while loop-continuation-condition:
    # Loop body
    Statement(s)
```

Condition

One indent



(a) A while loop

“While” statement

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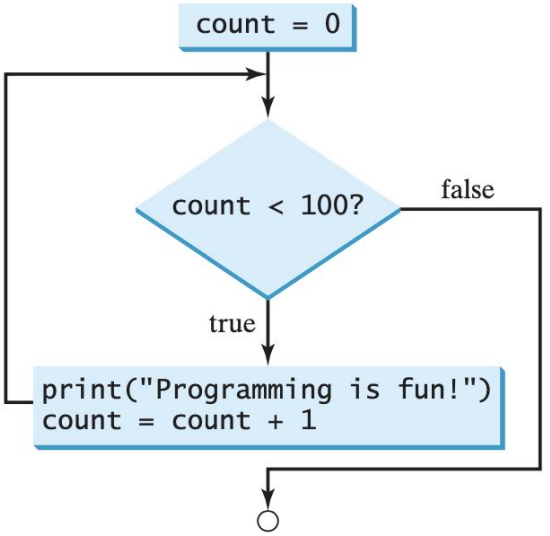
Initial Value

Condition

```
count = 0
while count < 100:
    print("Programming is fun!")
    count = count + 1
```

One indent



(b) A while loop example

“While” statement

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```
sum = 0
i = 1

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

“While” statement

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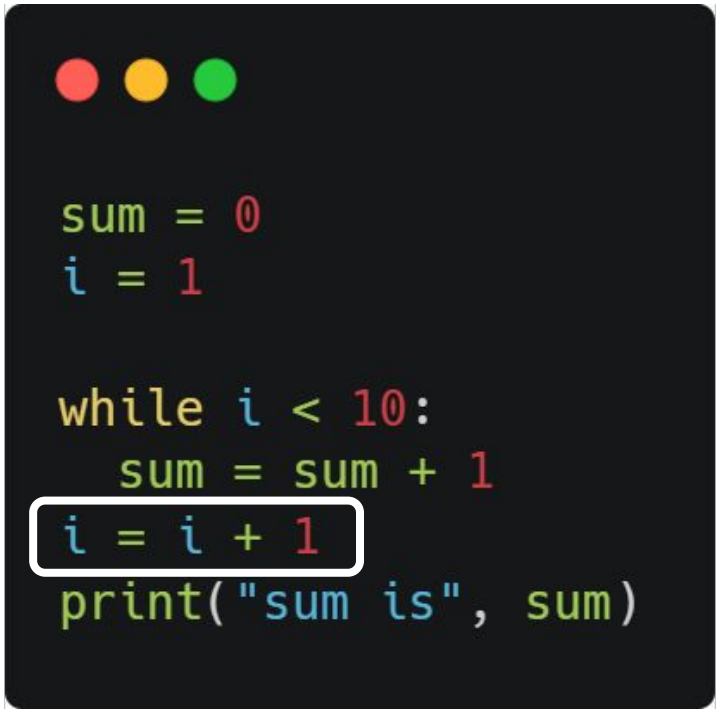

Practice 1: Count Numbers

Write a Python program that uses a while loop to print numbers from 1 to 10.

Practice 2: Find the Correct Answer

Write a program that prompts the user to enter an answer for a question on subtraction (4 - 3 = ?).

Using a loop, write the program to let the user enter a new answer until it is correct, as shown below:

```
What is 4 - 3? 4 ↵ Enter
Wrong answer. Try again. What is 4 - 3? 5 ↵ Enter
Wrong answer. Try again. What is 4 - 3? 1 ↵ Enter
You got it!
```

“For” statement

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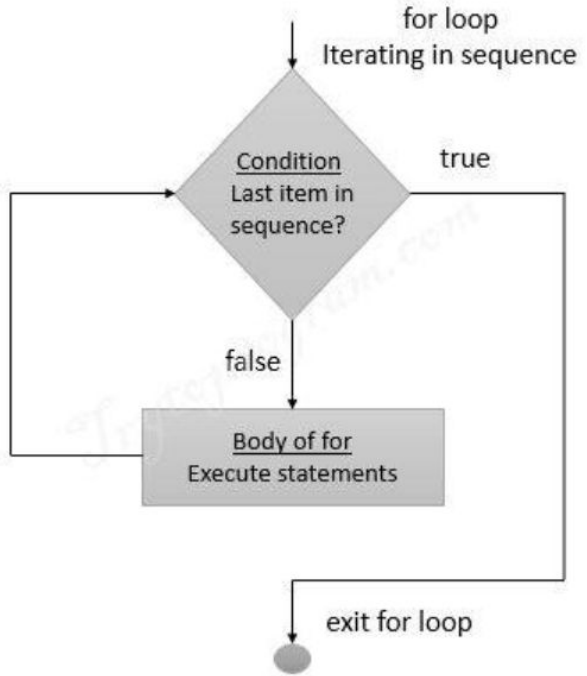
```
i = initialValue  # Initialize loop-control variable
while i < endValue:
    # Loop body
    ...
    i += 1  # Adjust loop-control variable
```

