Exercise 1

Our ontology O consists of two axioms:

- ClassAssertion(ex:Manager ex:Mackenzie)
- ObjectPropertyAssertion(ex:manages ex:Mackenzie ex:NBDD)

a) Write down an interpretation that satisfies O (is a model of O).

b) Write down an interpretation that does not satisfy O.
Solution 1a

**Vocabulary** \( V = \{\text{Mackenzie, NBDD, Manager, manages}\} \)

**Domain** \( D = \{a, b, c\} \)

**Interpretation function:**
- \( \text{Mackenzie}^I = a \)
- \( \text{NBDD}^I = c \)
- \( \text{Manager}^I = \{a, b\} \)
- \( \text{manages}^I = \{(a, c), (b, c)\} \)
Solution 1b

**Vocabulary** \( V = \{\text{Mackenzie, NBDD, Manager, manages}\} \)

**Domain** \( D = \{a,b,c\} \)

**Interpretation function:**
- \( \text{Mackenzie}^I = a \)
- \( \text{NBDD}^I = c \)
- \( \text{Manager}^I = \{a,b\} \)
- \( \text{manages}^I = \{(b,c)\} \)
Exercise 2

An ontology $O$ consists of the following axioms:

- $\text{SubClassOf}(\text{ex:SpaceSuit} \, \text{ex:Product})$
- $\text{SubClassOf}(\text{ex:SpaceAccessory} \, \text{ex:Product})$

Is the following interpretation $I$ a model of $O$ or not?

$D = \{a, b, c, d, e\}$

$\text{SpaceSuite}^I = \{a, b, c\}$

$\text{SpaceAccessory}^I = \{b, c, d\}$

$\text{Product}^I = \{a, c, d\}$

If not, how could you change $I$ so that it satisfies $O$?
Solution 2

I is not a model of O because

• SpaceSuite\(^I\) is not a subset of Product\(^I\)
• SpaceAccessory\(^I\) is not a subset of Product\(^I\)

I could be changed to become a model of \(I\) for instance by adding „b“ to the interpretation of Product:

\[
\text{Product}\(^I\) = \{a, b, c, d\}
\]