

## **Example 1: Measuring Time Complexity**

In this lesson, we are going to learn how to compute the running time complexity of an algorithm that involves loops.

We'll cover the following

- Simple For Loop of Size n
  - Running Time Complexity

In the previous lesson, we calculated the running time complexity of a very basic Python program. Lets now calculate the running time complexity of a more complex program. We will split the code into individual operations and then compute how many times each is executed.

## Simple For Loop of Size n #

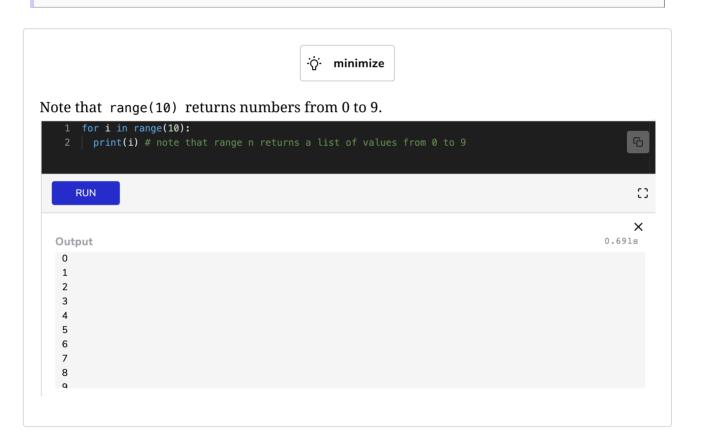
Here is an example of a simple loop of size n:

```
1 n = 10 # just as an example, n can be anything
2 sum = 0
3 for var in range(n):
4    sum += 1
5
6    print(sum)
7
```

Operation	Number of executions
n = 10	1
sum = 0	1
range(n)	1
var=0	1
var=1	1
var=2	1



Note that while range(n) executes only once, its execution cost is n. This is because it creates a list of values from 0 to n - 1.



## Running Time Complexity #

After counting how many times each operation is executing, we will just add all of these counts to get the time complexity of this program.

Time complexity = 
$$1 + 1 + n + (1 + 1 + 1 + 1 + 1 + 1) + 3n + 2$$
  
 $\Rightarrow 2 + n + n + 3n + 2$   
 $\Rightarrow 5n + 4$ 

In the next lesson, we will look at another example of a program containing nested loops and

? Ask a Question

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