

# Algorithm Evaluation

## – Day One

Students will be able to:

- identify algorithms that have different efficiencies in their problem solving approach.
- explain the metrics used to describe efficiency.
- perform an empirical analysis of sorting algorithms by running the algorithms on different inputs.

### Journal

Identify two places that you often travel between. Of the alternative routes available, what do you consider to be the best route? Why? Are there circumstances in which an alternate route is better? When is that the case?

Accuracy?

# Good Algorithms & Better Algorithms

Bubble Sort

Quick Sort

1. Correctness
2. Ease of Understanding
3. Elegance (clarity, simplicity, and inventiveness)
4. Efficiency

Steps  
clear steps  
speed  
efficiency  
speed  
time

Think about the  
Sorting  
Algorithms

# Algorithmic Efficiency

- 2 Resources: time & space (stored memory)

# Computational Complexity

$O$  → how many comparisons  
max switches

$n$  = number of items in the list

- Big O notation
- Examples

$$O(2^n)$$

- Allows for “linearithmic time” ordering
- $O(1)$ ?
- $O(n)$ ?
- $O(n^2)$ ? ~~\*~~
- $O(n \log n)$ ?
  - fastest possible order for a comparison-based sorting algorithm

# Comparing Sorting Algorithms

*bigocheatsheet.com*

