

**Exercise Sheet 1**  
**CS 2210 Logic for Computer Scientists (Hitzler)**  
**Solutions due: Tuesday September 2, 2014, 9:30am**

**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.