

Hotel Management System

A CS814 Project Report

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1. Introduction

Hotel Management System (HMS) is a web application to provide an interface for management in Hotels. It provides the proper management tools and easy access to the organization.

1.1 Scope

HMS is intended for management of bookings, rooms and guests to the administration of the hotel in a distributed way. Our Hotel management system will have three types of users:

1. Admin
2. Manager
3. Employee

Hotel Management System will consist of a Booking Management System and Database Management Server. The main goal of this introduced automated HMS software is to simplify the everyday process of hotel. It will be able to take care of services to customers in a quick manner. This automation will be able to replace the drawbacks of large customer information physical files which were difficult to handle. Quick retrieval of information, ease of use, quick recovery of errors, fault tolerance are some of the benefits that the development team will be working on to achieve end user satisfaction.

1.2 Product Modules

HMS system contains following modules:

1. Dashboard
2. Booking
3. Guest
4. Room
5. Permission
6. User
7. Roles

In Dashboard users can see total numbers of bookings, numbers of rooms and numbers of guests. While in the admin's dashboard, all this information as well as the total number of users registered in the system is also visible.

Booking module contains every task related to booking such as new booking, enquiry about booking, history of booking, cancellation of booking and modification of advance booking.

The Guest module handles every task related to Guest. Here every new customer is added to the database as a guest. So it is easy to maintain information about customers with respect to booking.

In the Room module it contains information of different types of rooms the hotel has as well as availability of rooms. It also provides an interface for addition of rooms, deletion as well as modification of existing rooms.

Admin can manage the entire system, while managers have less power than admin and employees have further restriction on the system by admin and manager. Each user roles to the system will be

Permission, Users and Roles modules are available for admin of the system only. From these modules admin can view current users which are registered in the system as well as their respective role to the system and permissions. Admin can also grant, modify and revoke permissions. More information about roles and permissions are described in section 2.

1.3 Interfaces

For the flexibility of the user, the interface has been developed in graphical user interface mode. The normal interface is applied through the browser.

The GUI's at the top level has been categorized as:

- 1) Administrative user interface
- 2) Customer or general user interface

The administrative user interface concentrates on the consistent information that is practically, part of the organizational activities and which needs proper authentication for the data collection. The interfaces help the visitors with all the transactional states like Data insertion, Data deletion and Data updating with the data search capabilities.

The general user interface helps the users upon the system in transactions through the required services that are provided upon the system. The general user interface also helps the ordinary user is managing their own information in a customized manner as per their flexibilities.

1.4 Functional Requirements

Inputs:

The major inputs for Integration of Web based Accommodation Upholding Maintenance System can be categorized module wise. Basically all the information is managed by the software and in order to access the information one has to produce one's identity by entering the user-id and password. Every user has their own domain of access beyond which the access is dynamically refrained rather denied.

Output:

The major outputs of the system are tables and reports. Tables are created dynamically to meet the requirements on demand. Reports, as it is obvious, carry the gist of the whole

information that flows across the institution. This application must be able to produce output at different modules for different inputs.

1.5 Tools & Technologies

Following tools & technologies were used to develop HMS.

1. IDE: Visual studio code
2. Database: MySQL
3. Front-end: Angular, HTML, CSS
4. Bake-end: NodeJS

2. Authorization

Authorization in this Hotel Management System is implemented using RBAC(Role Based Access Control). Following section defines need, components and administrative model for RBAC implementation.

2.1 Need of RBAC

In HMS there are three types of users who use this system for management. There is hierarchy in organization among these three types of users. Means some sort of information is restricted to user at lower level from user at upper level. Administration can assign different types of tasks to different types of users. So basically in this system there is a role of users which defines what types of tasks users can do.

2.2 Components

In RBAC accesses are assigned based on roles. Accesses are referred to as permissions in this context.

2.2.1 Roles

In HMS there are three types of roles:

1. Admin
2. Manager
3. Employee

Employees in HMS have create and read permission on Booking and Guest. Managers have all permission of the employee as well as edit and delete permission also on Booking and Guest. Managers can also create, read, update and delete on the Room module.

Admin can manage the entire system. Means admin have all permissions on Booking, Rooms and Guests. Admin also have access to other modules such as User, Roles and Permission module of the system as described in section 1.

2.2.2 Permissions

In HMS each module has four types of permissions (access).

