



Conditional Statements

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Let's explore conditional statements



- Conditional statements are handled by 'if' statements in python
- Conditional statement perform computations or actions depending on the boolean constraint is evaluated as true or false
- If the constraint is 'True', the statements in the body are executed, and if it is 'False', the statements in body are skipped
- Conditional statements:
 - If statement
 - If-else statement
 - If elif else statement
 - Nested if-else



If Statement

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If statement



- The syntax of the if-statement is

```
if condition:  
    statement 1  
    statement 2  
    ....
```

- Python logical conditions supported are
 - Equivalence `==`
 - Inequivalence `!=`
 - Less than `>`
 - Greater than `<`
 - Less than or equal to `<=`
 - Greater than or equal to `>=`
- If statement can be nested

If statement



```
# A demo of if statement
if (4 ** 2 >= 16):
    print("It's true!")
```

It's true!

```
if (4 * 2 < 100):
    print("This won't run")
```

This won't run

```
# Check if the given value is between 0 to 100
value = 56
if((value>0) and (value<100)):
    print("Given number is between 0 and 100")
```

Given number is between 0 and 100



The if...else Statement

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If-else statement



- The syntax of the if-statement is

```
if condition:  
    statement(s)  
    else:  
        statement(s)
```

- The statement(s) under 'else:' are executed when the condition in 'if ' is not satisfies, ie., the boolean output is 'False'

If-else statement



```
days = int(input("How many days are in June?: "))
if days == 30:
    print("You passed the test.")
else:
    print("You failed the test.")
print("Thank You!")
```

```
How many days are in June?: 31
You failed the test.
Thank You!
```

If-else statement



```
# calculate the circumference of the circle using if else
radius = int(input("Enter radius: "))

if radius >= 0:
    print("Circumference = ", 2 * 3.14 * radius)
else:
    print("Please enter a positive number")
```

Enter radius: 4

Circumference = 25.12



If elif else Statement

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If elif else statement



- Elif statement is used to control multiple conditions only if the given if condition false
- It's similar to an if-else statement and the only exception is that in else we are not checking the condition but in elif, we check the condition
- The syntax of the if elif else is

```
if (condition):  
elif (condition):  
    else:
```

If elif else statement



```
# check the ticket price according to your age
my_age = input('Enter your age:')
my_age = int(my_age)
if 0<my_age<3:
    print('Free ticket')
elif 3<my_age<10:
    print('Ticket price is 200')
elif 10<my_age<20:
    print('Ticket price is 250')
else:
    print('Ticket price is 300')
```

```
Enter your age:17
Ticket price is 250
```

If elif else statement



```
day = input(str('Enter the day: '))
if (day == 'Monday'):
    print('Today is Monday')
elif (day == 'Tuesday'):
    print('Today is Tuesday')
elif (day == 'Wednesday'):
    print('Today is Wednesday')
else:
    print('Today is Holiday')
```

```
Enter the day: Monday
Today is Monday
```



Nested if and if...else Statement

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Nested If-else statement



- The syntax of the if-statement is

```
if condition:  
    statement(s)  
    if condition:  
        statement(s)  
    else:  
        statement(s)  
else:  
    statement(s)
```

- Note that a 'if' statements are within the body of another if statement
- The statements in this manner are called 'nested if- statements'
- If the first 'if' condition is satisfied then the program executes the commands within that 'if'

Nested If-else statement



```
# find the Largest number among three numbers using nested if else
x = 234
y = 453
z = 223
if x > y:
    print('x is greater')
else:
    if z > y:
        print('z is greater')
    else:
        print('y is greater')

y is greater
```

Nested If-else statement



```
winning_number = 27
Num = input('Enter your score:')
Num = int(Num)
if Num == winning_number:
    print('YOU WIN !!')
else:
    if Num < winning_number:
        print('Your score is too low')
    else:
        print('Your score is too high')
```

```
Enter your score:45
Your score is too high
```

