
Database Design Document

for

Online Extra Class Scheduling for NITC

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1 Purpose

This Database Design Document for the application Online extra class scheduling for NITC establishes a target database management system identified from the analysis of the requirements of the software system maintaining data consistency and integrity. The Entity-Relational model thus created analyzing the use case diagram is converted to a relational schema of the target Database Management System (DBMS).

1.1 Document Objectives

The Database Design Document has the following objectives:

1. To build a Database management system that allows professors to book slots for extra online classes. The extra class can be scheduled for a slot within the next seven days based on the availability of the batch and the professor.
2. To provide a fundamental approach for implementing the database and related software units, thus aiding in extracting details necessary for the software development of the application.

1.2 Intended Audience and Document Overview

This document is intended to serve several groups of audience members like:

- Clients (students and professors) can view their timetables.
- Admin of the server updates the timetable every single day.
- Professors can book the free slots.

The next section of the document, Assumptions and Constraints gives an overview about the suppositions taken care of and the restrictions imposed for developing the product. The second section Database wide design focuses on describing the behaviour of the system laying importance to the major roles/actions along with the details of the DBMS platform, security requirements, performance and availability decisions. The fourth section, Database Administrative Functions provides the Entity Relationship Model created, the relational schema formed out from the ER diagram with the normalization and data formats details.

1.3 Definitions, Acronyms and Abbreviations

S. No	Abbreviation/Term	Definition(s)
1	ISBN	International Standard Book Number
2	SRS	Software Requirements Specifications
3	NITC	National Institute of Technology, Calicut
4	OECMS	Online Extra Class Management System

Database Design Document: Online Extra Class Scheduling

5	User	A student or professor of NITC
6	Admin	Super Admin of the system
7	Database	Stores the details of the users and the slots available and booked for online extra class
8	DBMS	Database Management System
9	1NF	First Normal Form
10	2NF	Second Normal Form
11	3NF	Third Normal Form

1.4 References

- <http://www.sdldforms.com/PopupForm-DatabaseDesignDocument.html>
- <https://app.diagrams.net/>
- <https://creatly.com/>
- Fundamentals of Database Systems by Ramez Elmasri

2 Assumptions and Constraints

2.1 Assumptions

The following are the assumptions made while developing this product:

- All students of a particular batch have the same courses.
- All slots for extra class are assumed to initially be empty.
- Professors can only update the empty slots.
- The data of all the students, professors, available and booked slots must be stored in a database.
- The system must have storage capacity and render fast access to the database
- The system will be available at all times
- The users know English as the interface will be entirely in English
- The admins are aware of the basic functioning of the system
- The database must be updated daily.
- Since the application is web-based, there is a need for an internet browser. It will be assumed that users will possess decent internet connectivity.
- It is also assumed that the user is familiar with an internet browser and handling the keyboard and mouse.

2.2 Constraints

The following design and implementation constraints are employed in the system:

- An admin version of the app needs to be always active on the college servers to update the timetables every single day.
- Each professor has an individual ID and password.
- Users can view the extra slot timetable
- The software is designed, delivered and maintained to the client by this team.

3 Database- Wide Design Decisions

3.1 Behaviour

3.1.1 Login

The user can login either as student or as professor. The application detects their roles and they are directed to different login pages according to their roles. The student can enter Roll No, branch and batch and log in to the application. The professor can enter Professor ID and password to log in to the application

3.1.2 Student

Students, after logging into the system are presented with the following options:

- View timetable
- Retrieve class link

3.1.3 Professor

Professor, once signed in, is presented with the following options:

- View timetable
- Retrieve class link
- Schedule extra class
- Deschedule extra class

3.2 DBMS Platform

OECMS is a web application that provides the user with a clear and interactive experience. The design is simple, and all the interfaces follow a standard template. The web application is expected to work on web browsers. The application allows users to log into the system with corresponding credentials and is directed to different pages according to their roles. The functionalities extended to different users differ in accordance with their roles.

