

Exercise Sheet 1
CS 2210 Logic for Computer Scientists (Hitzler)
Solutions due: Tuesday January 20, 2015, 11am

Exercise 1 Can you derive the following from (1) to (14) in Example 1.1.1? Justify your answers.

- (a) Michelle is a parent of Malia.
- (b) Ann is a grandmother of Natasha.

Exercise 2 Write the following sentences as Datalog rules.

- (a) Every mother is female.
- (b) If somebody is the father of a female person, then that female person is the daughter of this father.
- (c) If a person is the daughter of somebody's daughter, then this first person is the granddaughter of this "somebody."

Exercise 3 In the context of (1) to (14) of Example 1.1.1, write Datalog rules

- (a) which define what an aunt is
- (b) and which define what a niece is.

Explain your answers.

Exercise 4 In the context of (1) to (14) of Example 1.1.1,

- (a) define `siblingOf` and
- (b) state that `siblingOf` is symmetric.

Explain your answers.

Exercise 5 A vertex v in a graph is *self-connected* if there is a path from v to v in the graph. By extending the Datalog facts and rules from Example 1.1.5, complete the datalog rule

$$\dots \rightarrow \text{sc}(x)$$

such that a vertex v is self-connected if and only if $\text{sc}(v)$ can be derived. Justify your answer.