Problem Set 2 : Solutions

1. Tolstoy wrote both "War and Peace" and "Anna Karenina".
   \(\text{wrote(tolstoy,wp)} \land \text{wrote(tolstoy,ak)}\).

2. Russell and Norvig wrote "AI: A Modern Approach".
   \(\text{wrote(russell,aima)} \land \text{wrote(norvig,aima)}\).

3. There are no books that were jointly written by Tolstoy and by Russell.
   \(\neg \exists_B \text{wrote(tolstoy,B)} \land \text{wrote(russell,B)}\).

4. There is a book that was written by Norvig but not by Russell.
   \(\exists_B \text{wrote(norvig,B)} \land \neg \text{wrote(russell,B)}\).

5. Chris owns a copy of "War and Peace".
   \(\exists_V \text{owns(chris,V)} \land \text{copy(V,wp)}\).

   \(\forall_B \text{wrote(tolstoy,B)} \Rightarrow \exists_V \text{copy(V,B)} \land \text{owns(becky,V)}\).

7. Chris does not own any copy of "AI: A Modern Approach".
   \(\neg \exists_V \text{copy(V,aima)} \land \text{owns(chris,V)}\).

8. All the volumes that Chris owns are copies of books written by Tolstoy.
   \(\forall_V \text{owns(chris,V)} \Rightarrow \exists_B \text{copy(V,B)} \land \text{wrote(tolstoy,B)}\).

9. There is a book B by Russell such that Becky owns a copy of B but Chris does not own a copy of B.
   \(\exists_B \text{wrote(russell,B)} \land [\exists_V \text{owns(becky,V)} \land \text{copy(V,B)}] \land [\neg \exists_V \text{owns(chris,V1)} \land \text{copy(V1,B)}]\).

    Same as 6.

11. Russell owns a copy of every book that he himself has written.
    \(\forall_B \text{wrote(russell,B)} \Rightarrow \exists_V \text{owns(russell,V)} \land \text{copy(V,B)}\).

    \(\exists_B \text{wrote(becky,B)} \land \neg \exists_V \text{copy(V,B)}\).