Nested If statement



```
: userid = input(str('Enter your userid: '))
password = input('Enter your password: ')
password = int(password)
if userid == 'simplilearn@gmail.com':
    if password == 1234:
        print('You are successfully logged in')
```

```
Enter your userid: simplilearn@gmail.com
Enter your password: 1234
You are successfully logged in
```



Loops

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Python Iterables



- Iterable is an object capable of returning its members one by one
- Sequence type objects like lists, strings, tuples, dictionaries and sets are common type of iterables

Iteration through the Iterables



- Iteration is a general term for taking each item from a sequence one after another



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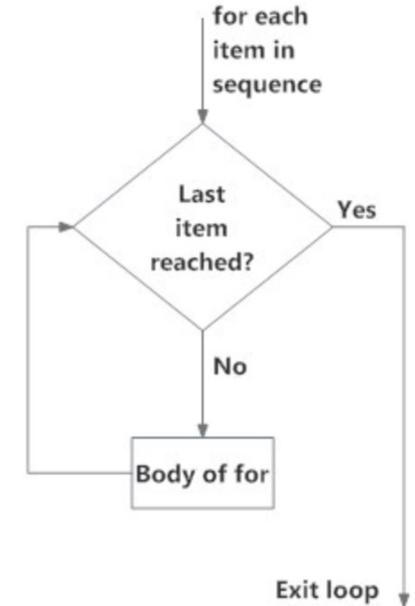
Python's for loop

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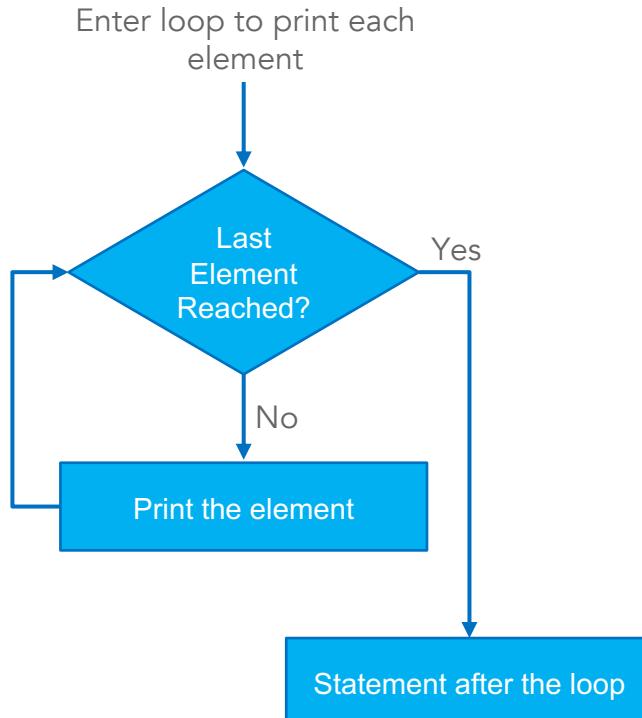
The for loop

The for loop in Python is used to iterate over a sequence (list, tuple, string) or other iterable objects.

Iterating over a sequence is called traversal.



The for loop code example



A list - sequence type object

A variable to hold a value from the list at each iteration

```
age = [10, 12, 15, 18, 20]
for each_age in age:
    print(each_age)
```

```
10
12
15
18
20
```

Read each element of a string



```
# read a string and print the elements one by one
nm = 'India'

for i in nm:
    print(i)
```

