Solution Applications of Logic Programming

Exercise 1

Create a finite collection of definite clause grammar rules to check whether a sentence is grammatically correct. A sentence can be composed of the following words:

article a, the
noun girl, boy
pronoun that, this
auxiliary is
verb sleeps, likes.

A sentence must be in one of the following forms subject-predicate and subject-predicate-object.

- subject is formed out of either an article and a noun, or a pronoun. For example, a girl or that.
- predicate is either an auxiliary or a verb
- object is formed out of an article and a noun

In the subject-predicate form of a sentence, the predicate can be only sleeps. In the subject-predicate-object form of a sentence the verb can be either likes or is. If the predicate is likes, the subject is composed of an article and a noun. If the predicate is is, the subject is a pronoun.

Write a Prolog question to produce all correct sentences in the grammar.

You can test your program with the following examples:

this is a sleeps // False
this is a likes // False
the boy likes // False
that boy likes // False
a boy the the girl // False
this is a boy // True
that is the girl // True
the girl likes a girl // True
Answer:

sentence --> subjectpredicate.
sentence --> subjectpredicateobject.

subjectpredicate --> subject, verb1.
subjectpredicateobject --> article, noun, verb2, object.
subjectpredicateobject --> pronoun, auxiliary, object.

subject --> article, noun.
subject --> pronoun.
predicate --> auxiliary.
predicate --> verb.
object --> article, noun.

article --> [a].
article --> [the].
noun --> [girl].
noun --> [boy].
pronoun --> [that].
pronoun --> [this].
auxiliary --> [is].
verb1 --> [sleeps].
verb2 --> [likes].