CSci 1302 Assignment 4
Due Fri., October 3, 2003

Note: the symbol $<\equiv>$ stands for logical equivalence.

Problem 1 (6 points). Exercise 5.4 on p. 76, Parts 1 and 3.

Problem 2 (25 points). Write down deductive proofs for the following arguments:

1. $(p \lor q) \Rightarrow r$

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   $\neg r \Rightarrow \neg p$

2. $\neg(p \Rightarrow q)$
   $p \Rightarrow r$

   ───────────

   r

3. $p \land \neg r$ (use proof by contradiction)
   $q \Rightarrow r$

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   $\neg(p \Rightarrow q)$

4. $(p \land q) \Leftrightarrow r$

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   $(r \Rightarrow p) \land (r \Rightarrow q)$

5. $(p \lor q) \Leftrightarrow r$

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   $(p \Rightarrow r) \land (q \Rightarrow r)$

Problem 3 (9 points). Recall exercise 5.6 (saints and liars). In each of the following statements, can you determine who the speaker is? Can you determine who Pat is? Use truth tables to justify your result.

1. If I am a saint then Pat is a liar.

2. I am a liar, but if Pat is a saint, then I am a saint.

3. If Pat is a liar or I am a liar, then Pat is a saint.