I
n
d
i
a



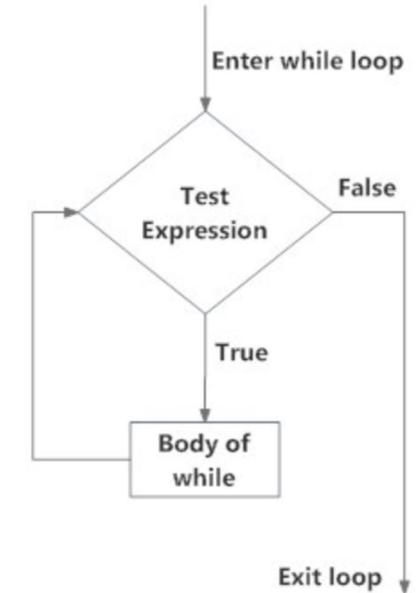
While Loop

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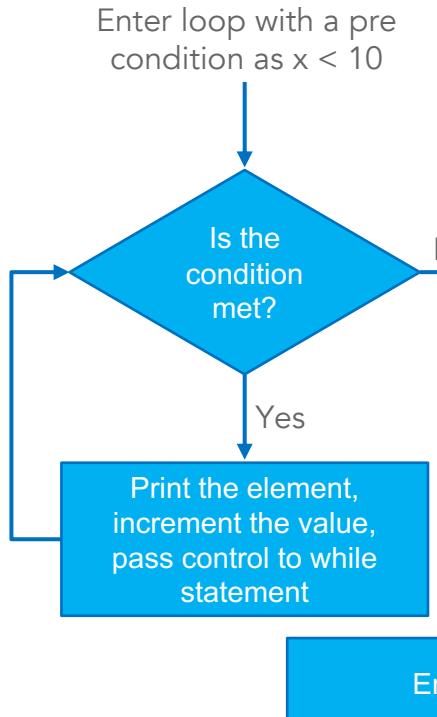
The while loop

The while loop in Python is used to iterate over a block of code as long as the test expression (condition) is true.

We generally use this loop when we don't know beforehand, the number of times to iterate.



The while loop code example



The while statement checks the condition if $x < 10$

```
# Assigning 0 to x
x = 0

# While the loop condition is less than 10,
# keep printing x
# add 1 to x
while x < 10:
    print (x)
    x+=1
```

0
1
2
3
4
5
6
7
8

Increment x by 1 and pass the control to the while statement

Print each element of a list using while loop



```
#get the list and print the input one by one
```

```
cars = ['Maybach', 'Audi', 'BMW']
i = 0
while i < len(cars):
    print(cars[i])
    i+=1
```

```
Maybach
Audi
BMW
```



Break, Continue

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Exiting a loop



Loops in Python allows us to automate and repeat tasks.

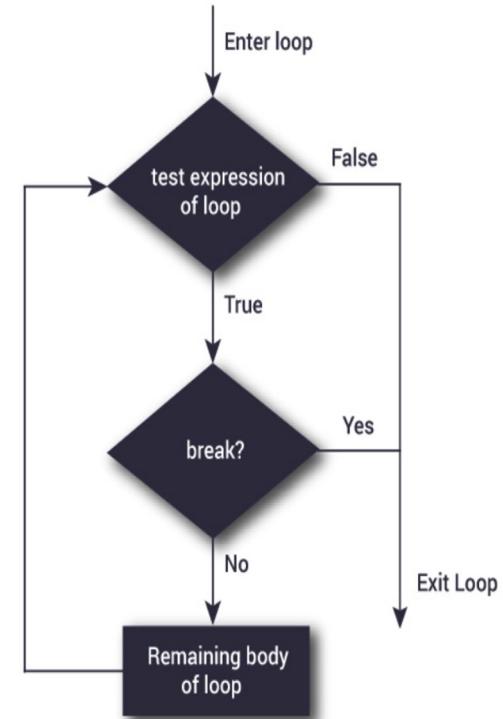
But at times, due to certain factors, we may want to:

- Exit a loop completely
- Skip part of a loop before continuing

Exit a loop with break statement

The break statement in Python terminates the current loop and resumes execution at the next statement

The break statement can be used in both while and for loops.



