

Full stack web development using python

range



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Agenda

- ① What are iterables?
- ② various iterables
- ③ range
- ④ Accessing range elements
- ⑤ Practice

What are iterables?

An iterable object is something that contains a countable number of values.

You can traverse through all the values from beginning to the end.

Technically, in Python, an iterator is an object, which implements the iterator protocol, which consist of methods `__iter__()` and `__next__()`

Various Iterables

- range
- list
- tuple
- str
- bytes
- bytearray
- set
- frozenset
- dict

range

- range is a class
- range is immutable sequence
- range can contain only int type values
- range contains sequence of integers with common difference (Arithmetic Progression)
- range elements are indexed

How to create range object?

$r = \text{range}(\text{beg}, \text{end}, \text{step})$

Example

$\text{range}(1, 10, 1)$ 1 2 3 4 5 6 7 8 9
 ↑ ↑ ← common gap
 inclusive Exclusive

$\text{range}(2, 8, 2)$ 2 4 6

$\text{range}(10, 3, -2)$ 10 8 6 4

Other ways to create range object

$x = \text{range}(\text{beg}, \text{end}, \text{step})$

① $\text{range}(\text{end})$ $\text{beg} = 0$ $\text{step} = 1$

② $\text{range}(\text{beg}, \text{end})$ $\text{step} = 1$

$x = \text{range}(1, 6, 1)$

indexing				
-5	-4	-3	-2	-1
0	1	2	3	4
1	2	3	4	5

$$x[0] \Rightarrow 1$$

$$x[1] \Rightarrow 2$$

$$x[4] \Rightarrow 5$$

Positive and negative indexing

$$x[-1] \Rightarrow 5$$

$$x[-2] \Rightarrow 4$$

$$x[-4] \Rightarrow 2$$

$$x[-5] \Rightarrow 1$$

Accessing range elements.

for e in r:

Code

e is an element of range

Write a program to print first n
natural numbers. [use range and for]

$$n=6$$

1 2 3 4 5 6

range(1, n+1, 1)

Write a program to print
Squares of first n natural numbers
[use range and for]

$$n=5$$

$$\begin{array}{lllll} 1^2 & 2^2 & 3^2 & 4^2 & 5^2 \\ 1 & 4 & 9 & 16 & 25 \end{array}$$

Write a program to print
first n even natural numbers
in reverse order. [use range and for]

n=5

1 2 3 4 5 6 7 8 9 10 11 12 ...
10 8 6 4 2

range(10, 1, -2)
↑
2*n

Write a program to calculate

Sum of first n multiples of x . [use range and for]

$$n = 5$$

$$x = 3$$

first 5 multiples of 3

$$3 + 6 + 9 + 12 + 15$$

$$= \underline{\underline{45}}$$

range(1, n+1, 1)

$$\begin{array}{ccccc} 1 & 2 & 3 & 4 & 5 \\ x & 2x & 3x & 4x & 5x \end{array}$$

$x = 3$

$n = 5$

$s = 0$

$s = s + x * e$

`range(1, n+1, 1)`

e 1 2 3 4 5

s	$x * e$	\rightarrow	s
0	+ 3	\rightarrow	3
3	+ 6	\rightarrow	9
9	+ 9	\rightarrow	18
18	+ 12	\rightarrow	30
30	+ 15	\rightarrow	45