For Loops in Python

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For Loops

Iteration
For loops allow us to iterate over each element of a set or sequence

Syntax:
for <var> in <set>:
do . . .
do . . .

Examples

▶ Iterating over a list:
words = ['got', 'me', 'looking', 'so', 'crazy', 'right', 'now']
for w in words:
    print(w)

▶ Iterating over a string:
phrase = 'looking so crazy in love'
for w in phrase:
    print(w)

The Range Iterator

Iteration
Python has a built-in function, range, which allows us to iterate over the numbers specified in the range.

What do these do?
l = list(range(0, 10))
l = list(range(10))
l = list(range(1, 11, 2))
l = list(range(0, -10, -1))

Note: in Python 3, range is an iterator, so it generates numbers on the fly
▶ the list function compresses them into a list

Range in Loops

for number in range(0, 10):
    print(number)

for number in range(len(a)):
    print(number, a[number])

for vs. while

a = 'uh oh uh oh uh oh uh no no no'
i = 0
while i < len(a):
    print(i, a[i])
i += 1

for i in range(len(a)):
    print(i, a[i])
For Loops in Python

For Loops
Range
Breaks

Breaking out of Loops

- **break**: stops the execution of the loop, independent of the test

  ```python
  for x in range(0,1000):
      if (x % 7) == 0:
          print('first number divisible by 7: ', x)
          break
  ```

- **continue**: skip the rest of the loop body, but continue with the loop

  ```python
  for x in range(0,1000):
      if (x % 7) == 0:
          print(x)
      else:
          continue
  print(x, "is divisible by 7")
  ```

Loop Else

- **Iteration**: else can follow a loop, then it is executed in case the loop is NOT exited by break.

  ```python
  for x in range(100):
      if x > 101:
          print(x)
      else:
          print('not found')
  ```

  Only if the break condition is met will the else not run

List comprehensions again

- **List comprehensions**

  ```python
  sasha = [1,2,3,4,5]
  fierce = [x**2 for x in sasha]
  ```

- **List comprehensions with conditions**

  ```python
  fierce = [x**2 for x in sasha if x%2==0]
  ```