Course	**Databases and Information Systems**		2023
Exercise Sheet	**3**		
Points	–		
Release Date	**April 18th 2023**	Due Date	**April 26th 2023**

1 Hibernate Tutorial

If you don't have any experience using the persistence framework Hibernate, make yourself familiar with it by firstly going through the Hibernate slides provided in Moodle.

A detailed Getting Started Guide can be found in the official documentation:

`http://hibernate.org/orm/documentation/6.2/`

The projects and code for the tutorials referenced in this guide are available as

`https://docs.jboss.org/hibernate/orm/6.2/quickstart/html_single/hibernate-tutorials.zip`.

After extracting the archive, you can import the folder into the IDE of your choice.

Note: Working through the tutorial is not required for an approval.

2 Developing a relational database application with Hibernate

The goal of this exercise is to implement a Java application using Hibernate in the same domain as in exercise sheet 2. For the ER diagram, see exercise sheet 2 or the appendix.
As a starting point, you may use your own implementation from exercise sheet 2 or the non-persistent, object-oriented prototype implementation in DIS_Exercise3_maven.zip within the Moodle course.

The prototype implementation is a Maven project which can be imported in any common IDE. It contains several packages:

- `de.dis2023` contains the `Main` class with the `main` method used to start the application.
- `de.dis2023.core` contains the class `EstateService` which simulates the database. It offers some functionality to store and query objects in the main memory. **The goal is to reimplement each method in `EstateService` such that all objects are finally stored in the database instead of the "main memory" sets provided in the protoype implementation**.
- `de.dis2023.data` contains bean classes for all entity types.
- `de.dis2023.data.mapping` contains example mappings for Hibernate. **Your task is to define the mappings for all entity types and relationship types correspondingly.** It is also possible to use annotaions instead of the native Hibernate mapping files (See for example Sections 3 & 4 of the Getting Started Guide at `http://docs.jboss.org/hibernate/orm/6.2/quickstart/html_single/#tutorial_annotations`).

- `de.dis2023.menu` contains the implementation of some terminal-based menus.
- `de.dis2023.editor` contains the menu navigation of the application.
- `de.dis2023.authentication` contains classes that are used for user authentication: the class `EstateAgentAuthenticator` can authenticate an estate agent with the help of the class `EstateService`. The class `PropertiesFileAuthenticator` authenticates the application administrator with the data stored in the file `admin.properties`, granting him or her the rights to administer the estate agents.
- `de.dis2023.util` contains little helper classes.

The project contains two types of Hibernate configuration files, hibernate.postgresql.cfg.xml for our DB2 database and hibernate.h2.cfg.xml to use a local H2 database. It is absolutly fine to use your own H2 database during the development phase. However, to connect to the H2 database with an external SQL client like DBeaver, it should not be run in embedded mode. To start the H2 server go to the project folder with a command line tool and executing the command

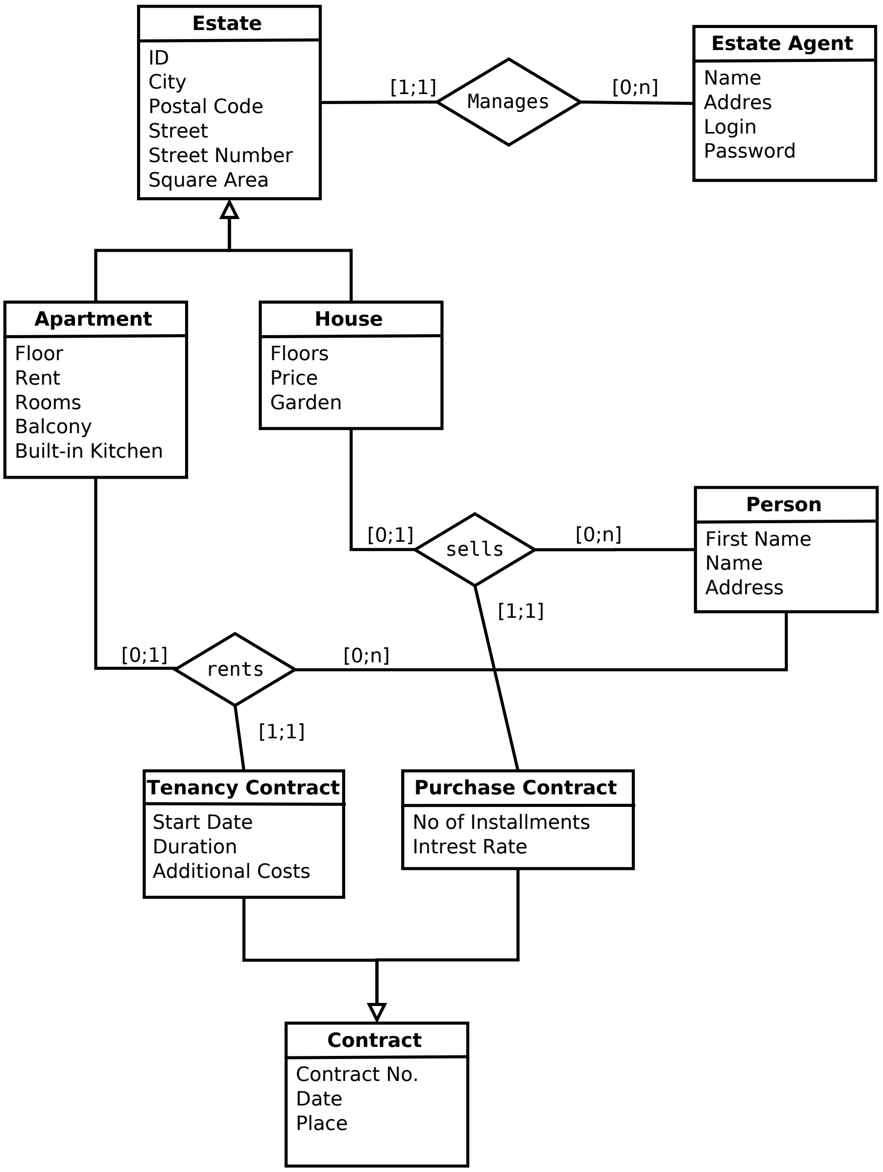
```
java -cp .\h2-2.1.214.jar org.h2.tools.Server
```

You can also use the H2 Console in your browser (http://localhost:8082) where you have to change the JDBC URL to `jdbc:h2:tcp://localhost/./data/estatedb`.

If you want to work with H2 instead of PostgreSQL during the development phase, make sure that you start the H2-Server before running the project!

At the end of the development phase, the production database should be used. To do this, you need to customize the hibernate.cfg.xml to use the PostgreSQL. After Hibernate has created the schema for the first time, the hbm2ddl.auto property can be set to validate or none, for example.

Appendix


Estate
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Tenancy Contract
Start Date
Duration
Additional Costs
Purchase Contract
No of Installments
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Contract
Contract No.
Date
Place