CS81 **Assignment 4**
Due Monday, 17 February 2009

For each statement or syllogism, if valid, prove by the tableau method. If not valid, give a counterexample.

Assume that “a lover” is anyone who loves someone.

1. Given
    a. Everyone loves a lover.
    b. Mary loves herself.
   It follows that
    c. John loves Mary.

2. Given
    a. Everyone loves a lover.
    b. Mary loves herself.
   It follows that
    c. Mary loves John.

3. Given
    a. Everyone loves a lover.
    b. Mary loves John.
   It follows that
    c. John loves Mary.

4. Given
    a. John loves everyone who does not love him/herself.
   It follows that
    b. John loves himself.

5. $((\forall x\ A(x)) \rightarrow (\exists x\ B(x))) \rightarrow (\forall x\ (A(x) \rightarrow B(x)))$

6. $(\forall x\ (A(x) \rightarrow B(x))) \rightarrow ((\forall x\ A(x)) \rightarrow (\exists x\ B(x)))$

7. $(\exists x\ (A(x) \rightarrow B(x))) \rightarrow ((\forall x\ A(x)) \rightarrow (\exists x\ B(x)))$

8. $((\forall x\ A(x)) \rightarrow (\exists x\ B(x))) \rightarrow (\exists x\ (A(x) \rightarrow B(x)))$