Exit a while loop with break statement



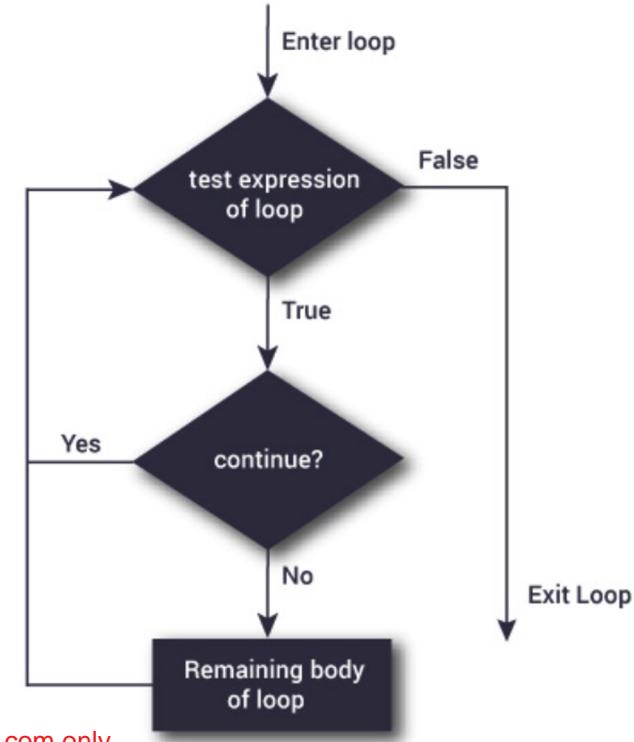
```
n = 5
while n > 0:
    n -= 1
    if n == 2:
        break
    print(n)
print('Loop ended.')
```

```
4
3
Loop ended.
```

Skip part of the loop with continue statement

The continue statement rejects all the remaining statements in the current iteration of the loop and moves the control back to the top of the loop.

The continue statement can be used in both while and for loops.



Skip part of the loop with continue statement

```
for i in "greatlearning":  
    if i == "i":  
        continue  
    print(i)  
  
print("The end of code")
```

g
r
e
a
t
l
e
a
r
n
i
ng
The end of code

The for...loop iterates through the string character by character

The if condition checks for the condition, x = "i"

The continue statement, when meets the condition, it ignores that character and moves the control to the beginning of the loop



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More on Loops

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Read each element of a tuple



```
# Read a tuple and display all the words one by one  
  
a = ("Opportunities", "don't", "happen.", "You", "create", "them.")  
  
for i in a:  
    print(i)
```

```
Opportunities  
don't  
happen.  
You  
create  
them.
```

Read through a list of list



```
list_of_lists = [['Learn', 'one', 'new', 'thing', 'everyday'], [101, 102, 103], [9.9, 7.7, 2.7]]  
for list in list_of_lists:  
    print(list)
```

```
['Learn', 'one', 'new', 'thing', 'everyday']  
[101, 102, 103]  
[9.9, 7.7, 2.7]
```

Loop through a range



```
#print the numbers from 1 till 5
for i in range(0, 5):
    print("value of i is :", i)
```

```
value of i is : 0
value of i is : 1
value of i is : 2
value of i is : 3
value of i is : 4
value of i is : 5
value of i is : 6
value of i is : 7
value of i is : 8
value of i is : 9
```

A range() function takes 3 parameters. Start, stop and step. If step is not provided a default step of 1 is considered.

```
#print the numbers from 1 till 6 with a step of 2
for i in range(0, 6, 2):
    print("value of i is :", i)
```

```
value of i is : 0
value of i is : 2
value of i is : 4
```

Loop through a range (negative step)



```
#print the numbers from 100 till 0 backward with a step of 10
for i in range(100, 0, -10):
    print(i)
```

```
100
90
80
70
60
50
40
30
20
10
```

A range() function takes 3 parameters. Start, stop and step. If step is not provided a default step of 1 is considered.

In this example we have a negative step of -10. The range starts from 10. Goes backward to 0 by step 10

Computation with for...loop



```
# read each element from the range and add 1 to each of the values
for i in range(1, 10, 2):
    print(i, "Squared value is :" , i + 1)
```

```
1 Squared value is : 2
3 Squared value is : 4
5 Squared value is : 6
7 Squared value is : 8
9 Squared value is : 10
```

```
# read each element from the range and square the values
for i in range(1, 10, 2):
    print(i, "Squared value is :" , i*i)
```

```
1 Squared value is : 1
3 Squared value is : 9
5 Squared value is : 25
7 Squared value is : 49
9 Squared value is : 81
```

