Final Exam Study Guide
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About the Examination
• There will be 6 questions
• You are expected to attempt 4.
• You may attempt more.
• Your highest 4 scores will be used.

About the Material
Only material after the midterm will be examined.
• Min-cost spanning trees.
• NP-completeness.
• Approximation algorithms.
• Linear time selection.

About the Questions
• Some questions will be “book work”.
• Some questions will ask you to do problems.
• Some of the problems you will have seen before.
• Some of the problems will be new.
• Some questions ask you for proofs.
• Some questions do not.

How to Study
• Be prepared to reproduce class material.
• Make sure you understand it first.
• Work the problems in practicequestions.pdf on the class web page. (The first one has the solution. The others do not.)
• Go over the solutions to the homework problems.

What Should You Study?
Min-cost Spanning Trees
• Min-cost spanning tree concepts and definitions.
• Prim’s and Kruskal’s algorithm.
What Should You Study?
NP-completeness

- NP-completeness concepts and definitions.
- Polynomial time reductions.
- NP-completeness proofs for 3SAT, CLIQUE, INDEPENDENT SET, VERTEX COVER, and TSP with the triangle inequality.

What Should You Study?
Approximation Algorithms

- Approximation algorithms definitions and concepts.
- TSP with triangle inequality is 2-approximable (algorithm and correctness proof).
- Proof that TSP is not $\epsilon$-approximable for any $\epsilon > 1$ unless $P = NP$.

What Should You Study?
Selection

- Selection concepts and definitions.
- Average-case linear time selection algorithm.
- Proof that it uses $4n + O(1)$ comparisons on average.

Study hard and good luck!