Problem 4.1
Consider the knowledge base
\[ F = \{ \text{interesting-food } \leftrightarrow \text{dessert } \lor \text{spinach-pilaf} \}
\]
\[ \text{dessert } \leftrightarrow \text{magic-cookie-bars } \lor \text{banana-burrito} \}
\]
the set of abducibles
\[ F_A = \{ \text{spinach-pilaf, magic-cookie-bars , banana-burrito } \}.
\]
and an empty set of integrity constraints. Compute the set of possible explanations for the observation "interesting-food"

- by using SLD–resolution, and
- by model generation.

Problem 4.2
Specify an abductive framework \( \langle F, F_A, I \rangle \) and an observation \( G \), such that the observation can be explained according to the satisfiability view in a way that is not available by the theoremhood view.

Problem 4.3
Assume that you have the data structure char of ASCII characters available.

1. Define the data structure string according to the following specification:
   A string may be empty or may be obtained by adding an ASCII character to the end of a string. Which are the constructors? Which are the selectors?

2. Express explicitly the following conditions that the data structure string should satisfy:
   (a) Different constructors produce different objects;
   (b) Constructors of arity > 0 induce injective mappings on the set of constructor ground terms;
   (c) Each constructor ground terms can be represented as an application of some constructor to the results of application of selectors, if any applicable selectors exists;
   (d) Each selector is ‘inverse’ to the constructor it belongs to;

3. Write a program \( F_{Trans} \) that defines the function \( Trans \) over non-empty strings, which transforms any string into a string of the same length containing only the character ‘a’.