TU München, Fakultät für Informatik
Lehrstuhl III: Datenbanksysteme
Prof. Alfons Kemper, Ph.D.

TUM

**Exercise for *Database System Concepts for Non-Computer Scientist* im WiSe 19/20**
Alexander van Renen (renen@in.tum.de)
http://db.in.tum.de/teaching/ws1920/DBSandere/?lang=en

Sheet 05

Exercise 1

Consider the entity relationship model of a train connection system (below). Note: `connects` models a the direct connection between two stations. For example, the train starting in Munich and ending in Hamburg passes through several stations. Each of these route-sections (e.g., Munich → Nürnberg or Nürnberg → Würzburg) has an entry in the `connects` relation.

c) Refine the relation schema as far as possible.

d) Create SQL DDL statements to create the respective tables from the refined relational schema.
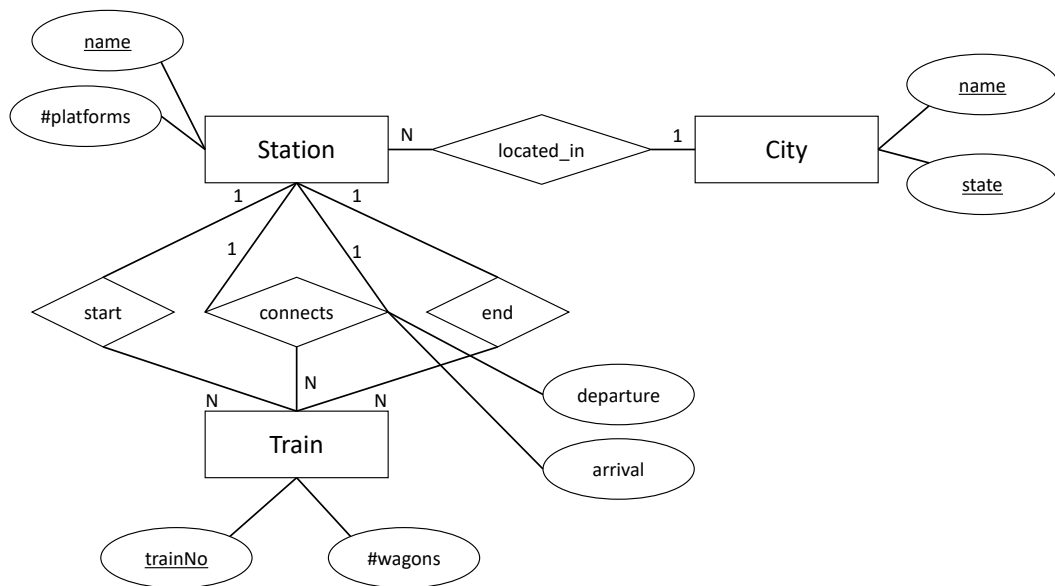
The un-refined translation yields the following relations for the entities in the model:

$$\text{City} \;:\; \{[\underline{\text{name} : \text{string}}, \text{state} : \text{string}]\} \tag{1}$$

$$\text{Station} \;:\; \{[\underline{\text{name} : \text{string}}, \#\text{platforms} : \text{integer}]\} \tag{2}$$

$$\text{Train} \;:\; \{[\underline{\text{trainNo} : \text{integer}}, \#\text{wagons} : \text{integer}]\} \tag{3}$$

For the relationships in the model, we create the following relations:

$$located\_in \quad : \quad \{[\underline{stationName : string}, cityName : string, cityState : string]\} \quad (4)$$

$$start \quad : \quad \{[\underline{trainNo : integer}, stationName : string]\} \quad (5)$$

$$end \quad : \quad \{[\underline{trainNo : integer}, stationName : string]\} \quad (6)$$

$$connects \quad : \quad \{[\underline{fromStationName : string}, toStationName : string, \quad (7)$$
$$\underline{trainNo : integer}, departure : date, arrival : date]\}$$

Exercise 2

Look at the following ER-diagram. Think about different ways of how to transform these into a database schema.