



Objectives

- 1. To model a comprehensive and efficient database for large scale management of a hospital
- 2. To make the database normalized such that there are no lapses
- 3. To make the system convenient, feasible and foolproof

Introduction

- This is the design of a database to satisfy the requirements of a real world hospital. The database keeps a record of all its patients, doctors, nurses, wardboys and rooms. Also the relations between them are taken into account. Treatments given to patients are also recorded according to date in a separate table. This is overall, a complicated system, which is made easy to use for the end user using special features like check-out function, and a plethora of queries which serve the purpose of increasing convenience along with giving useful information. The views solve the problem of extensive joining required due to normalization. The database is appropriately normalized which decreases discrepancies.

Stack Used

- **mySQL**: an open-source relational database management system (RDBMS)
- **SQLEditor**: for plotting RDBMS model from ERD and visualizing the model

Proposed Model

- **Classes of People in consideration:**
 - ▷ Patients
 - ▷ Doctors
 - ▷ Nurses
 - ▷ Wardboys
- **Types of rooms in the hospital:**
 - ▷ General ward
 - ▷ ICU
 - ▷ Private
 - ▷ Private(AC)
 - ▷ Emergency ward
- **Departments in the hospital:**
 - ▷ Neurology
 - ▷ Dermatology
 - ▷ Gastroenterology
 - ▷ Ophthalmology
 - ▷ Cardiology
 - ▷ Urology
 - ▷ Gynaecology
- **Room management:**
 - ▷ Rooms are managed by a proper check-in room availability and check-out functions.
- **Treatment:**
 - ▷ Various types of treatments recommended by the doctors to the specific patients are kept record of, in a separate table.

Key Innovation

- We wrote certain functions to encapsulate complex procedures such as checking out and checking the availability of rooms. These operations would require extensive computation on their own and would require modifications in multiple tables which would, in turn, require multiple queries to be written, which would multiply the chance of error. These functions take care of these possible lapses and increase convenience, making the system more stable and reliable.
- The increased number of tables which was a result of normalization increased the number of joins required for even the most basic of queries. These problems were resolved by creating views which made it convenient for the user to write queries and for other purposes.

Highlight Features

- **Check-out Function**
 - ▷ This function inputs patient id and mode of payment and returns the total amount to be paid by the patient. Also, it updates the transaction details of the check-out.
- **Views and queries:**
 - ▷ A view joining 3 tables making the queries shorter and more easy to write. Many queries for extraction of necessary information are included here.
- **Normalization:**
 - ▷ The database is appropriately normalized which decreases the chances of anomalies or discrepancies.

Schema

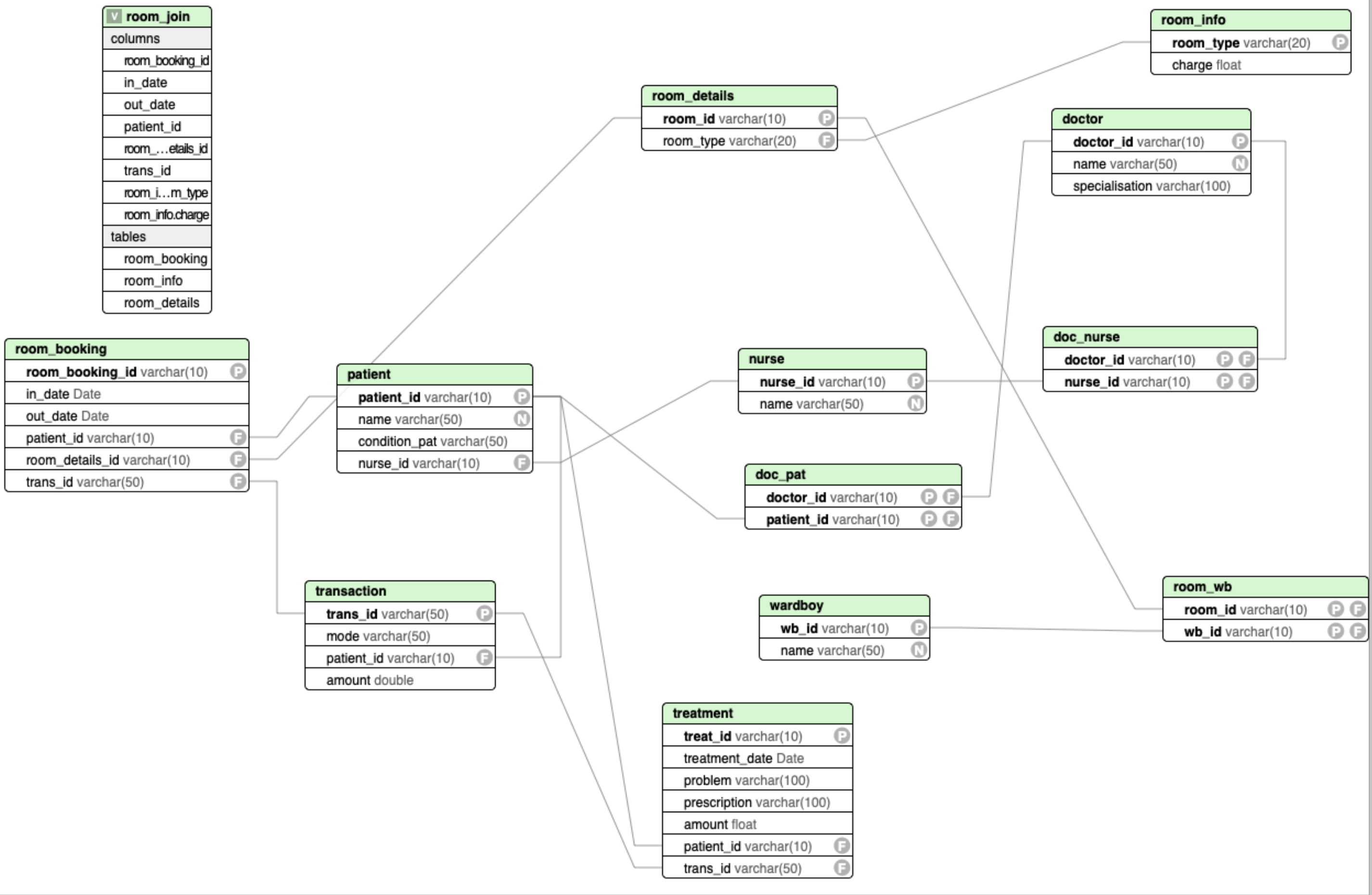


Figure 1: Database Schema

Conclusion

- An efficient solution to the problem statement which would help ease the present system was found and implemented. The highlight features comprising of check-out function and views made the maintenance of data extremely convenient and time-saving.

Future Work and Market Potential

- Increasing the internal complexity of the database, while easing the user experience.
- Multiple hospital integration, with availability and room accommodation. Also, the need for doctors in each hospital can be monitored and appropriate action can be taken as required.
- Making the database system suitable for integration into other platforms and make all of them cross-compatible.
- Wrapper functions will be easy to expose from APIs. The end user will have the convenience in using those APIs without diving into the internal complexity of queries.

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