3.3 Security Requirements

The system will store all the data in a secure database. The students will be able to view information but will not have the privilege to modify/edit it. This privilege will be given to the professor, and only they have the right to update the database. These are the two different types of accessors and have varying access constraints.

In terms of the safety aspect, the system does not pose a threat to its users. To combat attacks by malware, backing up the database is advised.

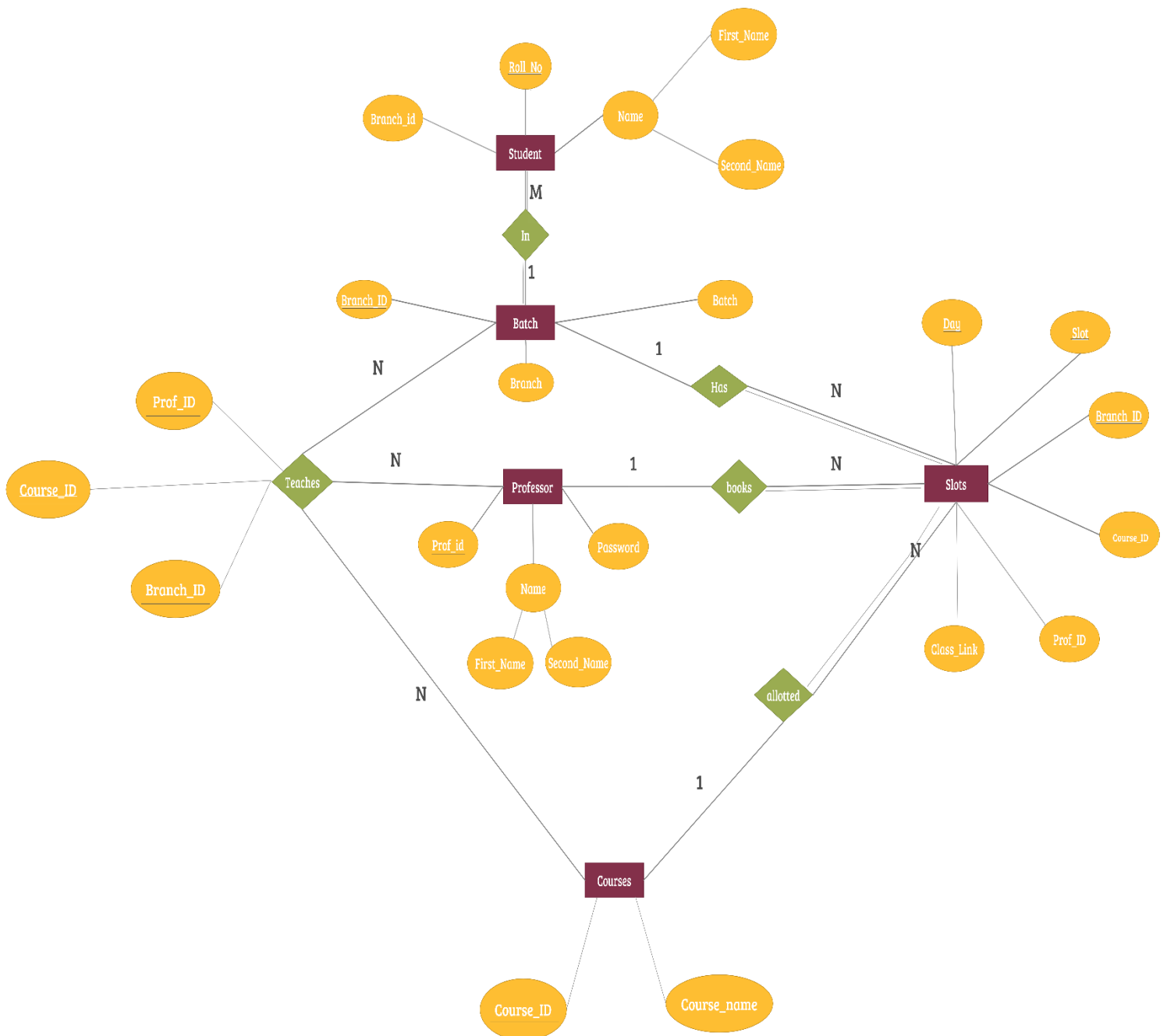
3.4 Performance and Availability Decisions

The search retrievals depend upon the updates made to the system. This system is designed to interact with students and professors across the campus.

