Math 1281 Midterm IV Information Sheet

The purpose of this handout is to help you study by listing the concepts, definitions, and results you will need to know for the midterm.

Midterm Information. The midterm will be on Friday, March 7, 2008. You will **not** be allowed to bring in any notes, use the text book, or use a calculator.

Material Covered. The exam will cover all the material discussed in class about Section 3.8, Chapters 7 and 8, and the start of Chapter 9. I have given a breakdown of what you will need to know from each section.

(1) **Section 3.8** Know how to multiply matrices together. Also know what is meant by the identity matrix, the transpose, and a symmetric matrix. As well, you should know how to use the Boolean operators $\wedge$ and $\vee$, and how to take the Boolean product of two zero-one matrices.

(2) **Section 7.1** Know the definition of a recurrence relation, and be able to determine if a sequence is a solution of a recurrence relation. Furthermore, you will need to know how to do problems like Example 6, that is, how to find recurrence relations for specific problems. You will also need to know how to use the iterative approach.

(3) **Section 7.2** In this section, you will only need to know all the material up to, and including Example 5. You can ignore the rest of the section. Make sure you know how to solve recurrence relations using Theorem 1 and Theorem 2.

(4) **Section 7.4** Know what a generating function is, and how to take a sequence and determine its generating function in its closed form. As well, you should be able to go from the generating function to the sequence. You do not need to memorize the table on page 489 – I will provide you with necessary formulas. Also, know how to use generating functions to solve counting problems like we did in class.

(5) **Section 8.1** You will need to know the definition of a relation. You will also be required to know the definitions for reflexive, symmetric, antisymmetric, and transitive. In particular, you should be able to identify which properties a relation has. You will also need to know how to combine relations, as well as the definition of a composite of two relations.

(6) **Section 8.2** Know what a n-ary relation is, and what the projection map is.

(7) **Section 8.3** You should be able to associate to a relation a zero-one matrix. Moreover, you should be able to describe how we can use a matrix to determine if a relation is reflexive, symmetric, antisymmetric, or transitive. You will also be required to know how to use the matrices of two relations R_1 and R_2 to find the matrices associated to the relations $R_1 \cap R_2$, $R_1 \cup R_2$, and $R_2 \circ R_1$.

(8) **Section 8.4** Given a relation, you should be able to find its reflexive closure, its symmetric closure, and its transitive closure.

(9) **Section 8.5** Know the definition of an equivalence relation, as well as an equivalence class. Be able to do problems like those assigned for homework.

(10) **Section 8.6** Know the definition of a partial order, poset, total order, and well order. You should know some examples of each type of ordering. As well, you will need to now how to use lexicographic ordering.

(11) **Section 9.1** Be able to distinguish between a simple graph, multi-graph, pseudo-graph, directed graph, and directed multi-graph. You should be able to do problems like 1-9 of Section 9.1.

(12) **Section 9.2** You will be required to know all the terms used to describe graphs, for example, degree, endpoints, etc. You should also be able to come up with examples of each term. As well, you should know Theorems 1 and 3. You will also need to know the names describing some simple graphs, e.g., cycle, complete, as well as bipartite graphs, and how to form the union of two graphs. You should be able to do problems like 1-4, 7-10, 20-25, 36 of Section 9.2.

Change to Grading Scheme for Midterms Please note that in calculating your final mark, I will be using the following scheme. I will calculate your mark in two ways: (1) The first way is the way described on the course handout, i.e., each test will be worth 12.5% of your final mark. (2) The second way is to drop your lowest midterm, and add its weight to the final exam. So your midterm mark will be worth 37.5% and is based upon three midterms, and your final exam will count for 52.5% of your mark. I will then take the highest of the two methods.