Summary of Class Topics
Asymptotics

- Relationship between polynomial, exponential, logarithmic time
- Big-Oh notation
Graphs

- Relationship between degree and number of edges
- Cycles, trees
- Graph Search
- Algorithms for coloring
- Negative Edge Weights in Directed graphs
Greedy Algorithms

- Interval Scheduling
- Approximation algorithms for Vertex Cover, Set Cover
- Minimum Spanning Tree Algorithms, and Cycle and Cut properties
- Union Find-Data Structure
Divide and Conquer Algorithms

• Recurrences (Master Theorem)
• Algorithms for merge sort, finding closest pair, multiplication, finding closest pairs, matrix multiplication, computing the median
• Fast Fourier transform
Dynamic Programming

• Design the recurrence using subproblems, then write the program. Many types of recurrences.

• Algorithms for sequencing related problems, edit distance, knapsack, weighted interval scheduling, algorithms on trees.
Network Flows

- Algorithms for max-flow, min-cut
- Applications to Image segmentation, project selection, edge-disjoint paths, maximum matchings in bipartite graphs, Marriage theorem.
NP

• Concept of NP-completeness
• NP-complete problems: 3SAT, 3Coloring, Independent set, Hamiltonian cycle
I hope

- You learnt a lot
- You are a better at communicating ideas
- The high level principles stay with you for a long time
Final

• Posted tomorrow, due Thursday.
• Lots of true/false questions, a few problems, similar to midterm
• No collaboration allowed!
Thanks!