

CS 512, Spring 2014

## Assignment 3

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Due Monday February 17th

### 1 Problem 1

Exercise 2.1.4 parts (a),(b),(c),(d),(e),(g). Skip part f which is ambiguous.

(a) Everybody has a mother.

$\forall y \exists x M(x, y)$

(b) Everybody has a father and a mother.

$\forall x \exists y \exists z M(y, x) \wedge F(z, x)$

(c) Whoever has a mother has a father.

$\forall x M(y, x) \rightarrow F(z, x)$

(d) Ed is a grandfather.

(e) All fathers are parents.

$\forall x F(x, y) \rightarrow P(x, y)??$

(g) No uncle is an aunt.