Django for Web Development & Artificial Intelligence

Lecture - 03

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Python Operators

The operator can be defined as a symbol that is responsible for a particular operation between two operands.

Python provides a variety of operators, which are described as follows:

- Arithmetic operators
- Assignment Operators
- Comparison operators
- Logical Operators
- Bitwise Operators
- Membership Operators
- Identity Operators

Arithmetic operators

Operators	Meaning	Example	Result
+	Addition	4 + 2	6
–	Subtraction	4 – 2	2
*	Multiplication	4 * 2	8
/	Division	4 / 2	2
%	Modulus operator to get remainder in integer division	5 % 2	1
**	Exponent	5**2 = 5^2	25
//	Integer Division/ Floor Division	5//2 -5//2	2 -3

Assignment operators

Operator	Name	Example
=	Assignment	x = y
+=	Add AND assignment	x += y is same as x = x + y
-=	Subtract AND assignment	x -= y is same as x = x – y
*=	Multiply AND assignment	x *= y is same as x = x * y
/=	Divide AND assignment	x /= y is same as x = x / y
%=	Modulus AND assignment	x % y is same as x = x % y

Comparison operators

Operators	Meaning	Example	Result
<	Less than	5<2	False
>	Greater than	5>2	True
<=	Less than or equal to	5<=2	False
>=	Greater than or equal to	5>=2	True
==	Equal to	5==2	False
!=	Not equal to	5!=2	True

Logical operators

Operator	Name	Example
AND	Logical AND operator	x and y is true, if both x and y are true
OR	Logical OR operator	x or y is true, if either x or y is true
NOT	Logical NOT Operator	Returns false, if the result is true.

Bitwise operators

Operator	Name	Example	Result
&	Bitwise AND	6 & 3	2
|	Bitwise OR	10 | 10	10
^	Bitwise XOR	2^2	0
~	Bitwise 1's complement	~9	-10
<<	Left-Shift	10<<2	40
>>	Right-Shift	10>>2	2