```
for var in sequence:
    # Loop body
```

```
for i in range(initialValue, endValue):
    # Loop body
```

One indent



“For” statement

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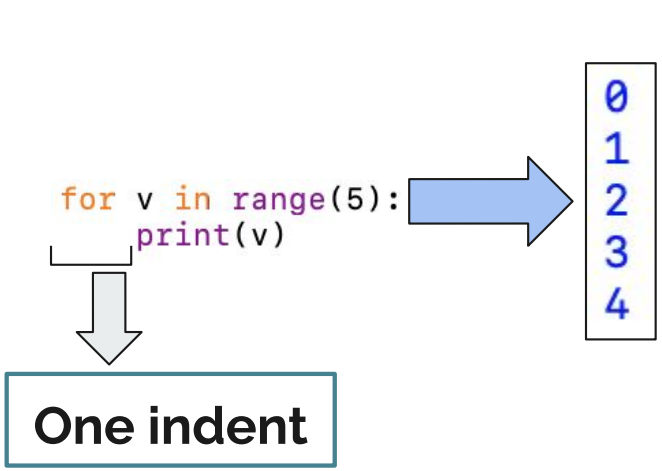

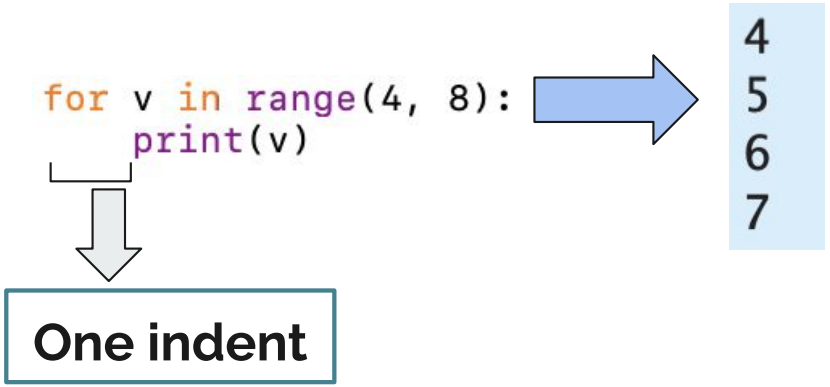

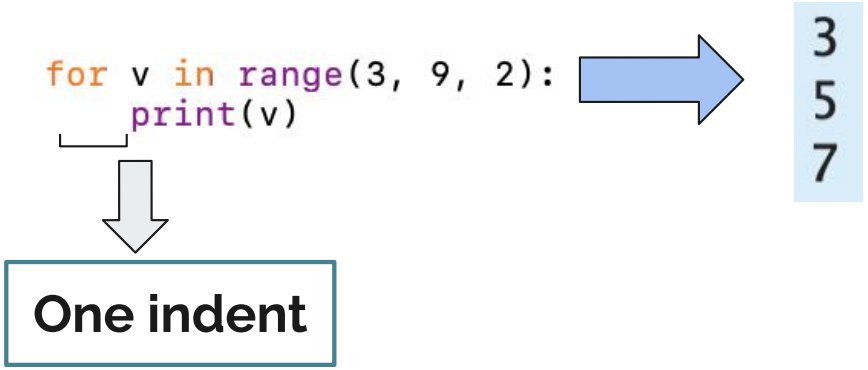

“Nested loop” statement

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```
num = eval(input("Enter a number: "))
for i in range(1, num + 1):
  j = 1
  while j <= i:
    print(j, end=" ")
    j += 1
    print()
```

