Hall Seat Management System

Course Title: Software Engineering Lab

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Group - 04

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1.Abstract:

As the name specifies "HALL SEAT MANAGEMENT SYSTEM" is a software developed for managing of seat allocation activities in the hall. For the past few years the number of educational institutions are increasing rapidly. Thereby the number of halls are also increasing for the accommodation of the students studying in this institution. And hence there is a lot of strain on the person who are running the hall and software's are not usually used in this context. This particular project deals with the problems on managing a hall and avoids the problems which occur when carried manually.

2. Introduction:

2.1 Overview of the Project

We have got seventeen halls in our university, which consist of eleven boy's hall and six girl's hostel. All these halls at present are managed manually by the hall office. The Registration form verification to the different data processing are done manually.

Thus there are a lot of repetitions which can be easily avoided. And hence there is a lot of strain on the person who are running the hall and software's are not usually used in this context. This particular project deals with the problems on managing a hostel and avoids the problems which occur when carried manually.

Identification of the drawbacks of the existing system leads to the designing of computerized system that will be compatible to the existing system with the system. Which is more user friendly. We can improve the efficiency of the system, thus overcome the drawbacks of the existing system.

- Less human error
- Strength and strain of manual labour can be reduced
- High security
- Data redundancy can be avoided to some extent
- Data consistency
- Easy to handle
- Easy data updating
- Easy record keeping
- Backup data can be easily generater

2.2   Problem Definition

2.2.1 Registration Form:

This section provides an online form to the students which can be filled by them, and a copy of the filled page can be taken in the printed form. This is later submitted to the Hall authorities which can be verified by them before aloting them to the halls.

2.2.2 Notice Board:

All the 17 halls have their Notice boards. Any change in the fee will be shown in this. It can be also used for different notifications.

Administrator Login

The Administrator can:

1. Allot different students to the different hostels.

2. Vacate the students for the hostels.

3. Control the status of the fee payment.

4. Edit the details of the students & modify the student records.

2.2.3 Allotment of the halls:

Their will be pre-defined criteria for the admission to the hostels. He checks the attested application forms of the students obtained from the internet and verify it with the student database. If the students are found eligible then they are allotted to the hostel. Vacating the rooms: As the student's course is over they will vacate their rooms. So it is required for the administrator to remove their records from the database tables. This section includes the option for the room vacation and the deletion of the particular record from the database.

3. Feasibility Study

The project is feasible given unlimited resources and infinite time. It is both necessary and prudent to evaluate the feasibility of the project at the earliest possible time. Feasibility and risk analysis is related in many ways. If project risk is great, the feasibility listed below is equally important.

The following feasibility techniques has been used in this project

- Operational Feasibility
- Technical Feasibility
- Economic Feasibility

3.1 Operational Feasibility

Operational feasibility examines the practicality of a proposed system in terms of daily operations and user acceptance. For a university, a Hall Seat Management System (HSMS) is designed to streamline the allocation and management of seats in lecture halls, exam halls, and other multi-purpose venues.

- **Alignment with University Objectives**
- **User-Friendly Interface**
- **Integration with Existing Systems**
- **Training and Support**
- **Scalability**
- **Cost-Benefit Analysis**
- **Risk Management**
- **Impact on Staff and Processes**

After analyzing the whole circumstances, we can assure that our product is operationally feasible.

3.2 Technical Feasibility

Technical feasibility centers on the existing computer system (hardware, software, etc.) and to what extent it can support the proposed addition. For example, if the current computer is operating at 80% capacity. This involves, additional hardware (RAM and PROCESSOR) will increase the speed of the process.

The technical requirement for this project are Windows Operating System as software and normal hardware configuration is enough, so the system is more feasible on this criteria.

3.3 Economic Feasibility

Economic feasibility is the most frequently used method for evaluating the effectiveness of a candidate system. More commonly known as cost / benefit analysis, the procedure is to determine the benefits and saving that are expected from a candidate and compare them with the costs. If the benefits outweigh cost then the decision is made to design and implement the system. Otherwise drop the system.

Assessing the economic feasibility of a hall seating management system involves several key considerations. This analysis will typically cover the costs, potential savings, and benefits to determine if the investment is worthwhile. Here's a structured approach to evaluate the economic feasibility:

1. Initial Costs

a. Software Costs

- Licensing Fees: 20,000 taka.

- Development Costs: 500,000 taka.

