

Algorithm performance



Common Pitfalls



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by Christine Alvarado, Mia Minnes, and Leo Porter, 2015.

By the end of this video you will be able to...

- Organize big O classes according to rate of growth
- Avoid some common pitfalls in asymptotic analysis



$O(1)$

$O(1)$

$O(\log n)$

Base of logarithm doesn't matter!



$O(1)$

$O(\log n)$

$O(n)$



$O(1)$

$O(\log n)$

$O(n)$

$O(n^2)$

$O(1)$

$O(\log n)$

$O(n)$

$O(n^2)$



Exponentials



Other functions



Algorithm
1

$O(\log n)$



Algorithm
2

$O(n^2)$

**Algorithm
1**



$O(\log n)$

**Algorithm
2**



$O(n^2)$

Will Algorithm 1 always use fewer operations than Algorithm 2?

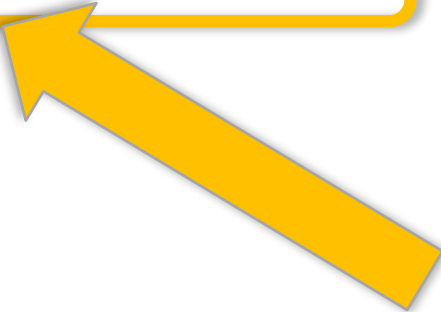
What's an operation?

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```
public static boolean hasLetter (String word, char letter)
{
    for (int i = 0, i < word.length(); i++)
    {
        if (word.charAt(i) == letter)
        {
            return true;
        }
    }
    return false;
}
```

What's an operation?

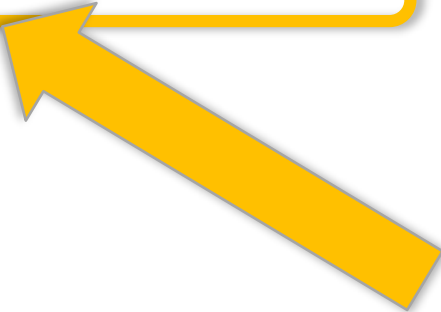
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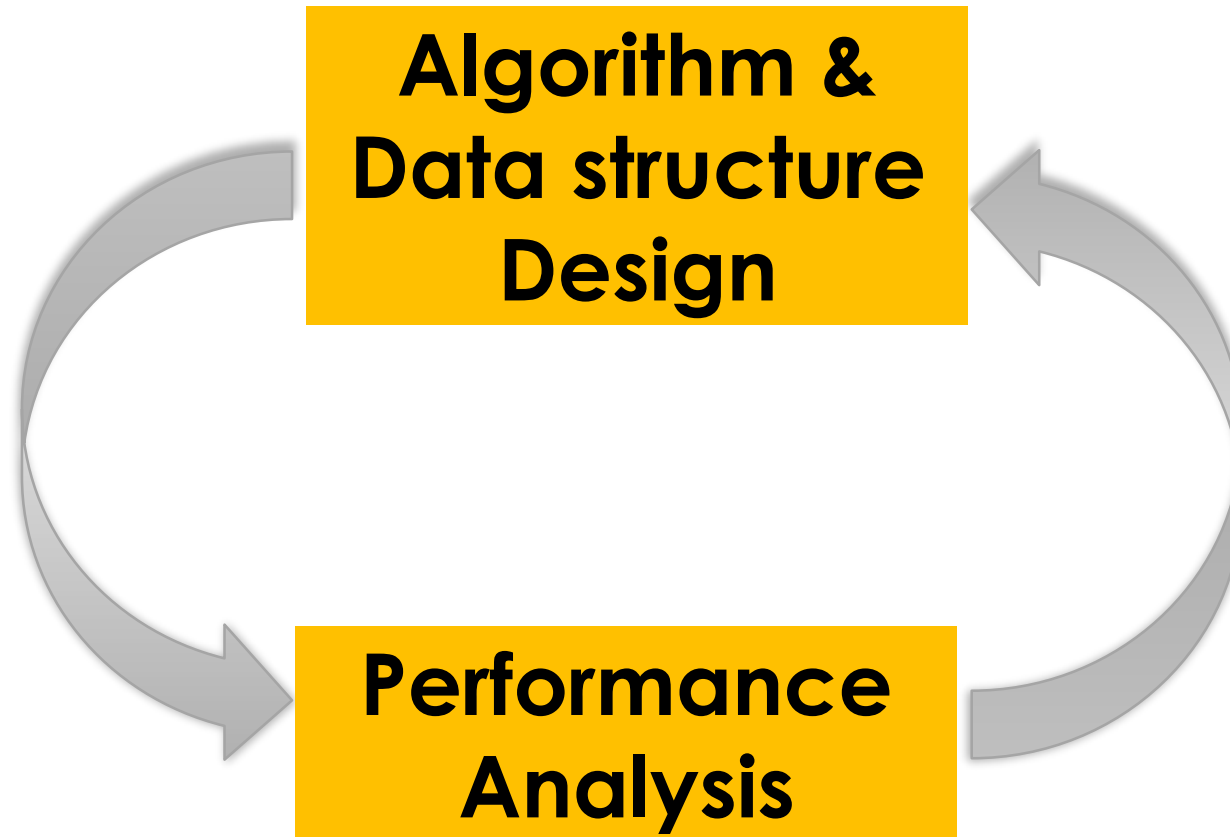


What's an operation?

Beware of method calls!

```
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Quiz

- Write the code snippet which, given a string, checks if it is in alphabetical order. For example, "best" is in alphabetical order but "worst" is not. What is the performance of this code?
- Distractor: n^2 or $n \log n$ because that's our sorting algorithm.