Read through a dictionary object

```
employee_dict = {'Name': 'Rajesh', 'Job': 'Data Scientist', 'Age': 27}  
employee_dict
```

```
{'Name': 'Rajesh', 'Job': 'Data Scientist', 'Age': 27}
```

```
## print all the items  
for each_item in employee_dict.items():  
    print(each_item)
```

```
('Name', 'Rajesh')  
(('Job', 'Data Scientist')  
(('Age', 27)
```

```
## print all the keys  
for item in employee_dict.keys():  
    print(item)
```

```
Name  
Job  
Age
```

```
## print all the values  
for item in employee_dict.values():  
    print(item)
```

```
Rajesh  
Data Scientist  
27
```

The dict.items() returns all key-value pair

The dict.keys() returns all keys

The dict.values() return all values

Read through the values in a dictionary to create a list



```
# Get all the values of a dictionary obejct and display the output as list  
employee_dict = {'Name': 'Rajesh', 'Job': 'Data Scientist', 'Age': 27}  
new_list = []  
  
for item in employee_dict.values():  
    new_list.append(item)  
  
print(new_list)
```

```
['Rajesh', 'Data Scientist', 27]
```

Create a blank list

Append new value to the list

Replace values in a dictionary with computed values



```
# create a dict key - fruit name, value is price
prices = {'MacBook Pro': 320000, 'iPad': 90000, 'iPhone': 127000}

# Get the key and values for each items
for each_key, each_value in prices.items():

    #for each key value, get its respective value and applies a 10% discount
    prices[each_key] = round(each_value * 0.9, 2)

prices
{'MacBook Pro': 288000.0, 'iPad': 81000.0, 'iPhone': 114300.0}
```

A dictionary object

Applies a 10* discount on
the values

The for loop with conditional statements



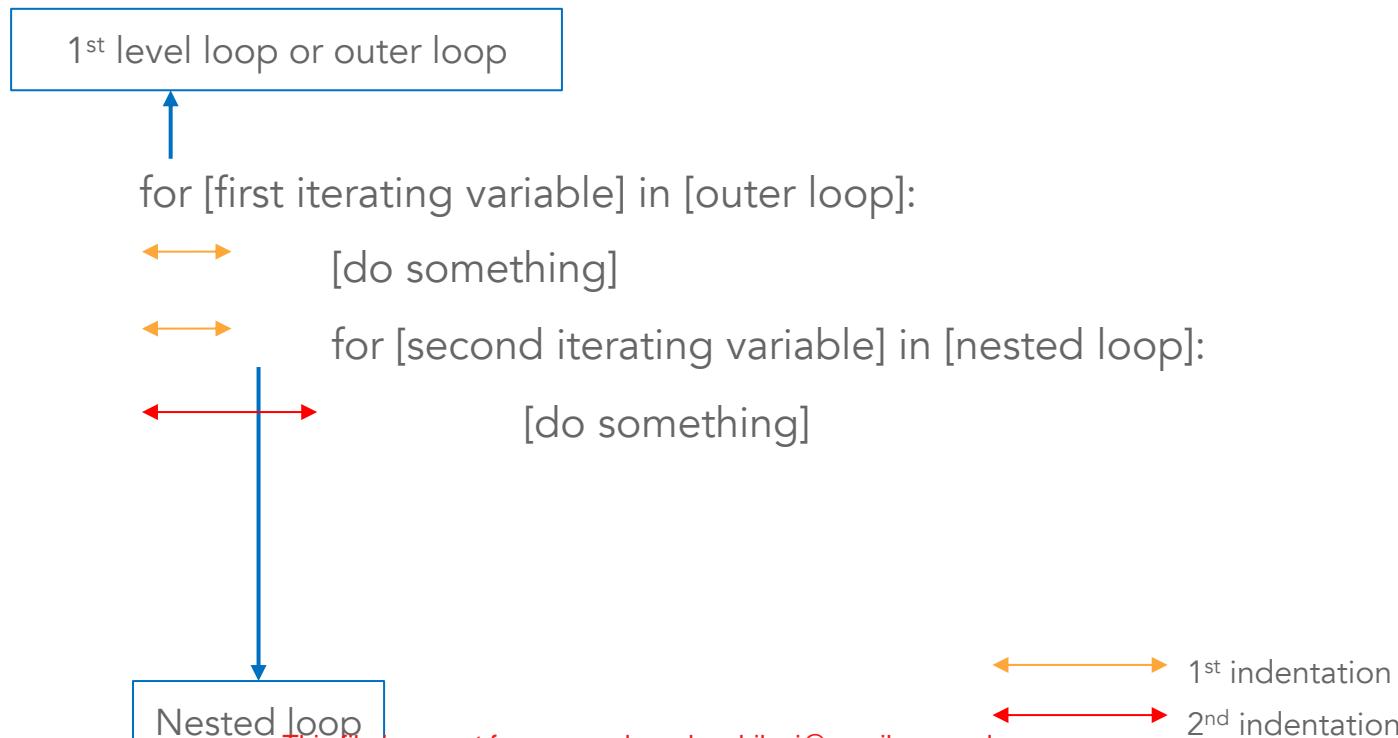
For loop

```
# for the given sequence, get the list of number which is divisible by 3
for i in range(0,20):
    if( i%3 == 0):
        print(i)
```

```
0
3
6
9
12
15
18
```