“Nested loop” statement

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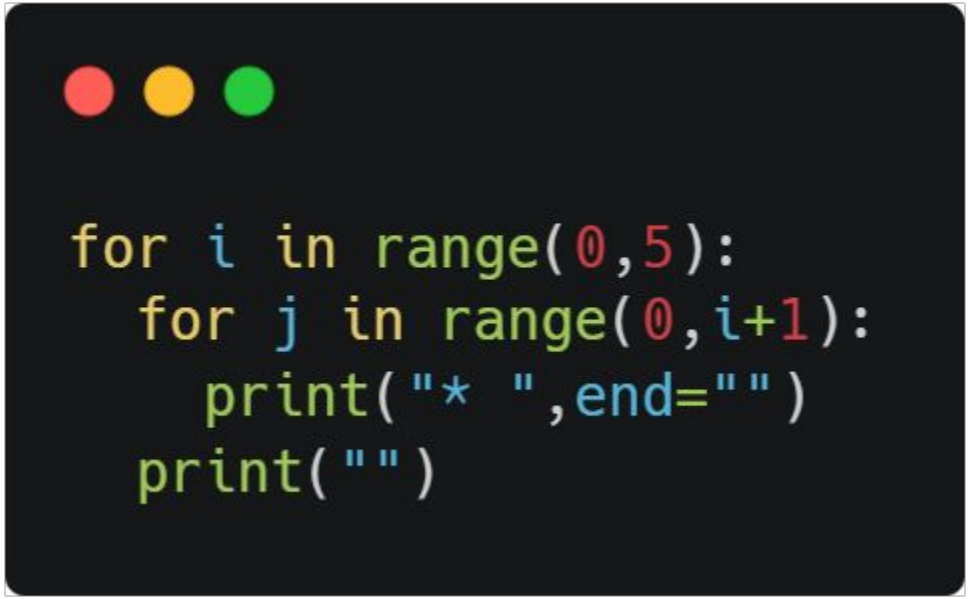


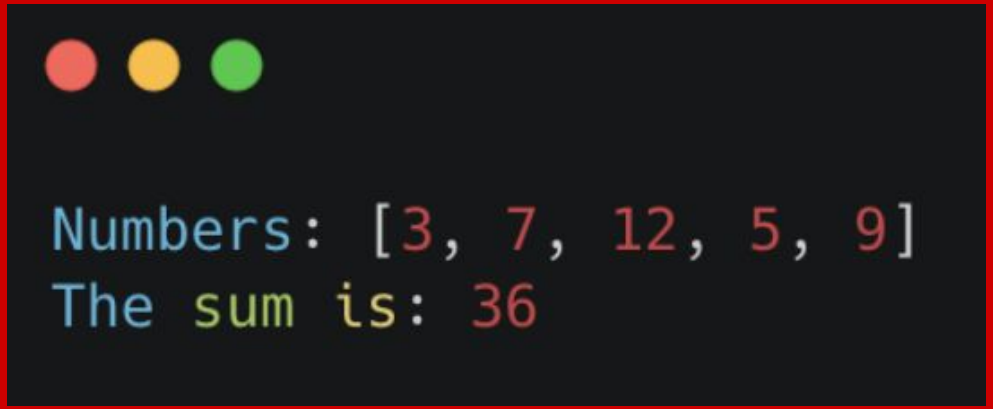
```
for i in range(0,5):
  for j in range(0,i+1):
    print("* ",end="")
  print("")
```

Practice 3: Print Each Letter in a Word

Write a Python program that uses a for loop to iterate over each letter in a word entered by the user and print it.

Practice 4: Find the Sum of Numbers in a List

Write a Python program that uses a for loop to calculate and print the sum of all the numbers in a list.



Practice 5: Estimate Tuition Fee

Suppose that the tuition for a university is $10,000 this year and increases 7% every year.

