First-Order Logic
Exercises

Exercise 1 (Einstein's puzzle) *Let us assume that there are five houses of different colours next to each other on the same road. In each house lives a man of a different nationality. Every man listens to one kind of music, watches one particular TV show, and keeps pets of a particular kind.*

1. *The Englishman lives in the red house.*

2. *The Swede keeps dogs.*

3. *The Dane listens to metal.*

4. *The green house is just to the left of the white one.*

5. *The owner of the green house listens to punk.*

6. *The Game of Thrones watcher keeps birds.*

7. *The owner of the yellow house watches Battlestar Galactica.*

8. *The man in the center house listens to country.*

9. *The Norwegian lives in the first house.*

10. *The Westworld watcher has a neighbour who keeps cats.*

11. *The man who watches Breaking Bad listens to techno.*

12. *The man who keeps horses lives next to the Battlestar Galactica watcher.*

13. *The German watches the Day of our Lives.*

14. *The Norwegian lives next to the blue house.*

15. *The Westworld watcher has a neighbour who listens to opera.*

Formalize the puzzle and answer the question "Who keeps fish?"

Exercise 2 *There is a party at Coruscant with many invited guests. Consider the following sentences:*

1. *All Sith Lords and Wookiees who were invited to the party are late.*

2. *There is at least one person who is on time.*

3. *There is at least one invited person who is neither a Sith Lord nor a Wookiee.*

Formalize the sentences and prove that (3) is not a logical consequence of (1) and (2).