

14 Monday  
(226-139)Wk-33

AUGUST - 2017

**PRINCE™**  
PIPING SYSTEMS

Day-05

Big O Notation (worst Time Complexity).

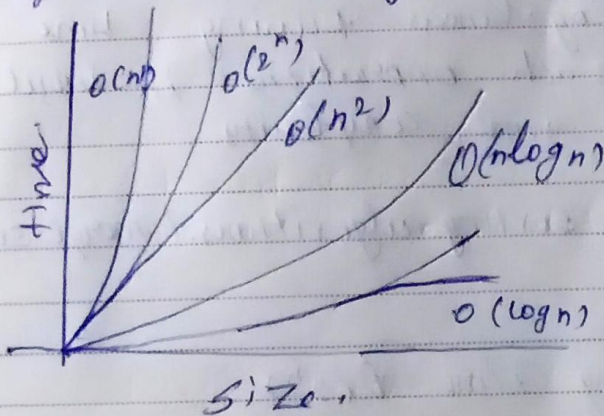
Time Complexity

Big O  $\rightarrow$  worst case time complexity is called.

Big O Addition.

Time Complexity

It is commonly expressed by the Big O notation, time complexity of an algorithm signifies the total time required by the program running till completion.



Constant Complexity  $O(1)$

It's a fastest complexity and running time we can't change.

July 2017							August 2017							September 2017						
S	M	T	W	T	F	S	S	M	T	W	T	F	S	S	M	T	W	T	F	S
30	31				1			1	2	3	4	5							1	2
2	3	4	5	6	7	8	6	7	8	9	10	11	12	3	4	5	6	7	8	9
9	10	11	12	13	14	15	13	14	15	16	17	18	19	10	11	12	13	14	15	16
16	17	18	19	20	21	22	20	21	22	23	24	25	26	17	18	19	20	21	22	23
23	24	25	26	27	28	29	27	28	29	30	31			24	25	26	27	28	29	30

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CPVC Plumbing Systems

**EASYFIT™**  
UPVC Plumbing Systems

**FOAMFIT™**  
Underground Drainage Pipes

**GREENFIT™**  
PP-R Plumbing Systems

**ULTRAFIT™**  
2000 Systems  
VMS World Class Joints

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Agri Protection & High Pressure  
Pipes & Fittings



Logarithmic Complexity  $O(\log n)$

⊗ Cut in half

Logarithmic time complexity are commonly found in operations on Binary tree or when using binary search

don't need to look at all values of the input data.

Log-linear Running Time -  $O(n \log n)$

A Quasilinear (or) log linear running time complexity when each operations in input data have a logarithm time complexity.

Commonly used in sorting algorithms. (merge sort, timsort, heapsort).

Exponential Running Time  $O(2^n)$

It is used in brute-force algorithm



using a exponential algorithm to do this, it becomes incredibly resource expensive to brute-force crack a long password versus a short one.

Ex

```
def fibonacci(n):
```

```
    if n <= 1:
```

```
        return n
```

The Input value size increase by  $n$  runtime doubles.

Exponential Running Time -  $O(2^n)$

Quadratic Running Time -  $O(n^2)$

Quadratic Running time Complexity when it needs to perform a linear time operation for each value in the input data.

'Bubble sort' is a great example of quadratic time complexity.

$O(n^k)$

$k$  - for loop count.

If the input size doubles the runtime quadruples.

July 2017

S	M	T	W	T	F	S
30	31					1
2	3	4	5	6	7	8
9	10	11	12	13	14	15
16	17	18	19	20	21	22
23	24	25	26	27	28	29

August 2017

S	M	T	W	T	F	S
			1	2	3	4
5	6	7	8	9	10	11
12	13	14	15	16	17	18
19	20	21	22	23	24	25
26	27	28	29	30	31	

September 2017

S	M	T	W	T	F	S
						1
2	3	4	5	6	7	8
9	10	11	12	13	14	15
16	17	18	19	20	21	22
23	24	25	26	27	28	29
30	31					



17

Thursday

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Factorial Running Time Complexity  $O(n!)$

A factorial running time complexity when it grows in a factorial way based on the size of the ~~data~~ input data.

Heap's algorithm is best example of factorial running complexity.