Complexity

- Asymptotic Analysis
- Best/worst/average cases
- Upper/Lower Bounds
- Big O, Theta, Omega
- Analysis methods
  - loops
  - recurrence relations (lightly)
  - common data structures, subroutines
Design Paradigms

- Greedy
- Dynamic Programming
  - recursive solution, redundant subproblems, few,
  - do all in careful order and tabulate
- Divide & Conquer
  - superlinear work
  - balanced subproblems
Examples

- Dynamic programming
  - Fibonacci
  - List partition
  - Longest increasing subsequence
  - Edit distance
  - HW: making change, RNA, etc.

- D & C
  - Merge sort
  - Polynomial multiply (Karatsuba)
Some Typical Questions

- Give $O(\cdot)$ bound on $17n^*(n-3+\log n)$
- Give $O(\cdot)$ bound on some code
  \{for i=1 to n \{for j \ldots\}\}
- True/False: If an alg is $O(n^2)$, then it rarely takes more than $n^3 + 14$ steps.
- Simulate any of the algs we’ve studied
- Give an alg for problem X, maybe a variant of one we’ve studied