Algorithm performance

Common Pitfalls

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

$O(\log n)$

$O(n^2)$

$O(\log n)$ $O(n^2)$

Will Algorithm 1 always use fewer operations than Algorithm 2?

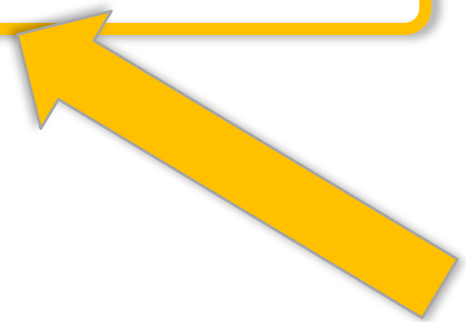
What's an operation?

What's an operation?

```
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?

```
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?

Beware of method calls!

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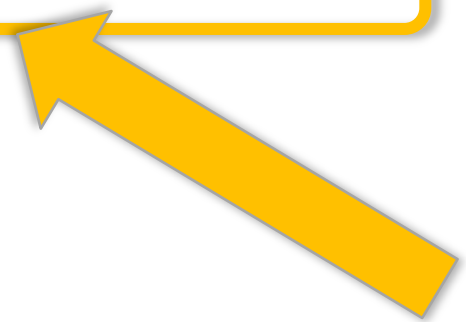

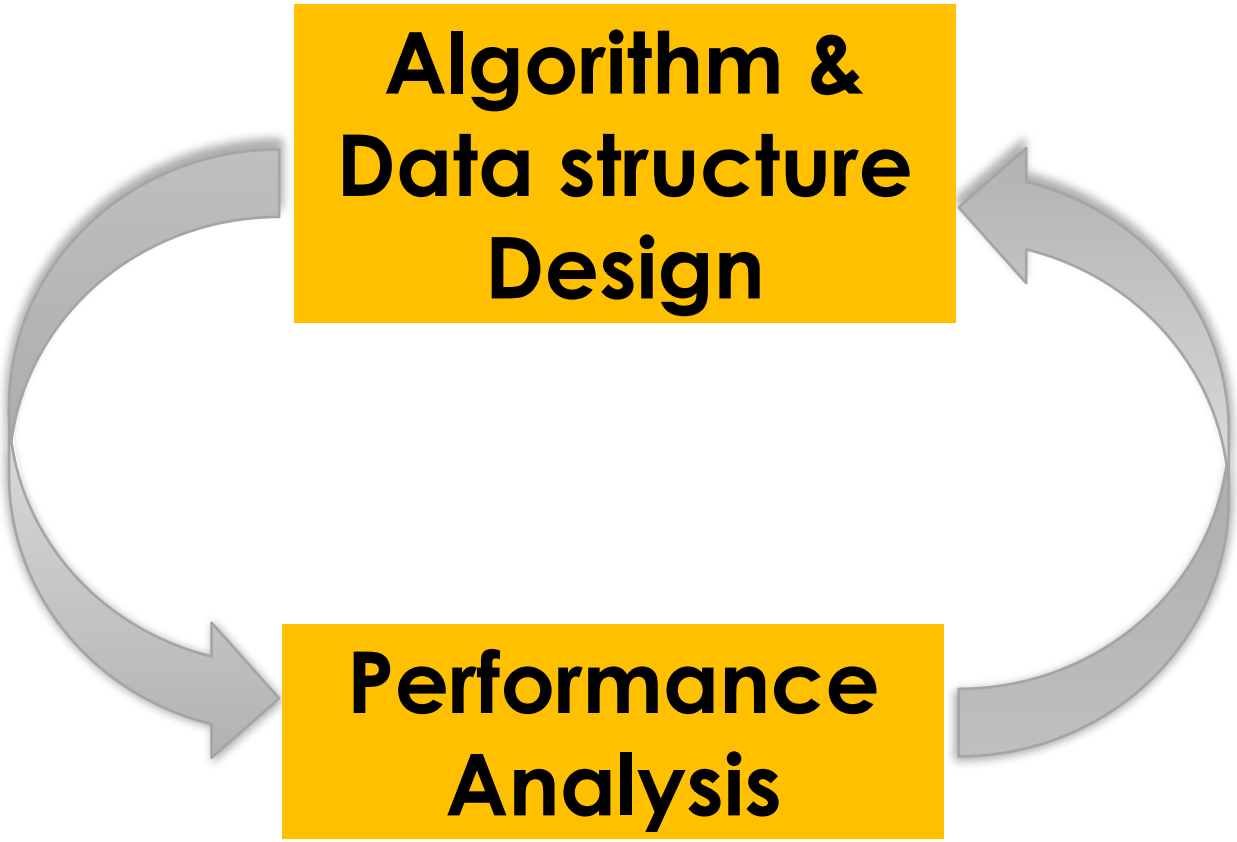
Algorithm &
Data structure
Design
Performance
Analysis

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 nlog n because that's our sorting algorithm.