CSC345 Discussion 3

Some Math Review and Going Over Homework 1

Project 1 Due In Less than a Week

Questions?

Homework 1

Questions?

Properties of Logs

1. $log(ab) = log(a) + log(b)$

2. $log(\frac{a}{b}) = log(a) - log(b)$

3. $log(a^n) = nlog(a)$

4. $\log_n(a) = \frac{\log_b(n)}{\log_b(a)}$

Why do we need to use logs?

Plenty of the Algorithms that we will cover in this class run on the order of some log.

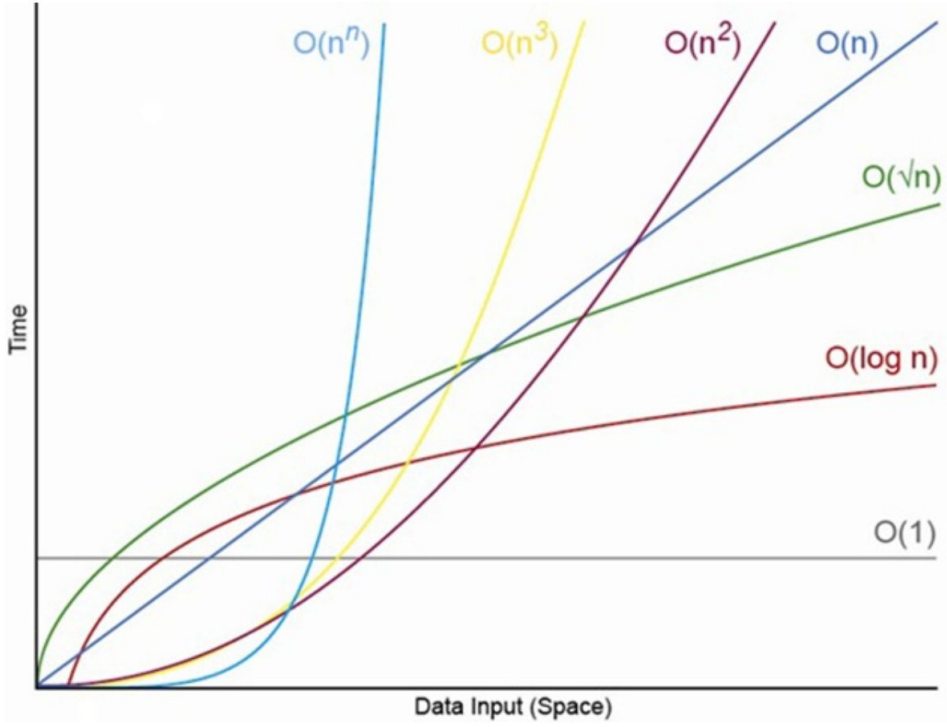
Quick Sort

Merge Sort

Heap Sort

Big O Notation

Next week will be starting big-O notation.



Different Proof Techniques

Direct Proof or Proof by Induction: “logical explanation” An argument in terms of logic.

Proof by Contradiction: First assume that the theorem is false. We then find a logical contradiction stemming from this assumption.

Proof by Induction: Mathematical induction proves that we can climb as high as we like on a ladder, by proving that we can climb onto the bottom rung (the basis) and that from each rung we can climb up to the next one (the step).

Side Note: If a theorem you are trying to prove contains the phrase “if and only if” you must prove both directions.

Practice

Prove: The sum of two odd numbers is even. (Direct)

Prove: There is no largest integer. (Contradiction)

Structural Induction

Structural Induction: is a proof methodology similar to mathematical induction, only instead of working in the domain of positive integers it works in the domain of such recursively defined structures.

Recursively Defined Structures: parts of them exhibit the same characteristics and have the same properties as the whole.