Python Operators

- Bitwise complement(~) operators

Ex: ~12
12→ 00001100
Reverse the binary
-13→ 11110011

- Bitwise and (&) operators

Ex: 12→ 00001100
13→ 00001101
12→ 00001100

- Bitwise or(|) operators

Ex: 12→ 00001100
13→ 00001101
13→ 00001101

- Bitwise XOR (^) operators

Ex: 12→ 00001100
13→ 00001101
1→ 00000001

- Left shift (<<) operators

Ex: 12→ 00001100
00001100 . 00
0000110000

- Right shift (>>) operators

Ex: 12→ 00001100
000011 . 00
000011

Membership operators

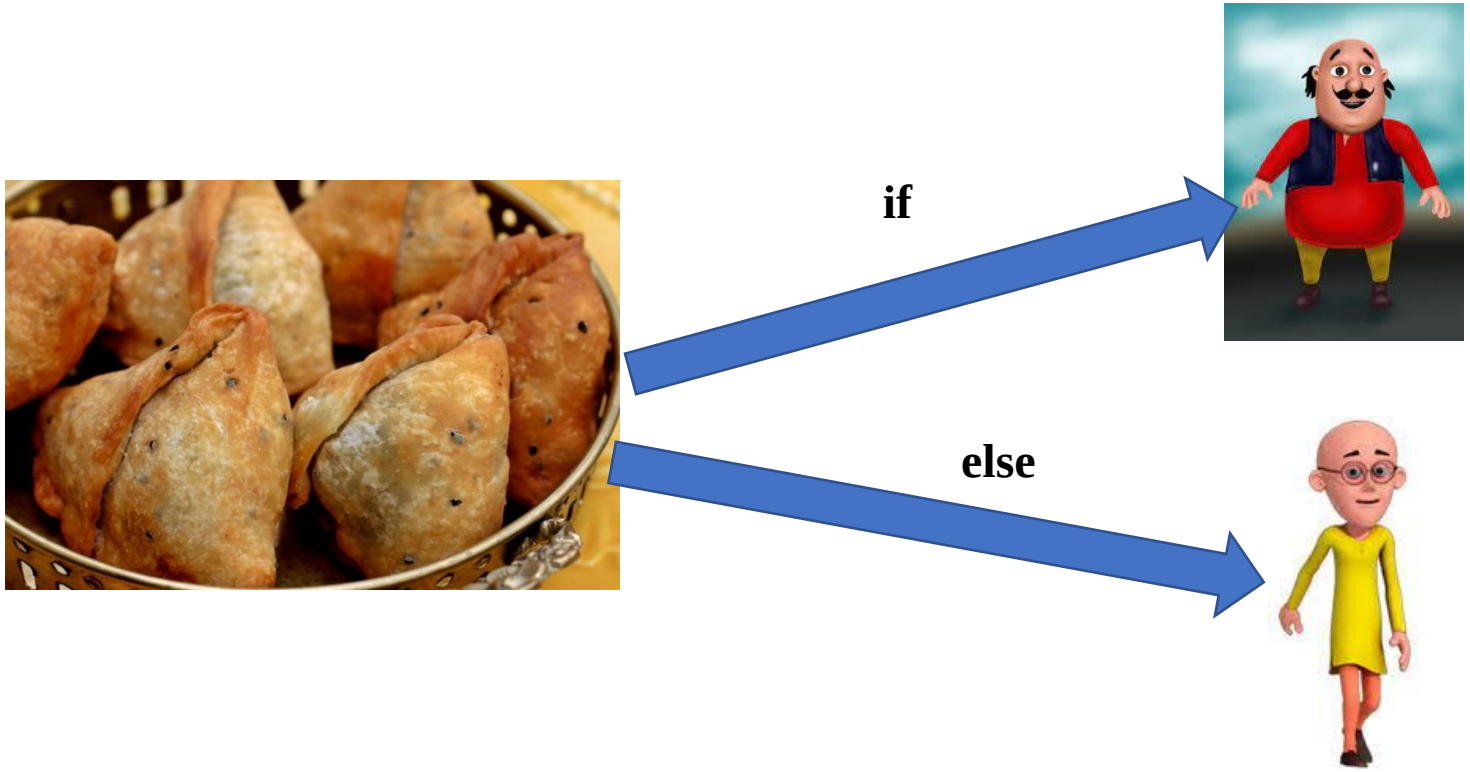
Operator	Name	Example
in	TRUE, if variable is in the list, string, dictionary, etc.	x in y
not in	TRU, if variable is not in the list, string, dictionary, etc.	x not in y

Identity operators

Operator	Name	Example
is	TRUE, if both the variable points to the same object, with same memory locations.	x is y
is not	TRUE, if both the variable points to different objects.	x is not y

