Another subset of predicate logic with efficient proof systems comprises the so-called *rule systems* (also known as *Horn logic* or *definite logic programs*). A rule has the form

$$A_1, \ldots A_n \rightarrow B$$

where $A_i$ and $B$ are atomic formulas. In fact, there are two intuitive ways of reading such a rule:

1. If $A_1, \ldots, A_n$ are known to be true, then $B$ is also true. Rules with this interpretation are referred to as *deductive rules*.[1]

2. If the conditions $A_1, \ldots, A_n$ are true, then carry out the action $B$. Rules with this interpretation are referred to as *reactive rules*.

Both views have important applications. However, in this chapter we take the deductive approach. We study the language and possible queries that one can ask, as well as appropriate answers. Also, we outline the workings of a proof mechanism that can return such answers.

It is interesting to note that description logics and Horn logic are orthogonal in the sense that neither of them is a subset of the other. For example, it is impossible to define the class of happy spouses as those who are married to their best friend in description logics. But this piece of knowledge can easily be represented using rules:

$$married(X, Y), bestFriend(X, Y) \rightarrow happySpouse(X)$$

On the other hand, rules cannot (in the general case) assert (a) negation/complement of classes; (b) disjunctive/union information (for instance, that a person is either a man or a woman); or (c) existential quantification (for instance, that all persons have a father). In contrast, OWL is able to express the complement and union of classes and certain forms of existential quantification.

[1] There are two ways, in principle, of applying deductive rules: from the body ($A_1, \ldots, A_n$) to the conclusion ($B$) (*forward chaining*), and from the conclusion (goal) to the body (*backward reasoning*).