1. Create
2. Read
3. Edit
4. Update

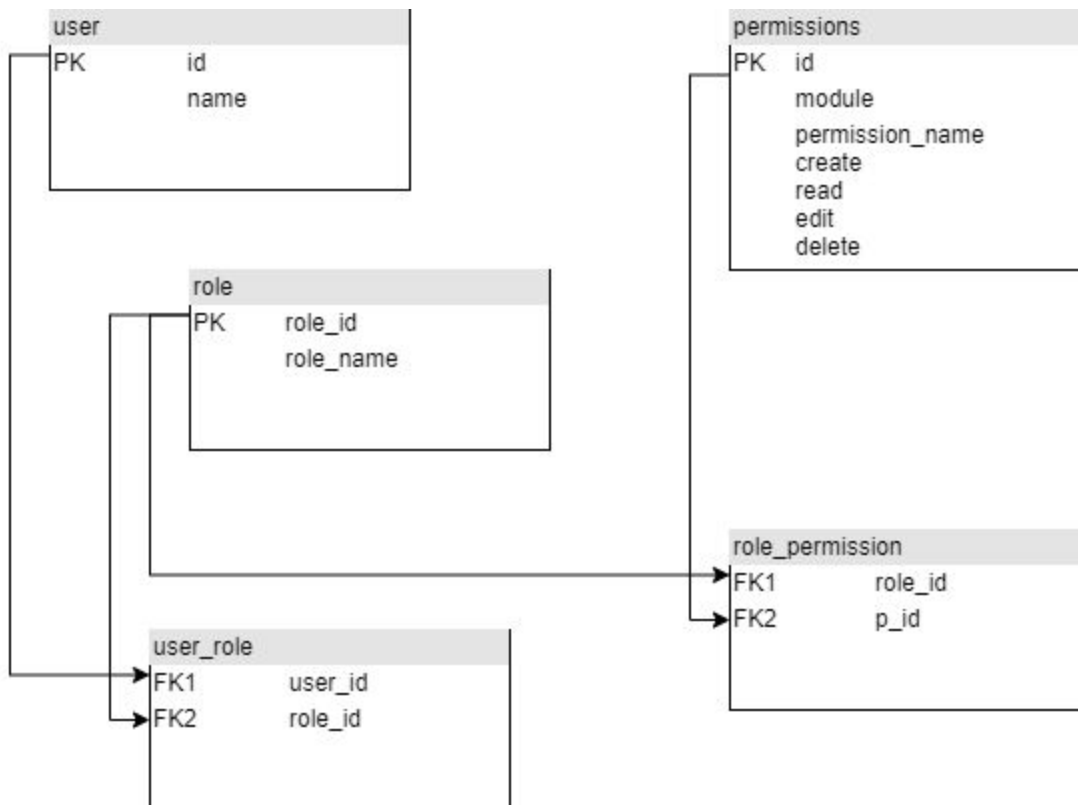
For example, a user role having permission to create and read on Booking module cannot perform edit and update operation. All this permission related to roles will be created and modified by admin.

2.3 Database design

This section contains database design used to implement RBAC. Following diagram shows database tables for RBAC. Here the user table has more than two columns but only two show here for reference purpose.

As shown here there are five different tables

1. User
2. Role
3. Permissions
4. User_Role
5. Role_Permission



User table contains information about the user which belongs to the organization in which HMS is used. Role table contains information about various roles organization have. It has **role_id** and name of role. Permission table contains information about the permission in which

we want to assign access rights. It has permission_is, name of the permission, module name (on which we want to assign permissions), create, read, edit and delete. Last four operations have boolean values. Either allowed or not.

User_Role table is mapping of user with role. Here user_id and role_id are foreign keys to User table's user_id and Role table's role_id respectively. Basically it provides role to any user. In our system mapping from user to role is one-to-one, means any user has only one role.

Role_permission table is mapping of roles with permissions. Here role_id and p_id are foreign keys to Role table's role_id and Permission table's id respectively. Mapping from roles to permission is many-to-many, means one role can have more than one permissions as well as one permission can be assigned with more than one role.

2.4 Administrative model

Administrative part of the system is also handled by RBAC. All the operations like creation of new role or permission, assignment of role with permission or assignment of user to role are done by admin (which have admin as a role in role table).

3. Conclusion

The entire project has been developed and deployed as per the requirements of and standard hotel managements need, it is found to be bug free as per the testing standards that are implemented. Any specification untraced errors will be concentrated in the coming versions, which are planned to be developed in near future. The system at present does not take care of the money payment methods, as the consolidated constructs need SSL standards and are critically to be initiated in the first face. The system needs more elaborative technicality for its inception and evolution.

Reference:

Sandhu, Ravi S. "Role-based access control." *Advances in computers*. Vol. 46. Elsevier, 1998. 237-286.