
Design Document for HOSTEL MANAGEMENT SYSTEM

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Glossary

ER	Entity Relation
DBMS	Database Management System
NF	Normalisation Form
1NF	First Normal Form
2NF	Second Normal Form
3NF	Third Normal Form

Table of contents

Glossary	2
Table of contents	3
Purpose	4
1.1 Document Objectives	4
1.2 Responsibilities - Usecase Diagram	4
1.3 Intended Audience	5
Assumptions and Constraints	5
2.1 Assumptions	5
2.2 Constraints	5
Database- Wide Design Decisions	5
3.1 Behavior	5
3.1.1 Login	5
3.1.2 Student	6
3.1.3 Hostel Manager	6
3.1.4 Admin	6
3.2 DBMS Platform	6
3.3 Security Requirements	6
3.4 Performance and Availability Decisions	6
Database Administrative Functions	7
4.1 Entity - Relation (ER) Model Diagram	7
4.2 Relational Schema	8
4.3 Normalization	8
4.4 Schema Description and Data Formats	9
References	10

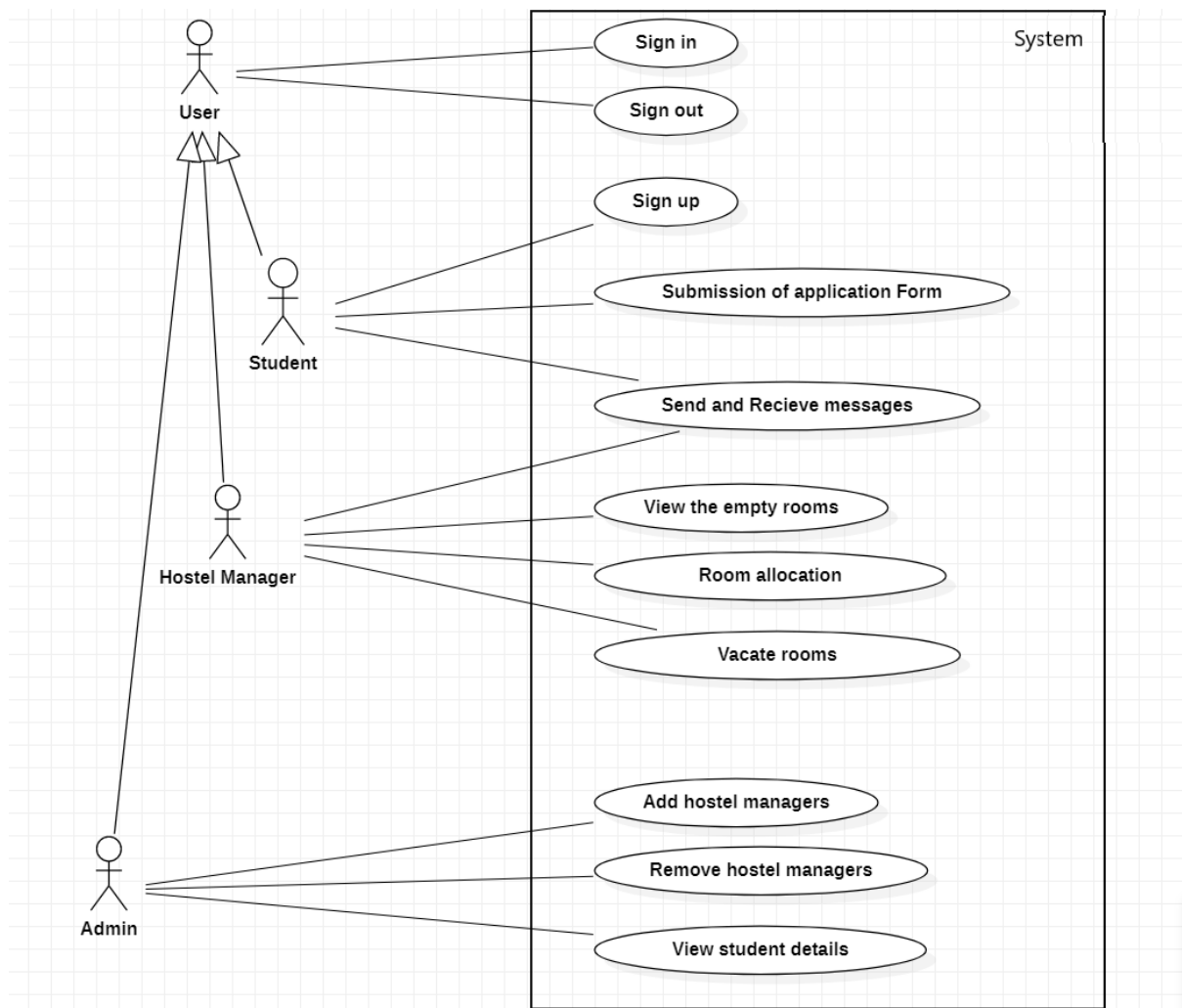
1. Purpose

1.1 Document Objectives

The Database Design Document has the following objectives:

- To provide a description of the design of a system fully enough to allow for software development to proceed with an understanding of what is to be built and how it is expected to build.
- To describe the design of a database, that is, a collection of related data stored in one or more computerized files that can be accessed by users or computer developers via a DBMS.
- To deal with Hostel Management System in an easy and efficient manner.

1.2 Responsibilities - Usecase Diagram



1.3 Intended Audience

This document is intended for the following audiences:

- Technical reviewers, who must evaluate the quality of this document.
- Designers, whose design must meet the requirements specified in this document.
- Developers, whose software must implement the requirements specified in this document.
- Quality Assurance personnel, whose test cases must validate the requirements specified in this document.

2. Assumptions and Constraints

2.1 Assumptions

The following are the assumptions made while developing this product:

- Only the admin has permission to add or remove hostel managers.
