CS 482 Summer 2004
Final Review Suggestions

Suggested Review Questions

The following are a few questions we recommend for review. They are neither sufficient nor necessary for studying for the final. We won't be posting solutions for these problems, but you are more than welcome to drop by office hours or the review session to ask about them. You can also ask us about any other question in the text (of which there are muchos *many*) and we can help you out.

Stable Matchings Ch. 1 Qn. 4

Greedy Ch. 4 Qn. 3

MST Ch. 4 Qn. 9

Divide and Conquer read section 6.2 then try Qn. 2

Dynamic Programming Ch. 5 Qn. 6

MSTs with Negative Cycles Ch. 5 Qn. 14

Network Flows Ch. 7 Qn. 19

Network Flows (*) Ch. 7 Qn. 52

NP-Complete Proof Ch. 8 Qn. 6

NP-Complete Proof (*) Ch. 8 Qn. 33

Special Case NP read section 10.1 then try Qn. 1

Approximation Algorithms Ch. 11 Qn. 8

Probabilistic Algorithms Ch. 13 Qn. 14

NP-Complete Problems You Are Responsible For

The following are the NP-Complete problems you are responsible for knowing for the final. They are problems we have either covered in class or assigned on homeworks. You don't necessarily have to know the reductions used to show these are hard, but you should understand the definition of each problem, especially the inputs and output.

3-SAT Given a set of clauses $C_1, \ldots, C_k$, each of length 3, over a set of variables $\{x_1, \ldots, x_n\}$, does there exist a satisfying truth assignment?

3-COL Given a graph G, does a 3-colouring exist?

4-COL Given a graph G, does a 4-colouring exist?

VERTEX COVER Given a graph G and a number k, does G contain a vertex cover of size at most k?

INDEPENDENT SET Given a graph G and a number k, does G contain an independent set of size at least k?

DOMINATING SET Given a graph G and a number k, does G contain a dominating set of size at most k?

CLIQUE Given a graph G and a number k, does G contain a clique of size at least k?

HAMILTONIAN PATH Given a directed (or undirected) graph G, does it contain a Hamiltonian path?

HAMILTONIAN CYCLE Given a directed (or undirected) graph G, does it contain a Hamiltonian cycle?

LONGEST PATH Given a directed (or undirected) graph G and a number k, does there exist a simple path of length at least k?

TRAVELING SALESMAN Given a set of distances on n cities, and a bound D, is there a tour of length at most D?

SET COVER Given a set U of n elements, a collection $S_1, \ldots, S_m$ of subsets of U, and a number k, does there exist a collection of $\leq k$ of these sets whose union is equal to all of U?

STEINER TREE Given a graph $G = (V, E)$, a subset $T \subseteq V$ of terminals, and a value C, does there exist a Steiner tree of cost at most C?

KNAPSACK/SUBSET SUM Given natural numbers $w_1, \ldots, w_n$ and a target number W, is there a subset of $\{w_1, \ldots, w_n\}$ that adds up to precisely W?

3D-MATCHING Given disjoint sets X, Y, and Z, each of size n; and given a set $T \subseteq X \times Y \times Z$ of ordered triples, does there exist a set of n triples in T so that each element of $X \cup Y \cup Z$ is contained in exactly one of these triples?

As usual, we'll be holding a review session on Thursday night, 7:30-8:30, in Upson 215.

The final exam itself is a two and a half hour dealie starting at 9:30am on Friday, August 20^{th}. It will be held in our regular classroom (Hollister 368).

And last but not least, *be on time* and GOOD LUCK!