For loop and range() Function

The `range()` function in Python generates a **List** which is a special sequence type. A sequence in Python is a succession of values bound together by a single name.

The syntax of the `range()` function is given below:

```
range(<Lower Limit>, <Upper Limit>) # Both limits are integers
```

The function, `range(L, U)`, will produce a list having values `L, L+1, L+2....(U-1)`.

Note: The lower limit is included in the list but the upper limit is not.

For Example:

```
>>> range(0,5)
[0,1,2,3,4] #Output of the range() function
```

Note: The default step value is +1, i.e. the difference in the consecutive values of the sequence generated will be +1.

An Example using the default value of lower limit:

Create a sequence of numbers from 0 to 5, and print each item in the sequence:

```
x = range(6)
for n in x:
   print(n)
```

Note: The range() function returns a sequence of numbers, starting from 0 by default, and increments by 1 (by default), and stops before a specified number, in this case, 6.

If you want to create a list with a step value other than 1, you can use the following syntax:

```
range(<Lower Limit>, <Upper Limit>, <Step Value>)
```

The function, `range(L, U, S)`, will produce a list `[L, L+S, L+2S...<= (U-1)]`.

For Example:

```
>>> range(0,5,2)
[0,2,4] #Output of the range() function
```

`in` Operator

The `in` operator tests if a given value is contained in a sequence or not and returns `True` or `False` accordingly. For eg.,

```
3 in [1,2,3,4]
```

will return `True` as value 3 is contained in the list.

```
"A" in "BCD"
```

will return `False` as `"A"` is not contained in the String `"BCD"`.

`for` Loop

The `for` loop of Python is designed to process the items of any sequence, such as a list or a string, one by one. The syntax of a `for` loop is:

```
for <variable> in <sequence>:
      Statements_to_be_executed
```

For example, consider the following loop:

```
for a in [1, 4, 7]:
      print(a)
```

The given `for` loop will be processed as follows:

1. Firstly, the looping variable `a` will be assigned the first value from the list i.e. 1, and the statements inside the for loop will be executed with this value of `a`. Hence 1 will be printed.
2. Next, `a` will be assigned 4 and 4 will be printed,
3. Finally, `a` will be assigned 7, and 7 will be printed.
4. All the values in the list are executed, hence the loop ends.