Chapter 1
Theory

1.1 Basic Notions

Exercise 1.1 (World Logic) Answer to the following questions:

- What is an interpretation function?
- What is entailment and what are its properties?
- What are the desired properties of logic languages?
- When it is the case that a theory is correct and complete?
- Can you describe the main reasoning problems?

Exercise 1.2 Indicate which of the following statements about world models (World Logics) are TRUE (one or more):

1. A model is a set of atomic analog representations, i.e., representations that cannot be further decomposed.
2. An assertional theory always correctly represents all and only the facts of the model it describes.
3. A domain is the set of all possible facts that are used to represent the world.
4. An assertional language contains at least one assertion for each fact contained in the domain it describes.
5. ER models are linguistic representations of the world for which an assertional theory can be constructed by defining an interpretation function.

Exercise 1.3 (Logic) Indicate which of the following statements about logics are TRUE (one or more):

1. The interpretation function is not necessarily defined on all of the formulas of a theory.
2. A theory can describe more than one model and, dually, a model can be described by more than one theory.
3. Solving a model checking problem consists of checking whether a theory $\mathcal{T}$ is correct and complete with respect to a model `M`.

4. $\mathcal{T}_2$ is a logical consequence of $\mathcal{T}_1$ ("$\mathcal{T}_1$ logically entails $\mathcal{T}_2$") if every model of $\mathcal{T}_1$ is also a model of $\mathcal{T}_2$.
formulas), and complex formulas.