

True/False

The running time of this snippet is $O(n^2)$ when `vec` has size n .

```
for (int x : vec) {  
    std::cout << x << ' ';  
}
```

True

Question From Ed

I thought $n \log n = O(n)$ would be true, since $n \log n \leq n \cdot n$ where $c = n$ and that would mean $n \log n = \Omega(n)$ would be false, since $n \log n \geq n \cdot n$ is false as $n \cdot n$ will always be greater. Am I using these formulas correctly?

Common functions

Complexity	Example
$\Theta(1)$	
$\Theta(\log n)$	
$\Theta(n)$	
$\Theta(n \log n)$	
$\Theta(n^2)$	

Theta vs. Problem Size

n	$\Theta(1)$	$\Theta(\log n)$	$\Theta(n)$	$\Theta(n \log n)$	$\Theta(n^2)$	$\Theta(n^3)$	$\Theta(2^n)$
10	1 ns	3 ns	10 ns	30 ns	100 ns	1 microsec	1 microsec
100	1 ns	6 ns	100 ns	600 ns	10 microsec	1 ms	40 trillion yrs
1,000	1 ns	10 ns	1 microsec	10 microsec	1 ms	1 sec	
10,000	1 ns	13 ns	10 microsec	130 microsec	100 ms	16 min	
100,000	1 ns	16 ns	100 microsec	1.6 ms	10 sec	277 hours	
1,000,000	1 ns	20 ns	1 ms	20 ms	16 min	32 yrs	

one operation per nanosecond

Sorting

Properties of Sorting Algos

Comparison Based:

In Place:

Stable: