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CS-2210

8/28/25

Exercise Set 1

Exercise 1

a) Yes. Marian is the mother of Michelle, and Michelle is the mother of Natasha. Therefore, Marian is the grandmother of Natasha.

b) Yes. Craig is the brother of Michelle, and Michelle is the mother of Natasha. Therefore, Craig is the uncle of Natasha.

c) No. Clark is never referred to in datalog facts 1-9, so we cannot make any determinations about him.

Exercise 2

a) father(x) → male(x) ^ parent(x)

b) father(x, y) ^ female(y) → daughterOf(y, x)

c) daughterOf(x, y) ^ daughterOf(y, z) → granddaughterOf(x, z)

Exercise 3

a) childOf(x, y) ^ uncleOf(y, z) → firstCousinOf(x, z)

b) grandParentOf(x, y) ^ grandParentOf(y, z) ^ grandParentOf(x, w) → secondCousinTwiceRemovedOf(z, w)

(This rule assumes that y and w are not siblings.)

Exercise 4

a) siblingOf(x, y) → parentOf(z, x) ^ parentOf(z, y)

b) siblingOf(x, y) → siblingOf(y, x)

Exercise 5

path(x, x) → sc(x). By the definition stated previously, any path from a point to itself automatically implies that that point is self-connected.

Exercise 6

Not necessarily. For example, while a self-connected vertex *v* may be that way because it has an edge connecting from and to itself, it could also be self-connected only because it connects to *x*, which connects to *y*, which connects back to *v*.