

# Database Technology

## Exercise Easter Break

### 1. DWS database

The DWS group needs a new database for project management. All projects will thus start and end after 2019. Each project has a label, a description and an employee which acts as a project lead. Employees have a staff number, a name which consists of first name and last name as well as multiple projects they work for (only for a specified time). Since the group covers many topics, there are 6 focus areas (each one has its own name). Each employee is assigned to one of these areas.

1. Construct an E-R diagram
2. Create the corresponding relation schema
3. Write the SQL DDL queries and enhance it with reasonable constraints (ensure that each project has one project lead)
4. Write SQL statements to insert at least one entry per table
5. Write an SQL statement to list the name of the employees together with their corresponding projects.

## 2. Air traffic control

The air traffic control wants to have a new database and asks you for help. They observe different airlines for which they need to know their headquarter and country. Each of them owns aircrafts which has a unique number, and a date for the last inspection (the traffic control also wants the date when the aircraft was bought). Important is also the type of aircraft (which contains the type number and count of seats as well as the maximum speed). Each airline employs pilots and steward/esses (start and end date of the contract should be also stored). For both the name (first name, last name) and birthdate is collected. For pilots the flight hours are added and for steward/esses they also have the date of the last safety training. Passengers (identified by a passenger id and mail address) can book flights (number of seats, economy/business/first class). For flights they need the flight number, date, departure city, arrival city, duration and corresponding aircraft. There is exactly one pilot and one co-pilot for each flight and multiple steward/esses. The pilot Hans Meier has no SQL skills but wants to see all of his flights in 2017. The air traffic control conducted a survey about the queries. As a result it shows that most queries require the date of the flights.

1. Construct an E-R diagram
2. Check that your E-R diagram is in 3<sup>rd</sup> normal form.
3. Create the corresponding relation schema
4. Write the SQL DDL
5. Enhance the result from 4 with reasonable constraints
  - a. Check that all pilots and steward/esses are currently older than 28
  - b. No flight takes longer than 20 hours
6. Enhance the result from 4 with better indices.
7. Write SQL statements to insert at least three entries per table
8. Write the following queries:
  - a. Delete all bookings of passenger with mail "max@maxi.com"
  - b. Increase the amount of seats by one for the same passenger but only for flights on 06.10.2017.
  - c. List all places which Pilot Hans Meier already visited.
  - d. Show for each aircraft the corresponding flight hours.
  - e. Find the airline that has the most pilots
9. Take care about Hans Meier who don't write SQL queries.