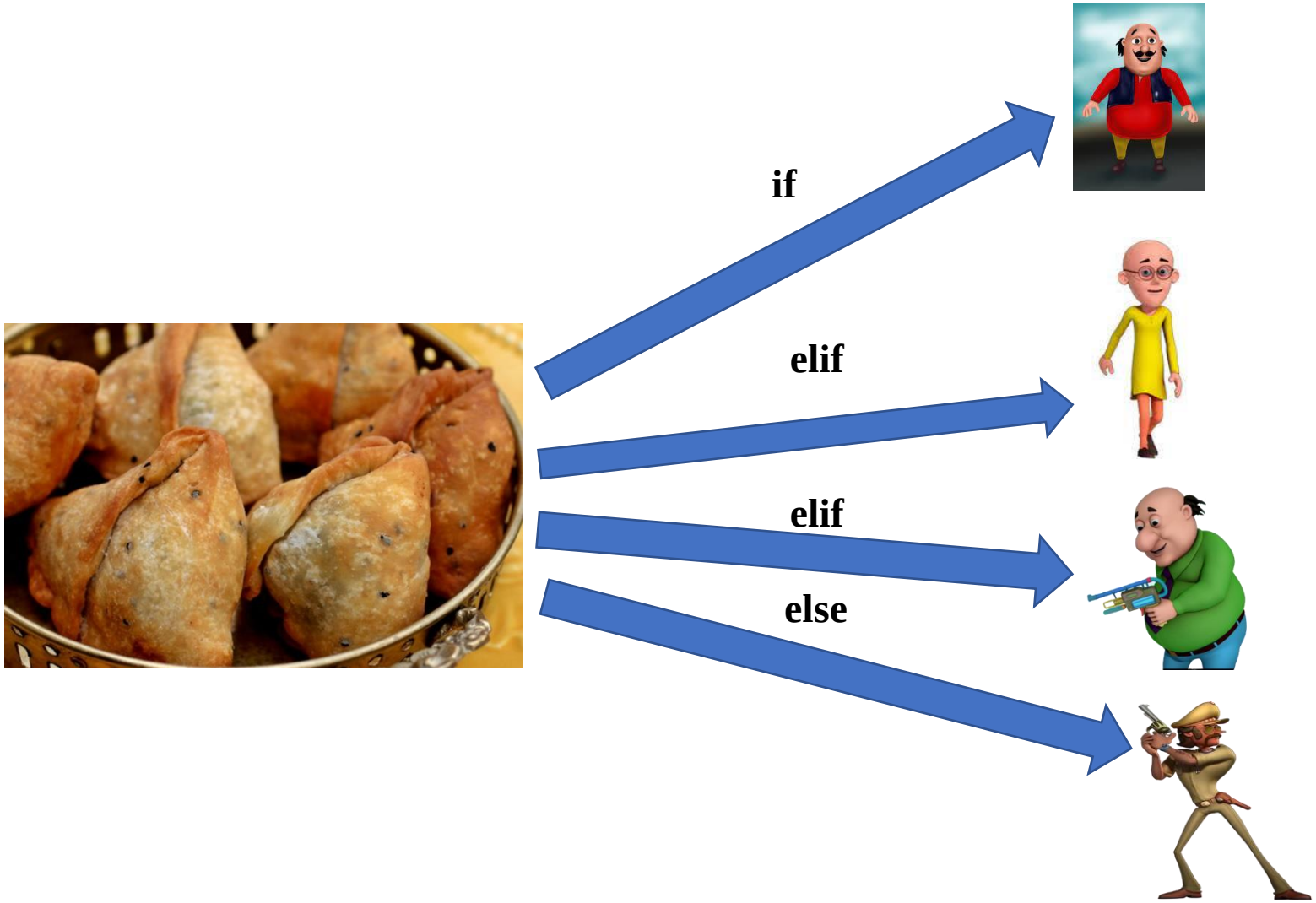
- if, else statements

Decision-making is the most important aspect of almost all programming languages.



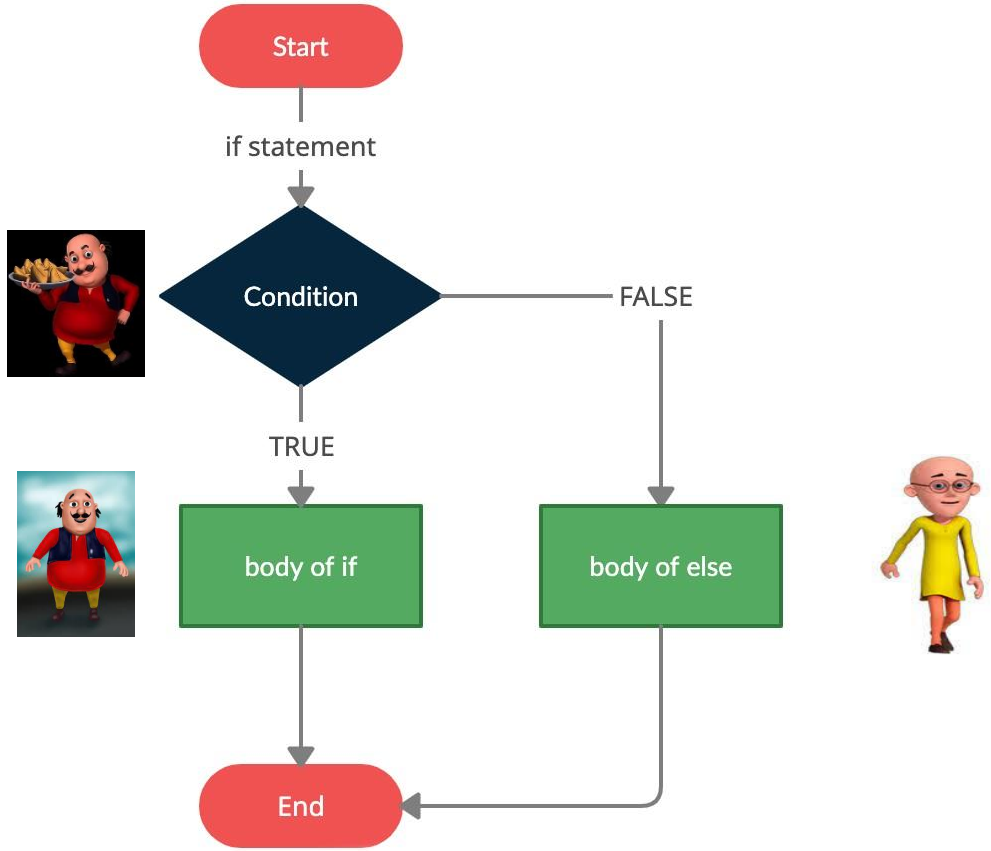
Python Conditions

if, elif, else statements



Python Conditions

if, else statements



Python Conditions

Python supports the usual logical conditions from mathematics.