Conditional statement to check if the remainder of a number divider by 3 is zero

Nested for loop



Nested for loop

```
product_line = ["iPhone", "MacBook", "iPad"]
color = ["Space Grey", "White", "Silver"]

for each_product in product_line:
    for each_color in color:
        print(each_product, each_color)
```

```
iPhone Space Grey
iPhone White
iPhone Silver
MacBook Space Grey
MacBook White
MacBook Silver
iPad Space Grey
iPad White
iPad Silver
```

Outer loop

Inner loop

Nested for loop with list of lists

```
list_of_lists = [['Learn', 'one', 'new', 'thing', 'everyday'], [101, 102, 103], [9.9, 7.7, 2.7]]  
  
for list in list_of_lists:  
    for item in list:  
        print(item)
```

Learn
one
new
thing
everyday
101
102
103
9.9
7.7
2.7

Outer loop

Inner loop

Example: Calculating sum of numbers



```
n = int(input("enter the count of sequential numbers you want to add :"))

# initialize sum and counter
sum = 0
i = 1

while i <= n:
    sum = sum + i
    i = i+1    # update counter

    # print the sum
    print("The sum is", sum)
```

enter the count of sequential numbers you want to add :5

The sum is 1
The sum is 3
The sum is 6
The sum is 10
The sum is 15

While loop with else statement



The else part is executed if the condition in the while loop evaluates to False.

```
# initialize counter
counter = 0

while counter < 3:
    print("Inside loop")
    counter = counter + 1
else:
    print("Inside else") # as the count reached 3, it exits out of the loop
```

```
Inside loop
Inside loop
Inside loop
Inside else
```

Exit a while loop with continue statement



```
n = 5
while n > 0:
    n -= 1
    if n == 2:
        continue
    print(n)
print('Loop ended.')
```

```
4
3
1
0
Loop ended.
```

List Comprehension

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What is a list comprehension?



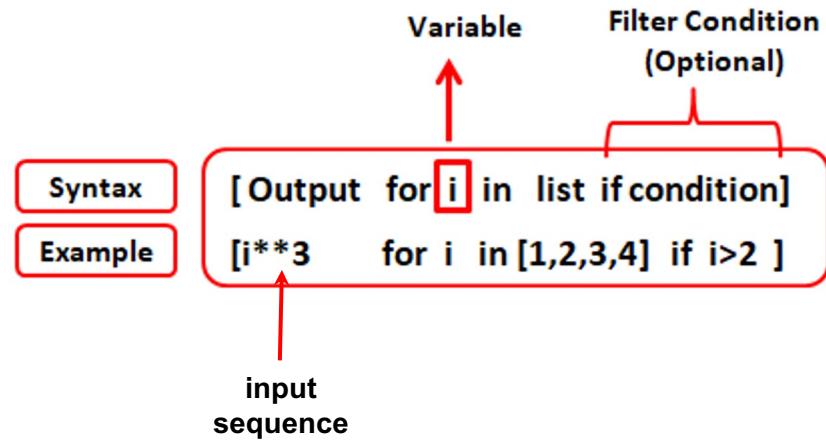
- List comprehensions provide a concise way to create lists
- It consists of [] containing:
 - an input sequence
 - a variable representing numbers of the input sequence
 - a conditional expression (optional)
 - an output expression producing a list
- The result will be a new list resulting from evaluating the expression in the context of the for and if clauses which follow it. The list comprehension always returns a result list

