Final Draft - Manage Surgery Materials and Instruments

A Project on connecting a Java application to an Oracle Database

Project Overview

This project is a design project where I design a database and an application which is connected to the database and accesses and uses the database. The database is stored **locally** and the application is connected to the database by a driver. The database and the application are both small, with the application having a simple model-view-controller with three views and the database has four tables and two views.

The application itself is used during surgery by the medical personal, where they can enter the number of materials (for each material) and instruments they used during the surgery, for statistical and logistical records. All materials are predefined, access control and security is handled outside this application.

The focus for the project is the complete development process, starting with gathering requirements and refining them, making diagrams for the database and creating a UI draft; as well as the interaction between the database and the application.

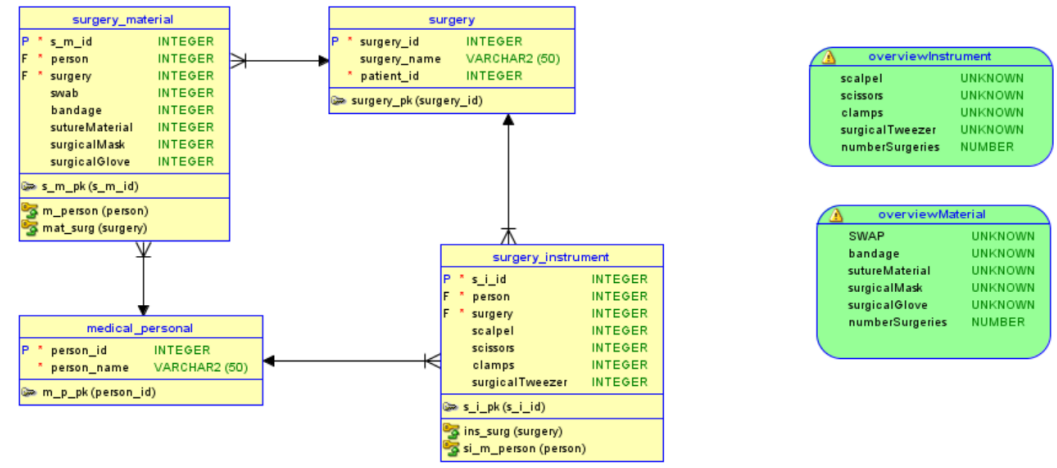
Requirements

The following is a short write-up of the requirements for this project. The full atomic requirements with category and priority are listed in the file: *Documents/Requirements.pdf*.

The database should be able to store the number for each material used, with the materials being Swab, Bandage, Suture Material, Surgical Mask and Surgical Glove. The database should be able to store the number for each instrument used, with the instruments being Scalpel, Scissors, Clamps and Surgical Tweezers. The application is used by medical personal, which enters the data. Information about the medical personal is stored in the database and cannot be changed by the application. Similarly, information about the surgery are stored in the database and cannot be changed by the application. For each material and instrument entry, the medical person that entered the data and the surgery for which the data was entered is referenced. Only positive values can be entered to the database.
The application should allow a user to enter the number of materials and instruments used in a specific surgery. An overview should by provided of the total number of materials and instruments for each material and instrument until the point that the overview is looked at.
The user should be able to use the application without any previous training.

Diagrams

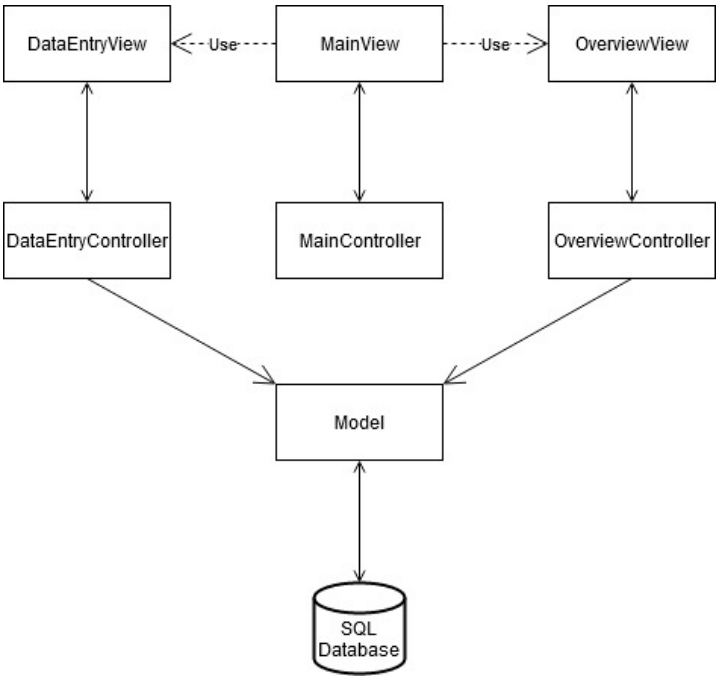
Database Diagram



Database Relational Diagram

The database contains 4 tables and 2 views. The views contain the sum for each material/ instrument as well as the total count of surgeries.