- Equals: **a == b**
- Not Equals: **a != b**
- Less than: **a < b**
- Less than or equal to: **a <= b**
- Greater than: **a > b**
- Greater than or equal to: **a >= b**

Python Conditions

if, else statements

```
1  motu = 100
2  patlu = 50
3
4  if (motu>patlu):
5      print('Motu has more than Patlu')
6
7  else:
8      print('Patlu has more than Motu.')
```

Python Conditions

if, elif, else statements

```
1   motu = 500
2   patlu = 100
3   jhotka = 1500
4
5   if (motu>patlu and motu>jhotka):
6       print('Motu have more than Patlu & Jhotka')
7
8   elif (patlu>motu and patlu>jhotka):
9       print('Patlu have more than Motu & Jhotka.')
10
11  else:
12      print('jhotka have more than motu & patlu')
```

Python Loops

We can run a single statement or set of statements repeatedly using a loop command.

Python has two primitive loop commands:

- For loop
- while loop

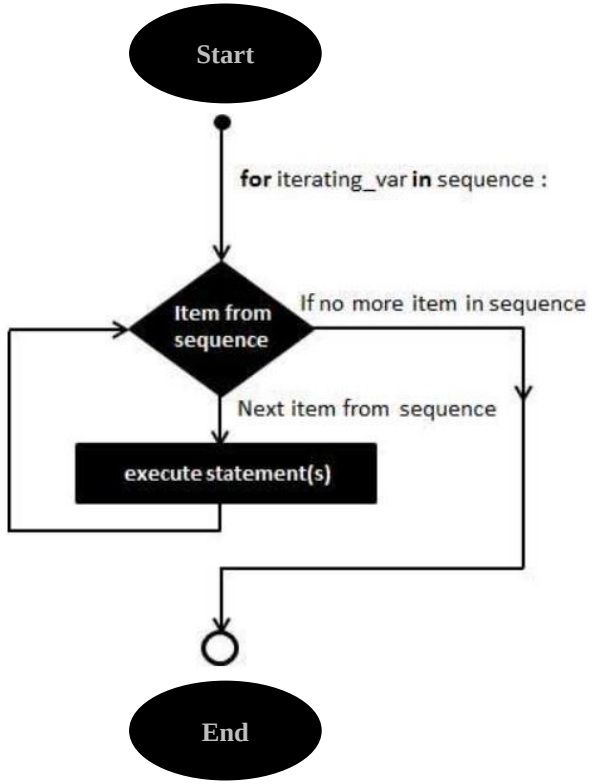
Python For Loops

❑ For loop

A for loop is used for iterating over a sequence (that is either a list, a tuple, a dictionary, a set, or a string).

Syntax

```
for iterating_var in sequence:
   statements(s)
```



❑ break Statement

With the **break** statement, we can stop the loop before it has looped through all the items.

❑ continue Statement

With the **continue** statement, we can stop the current iteration of the loop, and continue with the next.

Python For Loops

- **range() Function**

- **range(stop)**

  When you pass only one argument to the range() , it will generate a sequence of integers starting from 0 to stop -1

- **range(start, stop)**

  When you pass two arguments to the range(), it will generate integers starting from the start number to stop -1