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What is a list comprehension?

- It consists of [] containing:
 - an input sequence
 - a variable representing numbers of the input sequence
 - a conditional expression (optional)
 - an output expression producing a list



List comprehension vs loops

Create a list using for loop

```
num_square = []
for i in range(5):
    num_square.append(i*i)
num_square
[0, 1, 4, 9, 16]
```

```
num_squares = [i * i for i in range(5)]
num_squares
```

```
[0, 1, 4, 9, 16]
```

Create a list using list comprehension

did you know?

List comprehension reduces 3 lines of code into one, which will be instantly recognizable to anyone.

It is faster, as Python will allocate the list's memory first, before appending the elements to it, instead of having to resize on runtime.

For loop using list comprehension



```
num = [1,2,3,4]
doubled_num = [n * 2 for n in num]
doubled_num

[2, 4, 6, 8]
```

Multiply each element of the list by 2 using list comprehension



```
my_list = [1,2,2]
multiplied = [item*2 for item in my_list]
print (multiplied)
```

```
[2, 4, 4]
```

Read the first letter of each word using list comprehension



```
words = ["python", "for", "data", "science"]
items = [ word[0] for word in words ]
print(items)

['p', 'f', 'd', 's']
```

Iteration over more than one iterable in a list using list comprehension



```
seq_1 = [1, 2, 3]
seq_2 = 'ABC'
[(x,y) for x in seq_1 for y in seq_2]
```

```
[(1, 'A'),
 (1, 'B'),
 (1, 'C'),
 (2, 'A'),
 (2, 'B'),
 (2, 'C'),
 (3, 'A'),
 (3, 'B'),
 (3, 'C')]
```

If statement within a list comprehension



```
my_color = ['Orange', 'Yellow', 'Blue', 'Red', 'Green']
green_list = [color for color in my_color if color == 'Orange']
green_list

['Orange']
```

Extract all the numbers from the string using list comprehension



```
my_string = "Hello 12345 Python"
num = [x for x in my_string if x.isdigit()]
print(num)

['1', '2', '3', '4', '5']
```

Extract all the vowels from the string using list comprehension



```
sentence = 'PyThoN FoR dAtA SciEnCe'  
vowels = [i for i in sentence if i in 'aeiouAEIOU']  
vowels  
  
['o', 'o', 'A', 'A', 'i', 'E', 'e']
```

Nested condition within a list comprehension



```
my_color = ['Orange', 'Yellow', 'Blue', 'Red', 'Green']
color_indicator = [0 if color == 'Green' else 1 if color == 'Red' else 2 if color == 'Blue' else 3 for color in my_color]
print(my_color)
print(color_indicator)
```

```
['Orange', 'Yellow', 'Blue', 'Red', 'Green']
[3, 3, 2, 1, 0]
```

Find colors in list that are longer than 4 character using list comprehension



```
my_color = ['Orange', 'Yellow', 'Blue', 'Red', 'Green']
long_words = [color for color in my_color if len(color) > 4]
long_words
['Orange', 'Yellow', 'Green']
```

Find colors with a length between 3 and 6 using list comprehension



```
my_color = ['Orange', 'Yellow', 'Blue', 'Red', 'Green']
color_length = [color for color in my_color if len(color) > 3 and len(color) < 6]
color_length

['Blue', 'Green']
```



Thank You

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