Lab 8

[valid 2020-2021]

JDBC
Write an application that allows to **connect** to a relational database by using JDBC, **submit** SQL statements and display the results.

The main specifications of the application are:

Compulsory (1p)

- Create a relational database using any RDBMS (Oracle, Postgres, MySql, Java DB, etc.).
- Write an SQL script that will create the following tables:
  - *movies*: id, title, release_date, duration, score
  - *genres*: id, name (for example: Action, Drama)
  - an associative (junction) table in order to store each movie genres
- Update *pom.xml*, in order to add the *database driver* to the project libraries.
- Create a *singleton* class in order to manage a connection to the database.
- Create *DAO* classes that offer methods for creating movies and genres, and finding them by their ids and names;
- Implement a simple test using your classes.

Optional (2p+)

- Create the necessary table(s) in order to store movie *actors* and *directors* in the database.
- Create an object-oriented model of the data managed by the Java application.
- Create a *tool* to import data from a real dataset: IMDb movies extensive dataset or The Movies Dataset or other.
- For additional points, you may consider extending your model or generating suggestive HTML reports, based on the imported data.

Bonus (2p+)

- Use a *connection pool* in order to manage database connections, such as C3PO, HikariCP or Apache Commons DBCP.
- Using a ThreadPoolExecutor, create a (large?) number of concurrent tasks, each requiring a database connection in order to perform various SQL operations on the database.
  Analyze the behavior of the application when using the singleton connection versus the coonection pool approach.
  Create a scenario in order to highlight the advantages of using a connection pool.
- Use Visual VM in order to monitor the execution of your application (attach screenshots).
- For additional points, you may consider creating a graphical user interface.

Resources

- JDBC
- Oracle Database JDBC Developer's Guide and Reference
- JDBC Tutorial - The ULTIMATE Guide

Objectives

- Understand terms and concepts related to relational databases: DBMS, SQL, table, query, stored procedure, cursor, etc.
- Connect to a relational database by using a JDBC driver
- Submit queries and get results from the database
- Specify JDBC driver information externally
- Perform CRUD operations by using the JDBC API