Note: All pictures are attached as png in each package.

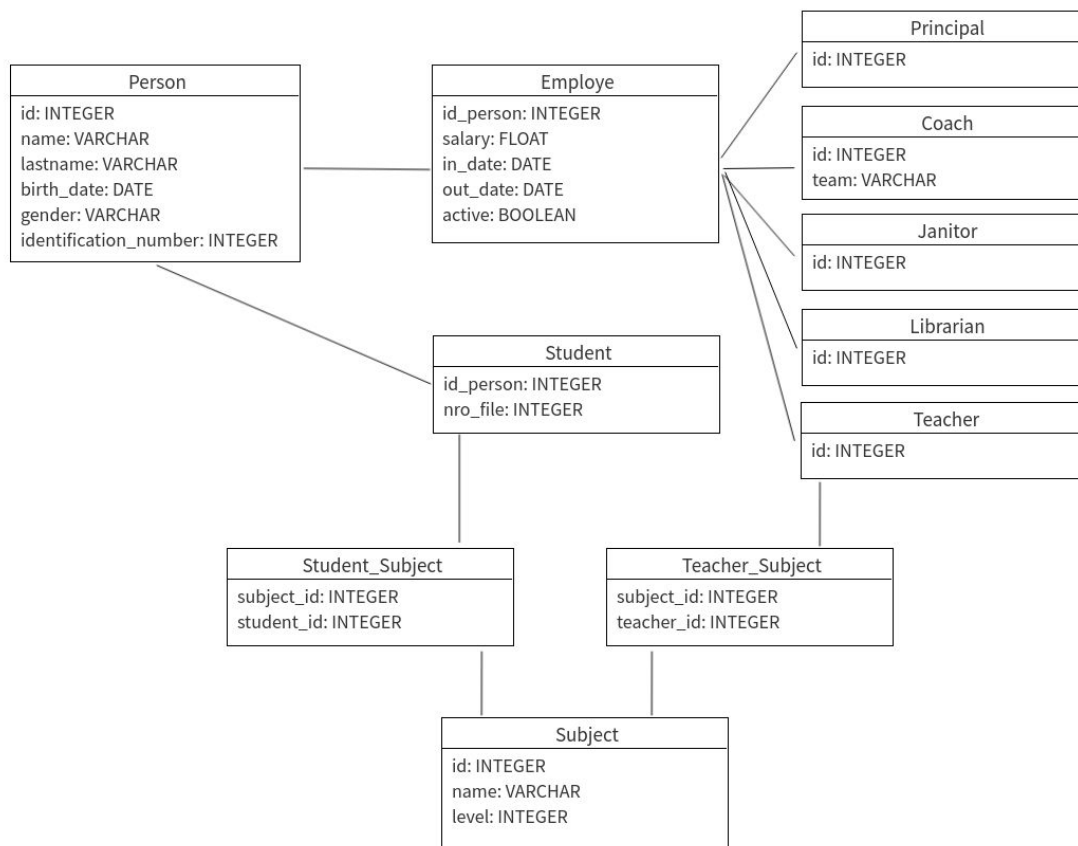## Exercise One

Package: School.

A) Implement a method that returns a list of all students grouped by the first letter of their last name.

The method is located on the StudentService, called getStudentsGroupByLastNameFirstLetter().

B) Implement a method that returns a list of students taking a subject. Consider that a same student cannot be signed to a subject more than once, use the necessary Java utilities and methods to provide this list.

The method is located on the StudentService, called getStudentsBySubjectId().

C) Create different database structure diagrams with the possible implementations of the created domain.

D) Consider that I want to query all the people in the database and the engine is taking too long to respond. Which are the possible solutions? How would you determine the problem?

- Use pagination.
- Make sure the tables are indexed, if not, create the indexes.

E) I want to query all the students which ages are between 19 and 22. How would you optimize this query?

- Make sure the tables are indexed, if not, create the indexes.
- Avoid unnecessary columns in Select clause.

F) I want to delegate the saving process to the database engine instead of having it on the application side, which database utility would you use?

Using Store Procedures is the best approach in this case.

Exercise Two

Package: Bookings.

Create the domain model of a conference room schedule where meetings are booked. Bookings should contain a list of participants and only the organizer can modify them.

Incorporate all attributes and methods you consider needed for each domain entity.

Have into account that bookings cannot overlap and cannot last less than 15 minutes and no longer than 3 hours.

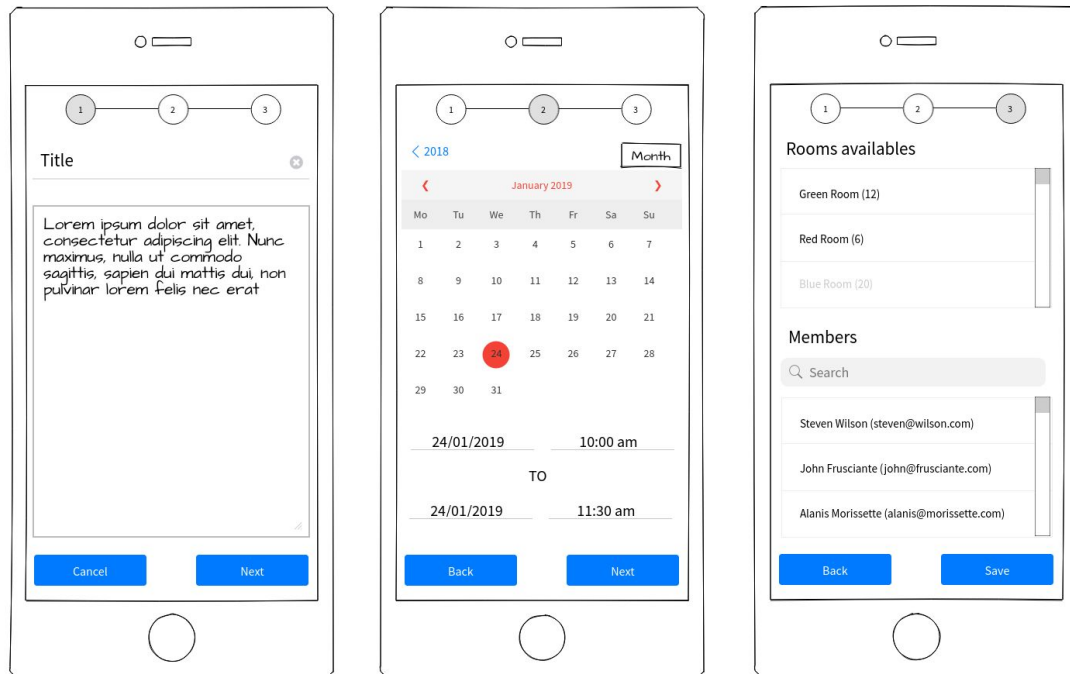Create a diagram of how the user interface would look like and how a booking flow should be.

Desktop Interface

When the user clicks on the day, the calendar will show the week with the meetings and rooms not availables per hour.

Mobile Interface

The user can change the calendar view for more details, like month, week and day. The calendar will show the week/day with the meetings and rooms not availables per hour.

Flow