In how many years will the tuition have doubled?

```
year = 0  # Year 0
tuition = 10000

year += 1 # Year 1
tuition = tuition * 1.07

year += 1 # Year 2
tuition = tuition * 1.07

year += 1 # Year 3
tuition = tuition * 1.07
...
```

Practice 5: Estimate Tuition Fee

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tuition = tuition * 1.07

year += 1 # Year 2
tuition = tuition * 1.07

year += 1 # Year 3
tuition = tuition * 1.07
...
```

```
year = 0  # Year 0
tuition = 10000
while tuition < 20000:
    year += 1
    tuition = tuition * 1.07
```

“Break” and “continue” keywords

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```
sum = 0
number = 0
while number < 10:
    number += 1
    if number == 5 or number == 6:
        continue
    sum += number
    print("The sum is", sum)
```

How about this one?

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

“Break” and “continue” keywords

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```
sum = 0
number = 0

while number < 20:
    number += 1
    sum += number
    if sum >= 100:
        break

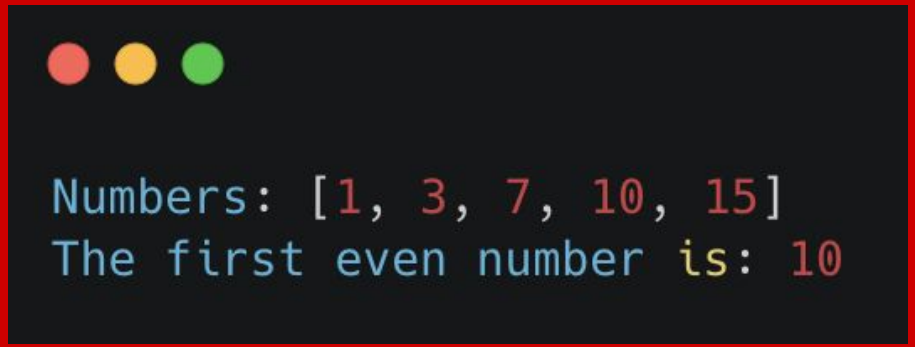
print("The number is", number)
print("The sum is", sum)
```

How about this one?

```
sum=0
number = 0
while number < 20:
    number += 1
    sum += number
print("The number is", number)
print("The sum is", sum)
```

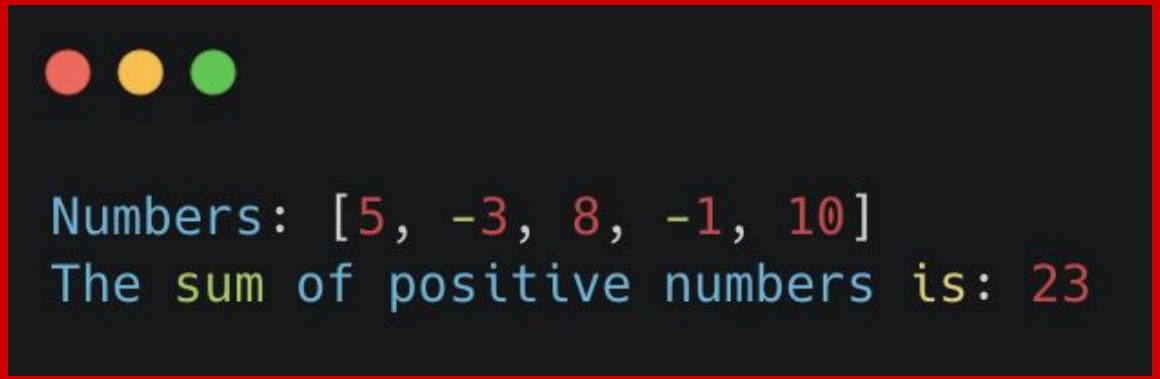
Practice 6: Find and Print the First Even Number

Write a Python program that takes a list of numbers and uses a for loop with the break keyword to find and print the first even number. If an even number is found, stop the loop.



Practice 7: Skip Negative Numbers and Calculate the Sum

Write a Python program that uses a for loop with the continue keyword to calculate the sum of all positive numbers in a given list. If a number is negative, skip it.



Practice 8: Find the Expected Numbers

Write a program to display only those numbers from a list below that satisfy the following conditions:

num = [11, 21, 27, 32, 35, 42, 46, 49, 56, 70, 777]

- The number is divisible by 7.
- If the number is greater than 50, then skip it and move to the next number.
- If the number is larger than 500, then stop the loop.

Expected output : 21 35 42 49

Thank You
for
Your Attention !