Problem 4.1
Consider the knowledge base

\[ \mathcal{F} = \left\{ \begin{array}{c}
\text{interesting-food} \leftrightarrow \text{dessert} \lor \text{spinach-pilaf} \\
\text{dessert} \leftrightarrow \text{magic-cookie-bars} \lor \text{banana-burrito}
\end{array} \right\} \]

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’. 