Problem 4.1
Consider the knowledge base

\[ \mathcal{F} = \{ \text{interesting-food } \leftrightarrow \text{dessert } \lor \text{spinach-pilaf} \}
\]

\[ \text{dessert } \leftrightarrow \text{magic-cookie-bars } \lor \text{banana-burrito} \}
\]

the set of abducibles

\[ \mathcal{F}_A = \{ \text{spinach-pilaf, magic-cookie-bars, banana-burrito} \}
\]

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 \( \langle \mathcal{F}, \mathcal{F}_A, I \rangle \) 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 \( \text{char} \) of ASCII characters available.

1. Define the data structure \( \text{string} \) 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 \( \text{string} \) 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 \( \mathcal{F}_{\text{Trans}} \) that defines the function \( \text{Trans} \) over non-empty strings, which transforms any string into a string of the same length containing only the character ‘a’.