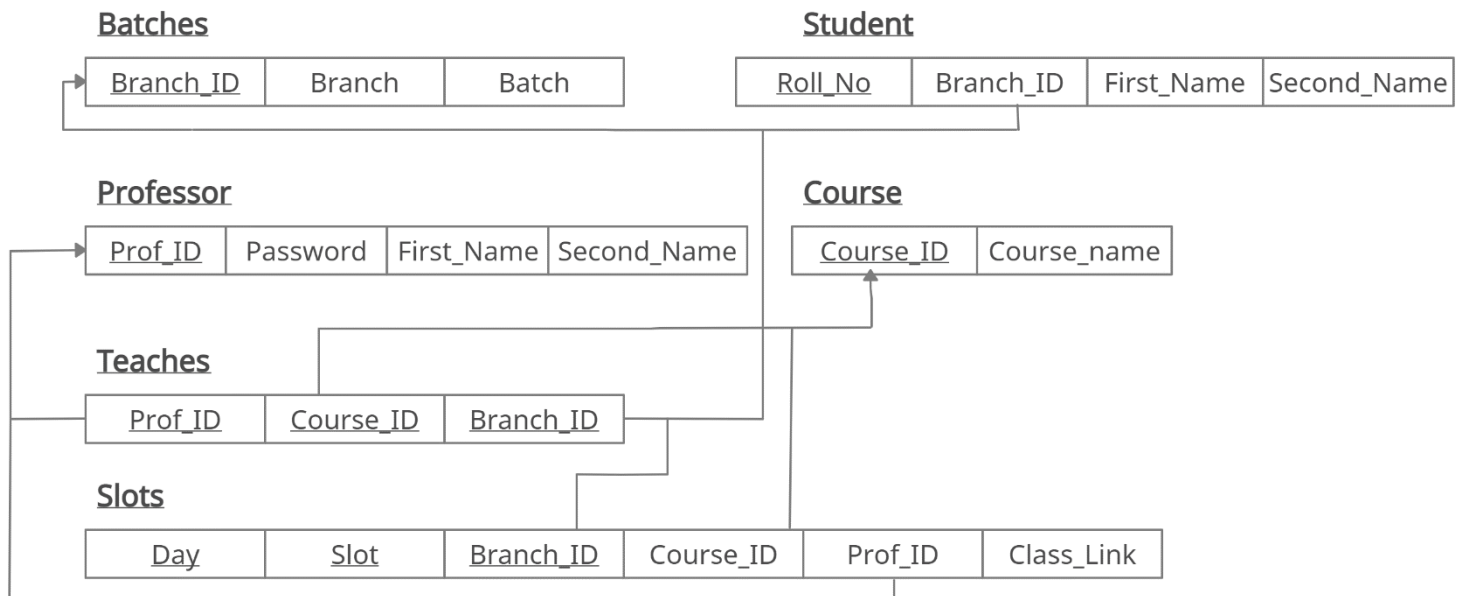
The system will respond to the user in less than a second of submitting a request. Overall, the performance will be fast and accurate. The system will be capable of handling a large amount of data and hence accommodate high no of batches, student and professor details, user credentials, etc.

4 Database Administrative Functions

4.1 Entity-Relation Model



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, there are no non-prime keys solely dependent on only one part of a primary key in any of the tables. 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 non-prime keys that are dependent on another non-prime key in any specific table. Hence the database is 3NF normalized.

4.4 Schema Description & Data Formats

