CSE417: Midterm Review

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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( ) bound on 17n*(n-3+logn)
- Give O( ) bound on some code
  `{for i=1 to n {for j …}}`
- 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