- Only hostel managers have access to allocate rooms for students.
- Students can only message the hostel manager in case of any problem.
- Students cannot communicate with each other.

2.2 Constraints

The following constraints are employed in the system:

- Admin access is password protected.
- Hostel manager access is password protected.
- Students must belong to NITC to signup for the system.
- The student has access only to his details.
- Every user has unique login credentials.

3. Database- Wide Design Decisions

3.1 Behavior

3.1.1 Login

Users are first prompted to select whether they are accessing the system as a student, Hostel Manager, or admin. The user then logs into the system by entering their

credentials. Accordingly, they are then directed to different pages respective to their roles and varying access permission levels.

3.1.2 Student

Students can apply for the hostel by viewing the available vacancy in different hostels. He/She sends the application to the hostel manager and then waits for confirmation. The student can also message the Hostel manager in the case of any queries.

3.1.3 Hostel Manager

The hostel manager views all the requests from the students and assigns the rooms to them if there is a vacancy, if there is no vacancy in any of the hostels he rejects the requests and sends the student a message to apply for any other hostel. The hostel managers can also view all the students assigned till now to the hostel.

3.1.4 Admin

Admin can view, add, remove any of the hostel managers in the system. Admin can also view the details of students that were in the system including their allocation status to any hostel. The admin role is one that must be highly secure.

3.2 DBMS Platform

Users will interact with the system via a web application that provides a simple and intuitive interface. It is expected to work on all web browsers. The web app allows users entry to their respective landing pages after providing login credentials. Depending on the user role, the functionality extended differs.

3.3 Security Requirements

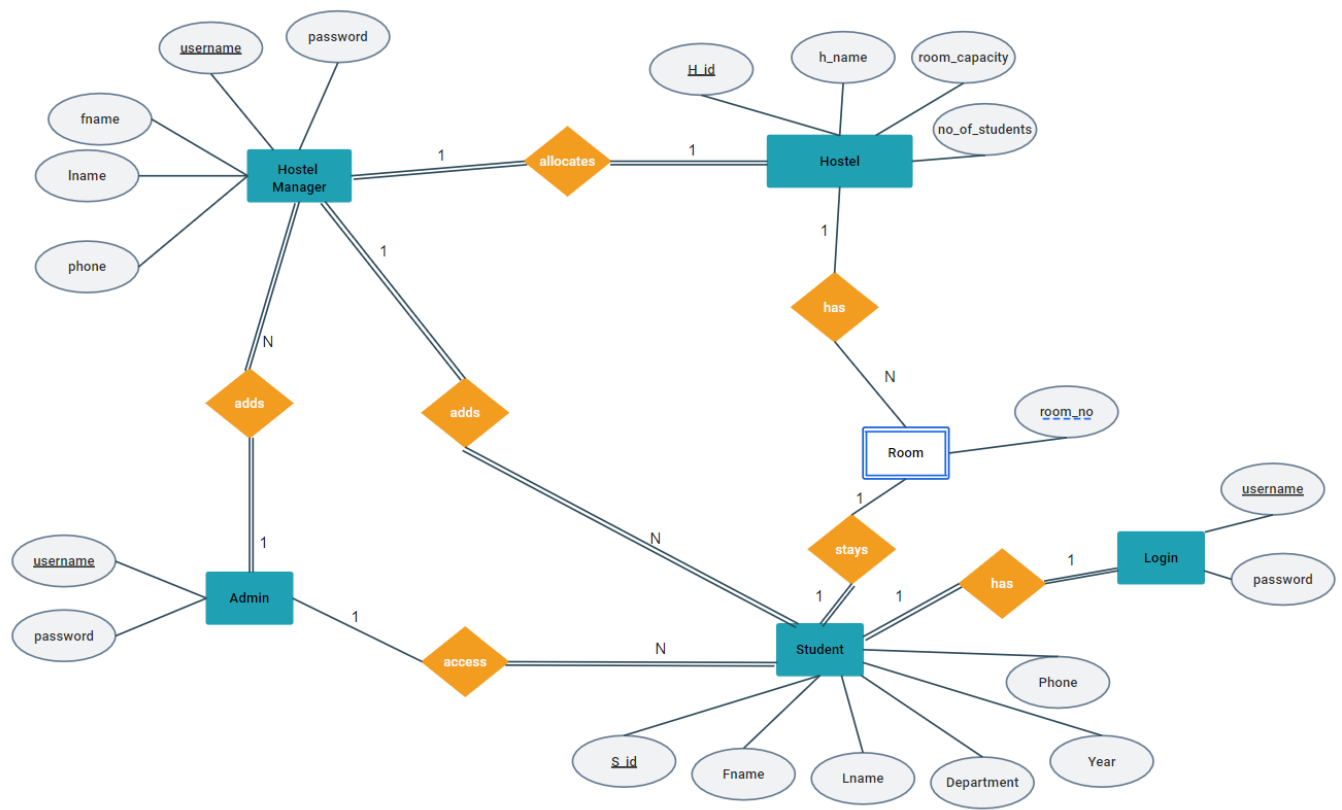
There will be proper arrangements to ensure secure access to the system and management of proper user permissions, to avoid malicious use and/or corruption of data by inappropriate access. Students will only be allowed access to view their own details, not any other student's, and may not edit or review it in any way. Hostel Managers have permission to view only the student details that they got requests from or the students that are assigned under him and cannot review the students assigned to another manager. All such methods of ensuring secure access and manipulation of data will be firmly implemented.

3.4 Performance and Availability Decisions

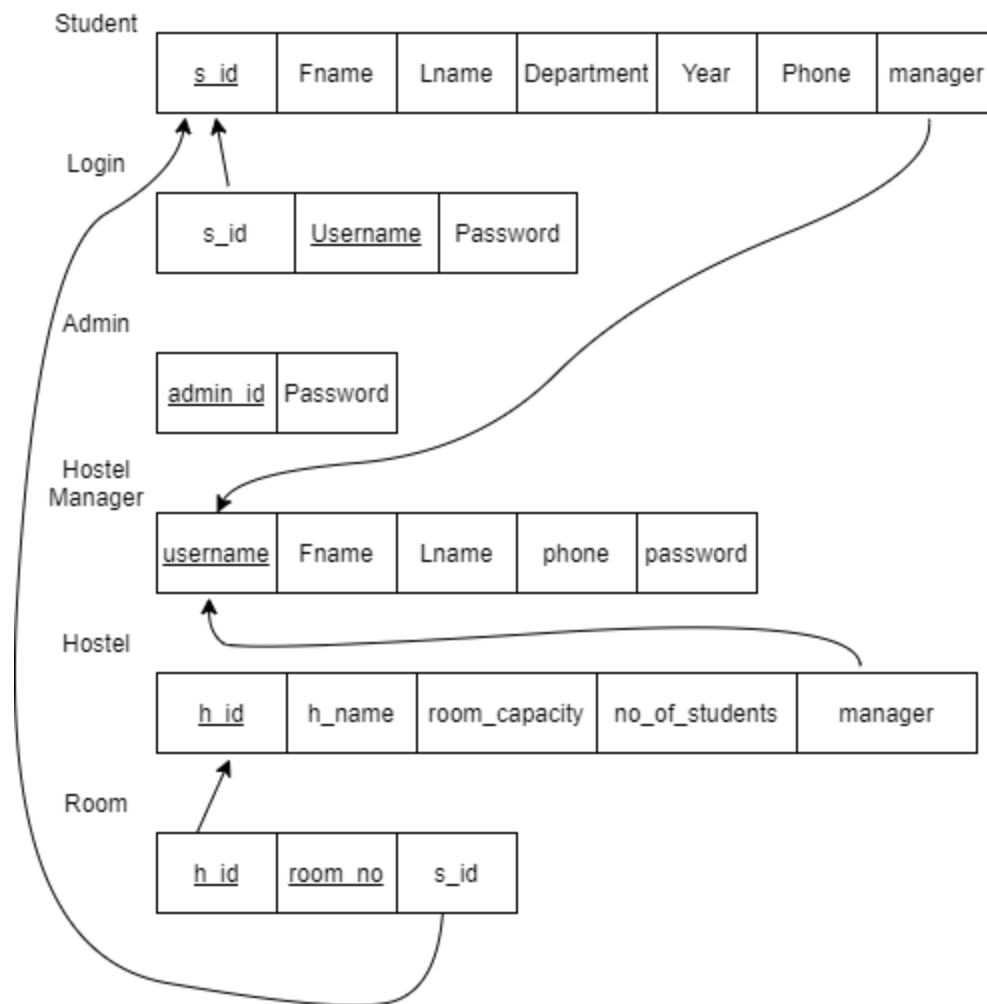
The response times of the various interfaces and capacity of the system is entirely dependent on the available memory space as well as the software's capability of performance. It mostly depends on the hardware system used and also the internet connection strength available.

4. Database Administrative Functions

4.1 Entity - Relation (ER) Model Diagram



4.2 Relational Schema



4.3 Normalization

- 1NF - The tables are in 1NF, as there are no multivalued or composite attributes. Each table cell contains atomic values, and each record is unique. Hence the database is 1NF normalized.
- 2NF - The tables are already in 1NF as proved above. There are no partial dependencies, that is, no non-prime attributes (attributes that are not part of any candidate key) are dependent on any proper subset of any candidate key of the table. Hence the database is 2NF normalized.
- 3NF - The tables are already in 2NF as proved above. There are no transitive functional dependencies in the schema. There are no nonprime keys that are dependent on another nonprime key in any specific table. Hence the database is 3NF normalized.

4.4 Schema Description and Data Formats

TABLE	ATTRIBUTE	DATA TYPE	TYPE
Student	s_id	string	primary key attribute
	fname	string	non-primary key attribute
	lname	string	non-primary key attribute
	department	string	non-primary key attribute
	year	int	non-primary key attribute
	phone	long int	non-primary key attribute
	manager	string	foreign key attribute
Login	s_id	string	foreign key attribute
	username	string	primary key attribute
	password	string	non-primary key attribute
Admin	admin_id	string	primary key attribute
	password	string	non-primary key attribute
Hostel Manager	username	string	primary key attribute
	fname	string	non-primary key attribute
	lname	string	non-primary key attribute
	phone	string	non-primary key attribute
	password	string	non-primary key attribute

Hostel	h_id	string	primary key attribute
	h_name	string	non-primary key attribute
	room_capacity	int	non-primary key attribute
	no_of_students	int	non-primary key attribute
	manager	string	foreign key attribute
Rooms	h_id	string	composite primary key attribute
	room_no	int	composite primary key attribute
	s_id	string	foreign key attribute

References

- <http://www.sdclforms.com/PopupForm-DatabaseDesignDocument.html>
- <https://app.diagrams.net/>
- <https://fadicool007.blogspot.com/p/project.html>