
Hall Management System

Group 12 - CS315 Project Report

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ABSTRACT

Most of the halls in IIT Kanpur don't have an integrated system to manage all the hall activities regarding the students, HEC, mess, canteen, xerox/stationary shop and the main hall office. Thus, each of the bodies have to work independently and therefore the whole management is not overseen properly. Thus, we have created a working model of Hall Management System which takes all these problems into account and oversees each and every of the hall related activities with the Hall Office having the admin rights to all of it.

PROBLEM STATEMENT

The problem statement formulated for this project is as follows: Generate a Hall Management System that controls all the hall related activities (**HEC elections, Guest Room Booking, Mess, Canteen and Shop Bills. Hall Student Search, User Login, Feedback Form and a dedicated Announcements Portal**).

RESOURCES

We have used the student data from the IITK Database and have scraped it from the link https://oa.cc.iitk.ac.in/Oa/Jsp/OAServices/IITk_SrchRes_new.jsp.

APPROACH

We are using sqlite3 databases to store the data and are using python3 along with the Django to provide the interface for the frontend and the backend. The Entity-Relation Model used in our framework is given below.

Key to the ER diagram:

- The green boxes each represent an entity set (each of which has a different table in the database).
 - The title of the box (in dark green background) each represents the name of that entity set.
- The attributes of each entity set and the attribute types are all given inside the boxes that represent that entity set.
 - The bold attributes are the primary keys of that entity set.
 - The keys which have ForeignKey(*attribute_name*) written as their character type are foreign keys.
- The black lines represent the relation between the entity sets that it connects.
 - The title of the relation is given in the text near the line representing that relation.
 - The little black circle (•) at the end of the black line represents that the relation is many-to-many from that side. That means, circle on both sides of black lines (•—•) means that the relation is many-to-many, circle on one side of black line (•— or —•) means that the relation is many-to-one or one-to-many depending on the position of the black circle and a line without circles (—) means that the relation is one-to-one.

Figure 1: The Entity Relation Diagram

The approach can be further divide into following subsections:

1. HEC Elections

The Elections takes place in various phases:

1. **Nomination Phase:** As the elections come closer, an announcement is made on the Announcement Portal and a separate e-mail is sent out to the students. It comes out with the a Nomination Form and a batch filter in it, so that students of only a specific batch can apply for the posts offered. Then the students (of that particular batch) can choose to fill the Nomination Form which also has an text entry for the Manifesto. The Election Commission receives all the nominations and chooses to accept or decline the nominations according to the student and their manifesto. Once, all the nominations are filtered and finalized, the election moves into another phase.

A point to note here is that the EC (Election Commission) plays a crucial part in all the phases of the elections as it has the rights to change the election phases. But the EC is itself a post which has a post user and a post holder (multiple people can have the powers of the EC).
2. **Campaign Phase:** Now, the students know about the selected candidates and can hear/read all their manifestos and the candidates can spread their propaganda. Then, when the election day comes, the process moves into another stage.
3. **Voting Phase:** On the election day, the Election Commission decides whether the election is to be held online or offline. The Offline election is basically the classic voting system but the online voting system is much more flexible and it is made sure that each voter can cast only 1 vote per post for the candidates or they can opt for NOTA. After the voting deadline, the election moves into Mid Phase.
4. **Mid Phase:** This phase is a special phase dedicated to allocate some time to the Election Commission to take the election from the Voting Phase to the Result Phase.
5. **Result Phase:** This is the phase in which the Election Commission announces the results of the election based on the votes. And the warden assigns selected candidates to their respective posts to start their tenure and their names recorded in the post history table.
6. **End Phase:** This is the last phase in which the Election Commission takes the election off the portal.

2. Billing

This is integrated many to many billing system in which certain users (like the mess, canteen, hall office, general shop, barber etc.) in the database can be identified as billers by the web admin/warden. Then that users (called billers) would have access to add bills corresponding to

other users with particular amounts. Also, the students can request for mess reimbursement which will automatically add to their transaction with the mess. As the billers add transactions corresponding to a user (say s), then when s logs in his/her account, he/she will see the bill against his/her name with the corresponding biller name and the amount. And when s pays the corresponding bill, the biller can add another transaction w.r.t s with $((\text{amount of money that } s \text{ paid}) \times (-1))$ amount and the entry is recorded in the database to record the payment and total bill reduces to $((\text{original amount} - \text{amount that } s \text{ paid}))$.

3. Guest Room Booking

This feature takes care of the 4 guest rooms that the hall offers for visitors. The user (say s) can make a request for the number of days that s wants to book a guest room for. And in the screen that follows, s can choose from the available rooms for those days and can request for any available room on each of the days. And then, the Hall Office can review those requests (in the Booking Requests section) and can approve those requests. And then when any other user (say k) tries to view those rooms on those particular dates, then k cannot request that room on that day (but can choose any other available room on that day). Also, depending on the number of days that s has booked the room for, a transaction bill with the corresponding amount of money will automatically be added to against s .

4. Hall Student Search

This feature basically allows the students residing in the hall to search for other students and their details. They can also filter their choices according to username, name, roll number, branch, program, room number etc.

At the beginning of a new semester, the students change their rooms and that data can be updated by the Hall Office as they have a feature change the room of students on their dashboard. They also have a Booking Requests section where they can review the various guest room booking requests made by the users.

5. Form Module

There is also an option for the users to create and circulate dynamic forms (like Google Forms) which allows users to generate questionnaires consisting various questions. The users can specify the question type like CharField, TextField, ChoiceField, MultipleChoiceField, etc. Requirements can also be mentioned like whether the question is compulsory or not. The form also has various options like collecting the Identity of the user filling it or allow them to fill anonymously. And these forms can be circulated using one of two sharing links provided (one is the non-editable link which allows users to only fill the form and other link is editable which allows the users to edit the form) and putting the obtained link in the announcement section along with a proper description so that others can understand the form and fill it accordingly. The same form Generation Module is also used by Election module to generate nomination forms.

6. Announcement

This feature basically allows the Hall Administration i.e Posts to announce important information like Mess survey and Fee submission Deadline, Minutes of HEC meeting, etc. The Posts can also circulate any form made by form module here.

7. Post and Post History

All special identity of Hall management has a Post. A post has a special id linked with it. We have allowed to assign multiple users to a post. The assigning power resides with warden and web administrator. We also keep Post History of each post i.e the start and end date of tenure of each Post Holder.

TOOLS AND SOFTWARES USED

We have used various python3 libraries for our project. One of them forms the very framework backend - **Django**. We have also used various Django tools to make the setup connections between various pages simple to use.

The database on which our project is based is **sqlite3**.

Also, to produce the ER diagram, we have used the **graphviz** library.

CHALLENGES ENCOUNTERED

Adding the Election routine in many phases was particularly challenging as we had to keep a lot of things in mind while doing that.

Also we made the dynamic forms for Student Survey and Nomination Forms from scratch. And generating the forms dynamically in django and then allowing other users to edit the same form was particularly challenging and time consuming.

FUTURE WORKS

The major update that will be done is to deploy the server permanently and use it in our halls. Also, another update can be to link the billing system with online merchants and banks like SBI etc (just like in pingala).

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