CS 5130	**Advanced Data Structures and Algorithms**	Test 2
Name:	Summer 2005	Max Pts: 40

Important: This is an open book test. You can use any books, notes, or paper. *Do not log into the computer during the test*. Any calculations and rough work can be done on the back side of the test pages. You will lose five points for not writing your name.

1. [10 pt] You are designing a program to solve the traveling salesperson problem using a backtracking algorithm. Identify the explicit and implicit constraints to solve this problem.

2. [10 pt] Given two sets S_1 and S_2, the disjoint sets problem is to check whether the sets have a common element. Present an $O(1)$ time nondeterministic algorithm for this problem.

3. [10 pt] A greedy algorithm, just like an approximation algorithm, gives a non-optimal solution to a problem. What is the difference between the two types of algorithms? What can you say about their time complexity in general?

4. [10 pt] Draw the branch and bound tree to solve the traveling salesperson problem for the following data set of five cities:

	A	B	C	D	E
A	-	11	5	12	16
B	9	-	4	13	7
C	18	11	-	4	10
D	7	20	18	-	3
E	3	12	2	3	-