Exercise 1.1:
Using the Prolog program from Slide 3-6 (Lecture 1), give the answer for the following queries:

- \( ?\text{-}\text{connection(frankfurt, } X) \).
- \( ?\text{-}\text{connection(} X, \text{ maui)} \).

Exercise 1.2:
Define in Prolog a predicate for multiplication. (You may want to use the predicate \textit{add} defined on Slide 10, Lecture 1.) Give the output for the following queries:

- \( ?\text{-}\text{mul(s(0)),s(s(0))),Z)} \).
- \( ?\text{-}\text{mul(s(0)),s(s(0)),s(s(s(s(0)))))}} \).

Exercise 1.3:
Now use your definition from Exercise 1.2 to define the factorial function.

- Example: \( ?\text{-}\text{fact(s(0)), F ) has the result F = s(s(s(s(s(0)))))}. \)

Exercise 1.4:
Define a predicate \textit{palindrome}(L) which checks if the list L is a palindrome, i.e. the reverse of L is identical to L .

- Example: \( ?\text{-}\text{palindrome([a,b,c,b,a]) has result yes.} \)

Exercise 1.5:
Compute the substitution composition \( \theta, \eta, \tau \), where \( w, x, y, z \) are variables and

\[
\theta = \{y/a(x, z), z/y\} \quad \eta = \{y/x, x/f(w)\} \quad \tau = \{w/g(a), x/z, z/b\}
\]