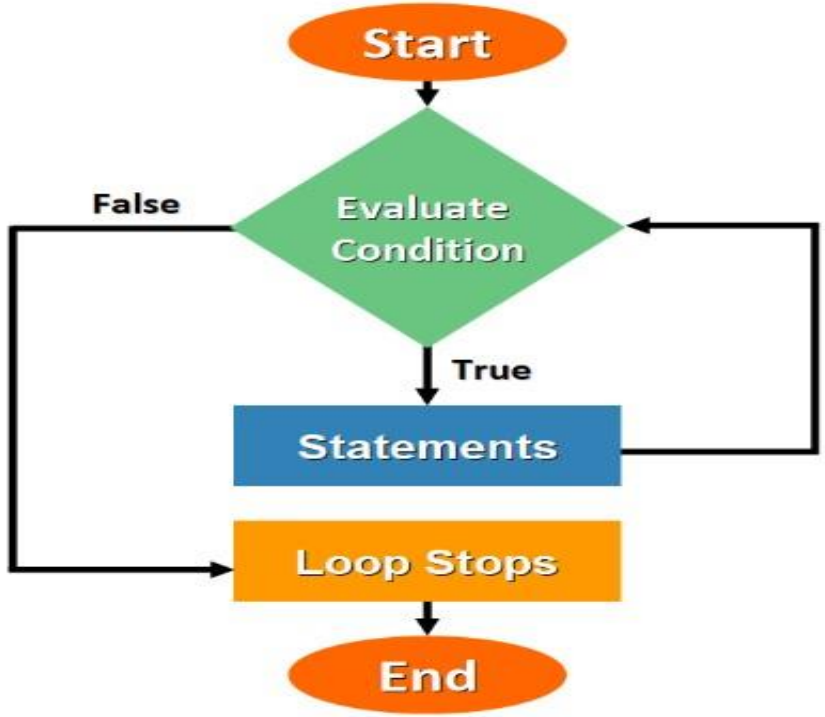
- **range(start, stop, step)**

  When you pass all three arguments to the range(), it will return a sequence of numbers, starting from the start number, increments by step number, and stops before a stop number.

Python While Loops

❑ While loop

While Loop is used to execute a block of statements repeatedly until a given condition is satisfied. And when the condition becomes false, the line immediately after the loop in the program is executed.



Python List

❑ List

A list is a collection of things, enclosed in [ ] and separated by a comma (,).

Ex:

```
course = ['python',4, 'Django', 16, 'ML', 20,'DL',22]
```

❑ len() Function

Ex:

```
course = ['python',4, 'Django', 16, 'ML', 20,'DL',22]
print(len(course))
```

❑ Access List Items

Ex:

```
course = ['python',4, 'Django', 16, 'ML', 20,'DL',22]
print('List item: ',course[4])
```

Python List

❑ Range of indexes

Ex:

```
course = ['python',4, 'Django', 16, 'ML', 20,'DL',22]
print('Range: ',course[2:5])
```

❑ Range of negative indexes

Ex:

```
course = ['python',4, 'Django', 16, 'ML', 20,'DL',22]
print('Negative range: ',course[-6:-1])
```

❑ Change item value

Ex:

```
course = ['python',4, 'Django', 16, 'ML', 20,'DL',22]
course[1] = 3
print('New list: ', course)
```

❑ insert() method

- To insert a list item at a specified index, use the **insert()** method.

Ex:

```
course = ['python',4, 'Django', 16, 'ML', 20,'DL',22]
course.insert(0,"AiQuest")
print('New list: ', course)
```

❑ append() method

- To add an item to the end of the list, use the **append()** method.

Ex:

```
course = ['python',4, 'Django', 16, 'ML', 20,'DL',22]
course.append("StudyMart")
print('Append: ', course)
```

❑ remove() method

- The **remove()** method removes the specified item.

Ex:

```
course = ['python',4, 'Django', 16, 'ML', 20,'DL',22]
course.remove(22)
print('Remove: ', course)
```

❑ pop() method

- The **pop()** method removes the specified index.

Ex:

```
course = ['python',4, 'Django', 16, 'ML', 20,'DL',22]
course.pop(6)
print('pop: ', course)
```

******If you do not specify the index, the pop() method removes the last item.***

❑ del keyword

- The **del** keyword also removes the specified index.

Ex:

```
course = ['python',4, 'Django', 16, 'ML', 20,'DL',22]
del course[5]
print('del: ', course)
```

❑ clear() method

- The **clear()** method empties the list. The list still remains, but it has no content.

Ex:

```
course = ['python',4, 'Django', 16, 'ML', 20,'DL',22]
course.clear()
print('Remove list item : ', course)
```

❑ sort() method

- List objects have a **sort()** method that will sort the list alphanumerically, ascending, by default.

Ex:

```
alphabetic = ['Python','Django','ML']
alphabetic.sort()
print('Alphabetic ascending order: ', alphabetic)
```

❑ sort() method (descending)

- To sort descending, use the keyword argument, **reverse = True**

Ex:

```
numeric = [34,1,20,22,5,97,11]
numeric.sort(reverse=True)
print('Numeric descending order: ', numeric)
```