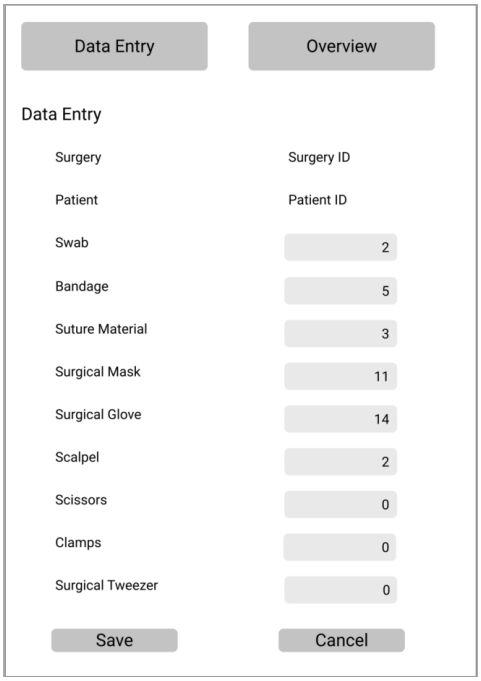
Class Diagram



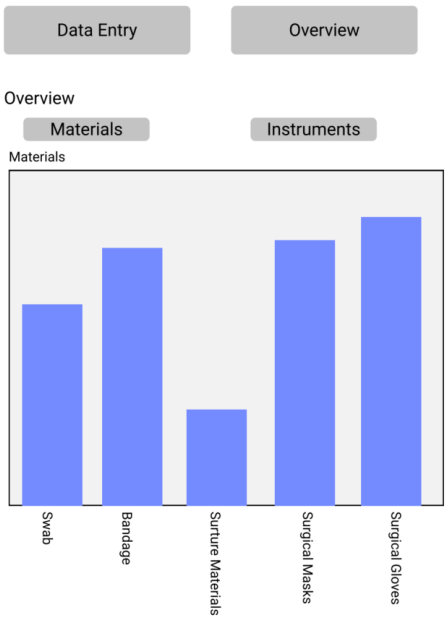
Application Class Diagram

The Application uses the *Model-View-Controller* Pattern with a *Main* view and controller, that controls, which view is shown (data entry or overview) and a *model* which is connected to the SQL Database. As the *MainView* only directs, which *view* to show, the *MainController* is not connected to the *Model*.

GUI Draft



GUI Draft for Data Entry View



GUI Draft for Overview View

The GUI consists of two simple views, which are controlled by the *MainView*. The *DataEntryView* has input fields to enter the number of materials and instruments used and when the user clicks the *save*-button, the data gets written to the database. The *OverviewView* shows the data from the *overviewMaterial*- and *overviewInstruments*- views from the relational diagram.

Database

The database is a local Oracle Database, the tables and example data are written in sql developer. The DDL and DML files are stored in the *Scripts/SQLScripts* folder.

Tables

Surgery: Table contains attributes id (primary key), name and patient name. Rows of the table will be referenced, but there is no direct interaction with the table.

Medical_Personal: Table contains attributes id (primary key) and name. Rows of the table will be referenced, but there is no direct interaction with the table.

Surgery_Material: Table contains id (primary key) attribute, reference to *Surgery* and *Medical_Personal* tables and one attribute for each material listed in the requirements. All material attributes are integer with a condition, that entered data has to be zero or greater.

Surgery_Instruments: Table contains id (primary key) attribute, reference to *Surgery* and *Medical_Personal* tables and one attribute for each instrument listed in the requirements. All instrument attributes are integer with a condition, that entered data has to be zero or greater.

OverviewInstrument: View contains only the sum per instrument from the *surgery_instruments* table. Using a view instead of a function to calculate the sum gives flexibility for privacy settings (here not covered), as an application can only have access to the view instead of the complete table, which includes data about the surgery and personal, when only the total number of used instruments is of interest.

OverviewMaterial: View contains only the sum per material from the *surgery_material* table. Using a view instead of a function to calculate the sum gives flexibility for privacy settings (here not covered), as an application can only have access to the view instead of the complete table, which includes data about the surgery and personal, when only the total number of used materials is of interest.

Application

The application is a Java 11 application using JavaFX for the graphical user interface. The implementation is based on the Class Diagram and GUI Drafts.

Connection between Application and Database

The Application uses a JDBC driver to connect to the database.