Exercise 1

Consider the entity relationship model of a train connection system (below). Note: The \texttt{connects} relationship models a direct connection between two stations. For example, the train starting (\texttt{start}) in Munich and ending (\texttt{end}) in Hamburg passes through several stations. Each of these route-sections (e.g., Munich $\rightarrow$ Nürnberg or Nürnberg $\rightarrow$ Würzburg) has an entry in the \texttt{connects} relation. Further, the train entity models a train line: The train line going from Munich to Hamburg, becomes a different train line (different \texttt{trainNo}) when returning.

Task: Add functionalities to the shown ER diagram.

Exercise 2

For now, ignore the functionalities in the diagram and answer the following questions:
• How many partial functions \((A \times B \rightarrow C)\) are possible in a ternary relationship (ignore permutation on the left side of the partial function when counting).

• List all possible partial functions of the „offers“ relationship.

• For each partial function, try to describe in natural language which constraints it would enforce (not all of them make sense in the real world).

Now, considering the functionalities:

• Which partial function actually hold?

• What does the absence of the other partial functions allow for? (no need to create an exhaustive list).