

CSE 321: Discrete Structures

Assignment #1

Due: Wednesday, April 6

**Reading Assignment:** Section 1.1-1.5 of Rosen.

**Problems:**

1. Section 1.1, exercise 10 (a,b,e,f).
2. Section 1.1, exercise 18.
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 60.
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. Section 1.2, exercise 8 (a,b).
7. Section 1.2, exercise 12.
8. Section 1.2, exercise 36. (Hint: Do exercise 35 as a warmup, and check your solution at the back of the textbook.)
9. Section 1.3, exercise 8 (a,d).