CSE 321: Discrete Structures
Assignment #1
October 3, 2001
Due: Wednesday, October 10

Reading Assignment: Read Sections 1.1 - 1.5 carefully (make sure that you understand the examples). You should also read Sections 1.6 - 1.8 (these are not a main focus of the class, but provide some good background).

Problems:

1. Section 1.1, exercise 8.

2. Section 1.1, exercise 16, parts a, b, f, g.

3. State in English the converse and contrapositive of each of the following implications:

   (a) If a is pushed onto the stack before b, then b is popped before a.

   (b) If the input is correct and the program terminates, then the output is correct. (Be sure to use De Morgan's Law to simplify the contrapositive.)

4. Section 1.1, exercise 42.

5. The following two statements form the basis of the most important methods for automated theorem proving. Use truth tables to prove that they are tautologies.

   (a) Resolution: $((p \vee q) \wedge (\neg q \vee r)) \rightarrow (p \vee r)$

   (b) Modus ponens: $((p \wedge (p \rightarrow q)) \rightarrow q$

6. Show that Modus ponens is a tautology without using a truth table.

7. Section 1.2, exercise 12.