- Customization: 25,000 taka.

b. Hardware Costs

- Servers: For hosting the system, we need server. For that we need 50,000 taka.

- Devices: Tablets, PCs, or kiosks for staff and customer interfaces.

- Networking: For networking we need around 20,000 taka.

c. Training Costs

- Staff Training: Training staff to use the new system effectively, we need 10,000 taka.

- Documentation and Support: Creating manuals and support documentation, we need 3000 taka.

2. Operational Costs

a. Maintenance

- Software Updates: Ongoing costs for updates and upgrades, we need annually 50,000 taka only.

- Hardware Maintenance: Regular upkeep of physical devices, we need 10,000 taka each year. The cost will be more according to our requirement.

b. Support

- Technical Support: For technical support we need 10,000 taka only annually.

-Customer Support: Additional support staff for handling customer queries related to the system, we need 30,000 taka per month.

3. Potential Savings and Revenue

a. Improved Efficiency

-Time Savings: Reduced time in managing and updating seating arrangements.

-Reduced Errors: Fewer errors in booking and seat allocation, leading to better customer satisfaction.

b. Increased Revenue

-Optimized Seating:Better management could lead to selling more premium seats.

-Dynamic Pricing: Ability to implement dynamic pricing models based on demand.

c. Cost Reductions

- Paperless Operations: Savings from reduced need for paper tickets and printed materials.

- Staff Reduction: Possible reduction in the number of staff needed for manual seating management.

4. Intangible Benefits

- Customer Satisfaction: Improved customer experience through easy booking and check-in processes.

- Brand Image: A modern, efficient system can enhance the halls image.

- Scalability: The ability to easily scale operations as the business grows.

5. Break-even Analysis

Calculate the break-even point by comparing the total costs against the total benefits over a period. This includes:

- Payback Period: The initial cost will be recover in between 1.5 to 2 years.

- Net Present Value (NPV): The NPV will be 1,000,000.

- Return on Investment (ROI): The ROI will be 25%

6. Risk Assessment

Identify potential risks such as:

-Technical Failures: Risks associated with system downtimes.

-User Adoption: Resistance from staff or customers in adopting the new system.

- Cost Overruns: Risk of actual costs exceeding initial estimates

By conducting a thorough cost-benefit analysis, considering both quantitative and qualitative factors, you can determine the economic feasibility of implementing a hall seating management system. This comprehensive assessment will help in making an informed decision, ensuring that the investment aligns with the business's financial and operational goals.

Initial cost table

Name of expense	Cost(taka)
Domain & hosting	25,000
Development cost	200,000
Accessories	50,000
Networking	20,000
Staff training	10,000
Documentation	3,000
Total: 308000 taka only	

Maintenance cost

Name of expense	Cost(taka)
Domain & hosting	30,000
Networking	10000
Software update	18000
Technical support	12000
Repair cost	On demand
Total: 70000 taka only	

3.4 Resource Feasibility

Resources that are required for this project include,

● Programming device (Laptop)

● Hosting space

● Domain

● Programming tools (freely available)

● Programming individuals

From these, it's clear that the project "Hall Seat Management System" is feasible in terms of resources.

4. Software Requirement and Specifications

This Software Requirement and Specifications(SRS) document outlines the requirements for a Student Hall Seat Management System (SHSMS) designed to automate the process of assigning seating arrangements within designated halls for various student activities. The system aims to improve efficiency, transparency, and fairness in seat allocation.

4.1 Functional Requirements:

4.1.1 User Categories

The system will accommodate three primary user categories:

    A. Student
    B. Admin (Provost)

4.1.1.A. Student

R1. Student Registration

Description: This feature enables new students to create an account in the system.

Input:

- Name: Full legal name of the student.
- Password: Secure password (minimum 8 characters, including uppercase, lowercase, number, and special character).
- Email (Gmail): Unique email address.

Output:

- Verification Email: Sent to the provided email address.
- Account Activation: Upon email verification, the student's account is activated and a confirmation message is displayed.

R2. Login

Description: Allows registered students to access their accounts.

Input:

- Email (Gmail)/Username: The email address/username used during registration.
- Password: The secure password.

Output:

- Dashboard Access: Upon successful authentication, the student is redirected to their dashboard.
- Error Message: Displayed if the email or password is incorrect.

R3. Profile

Description: Students can view and update their personal and academic information.

Input:

- **Profile Information:**
  o Name
  o Profile picture
  o Father's Name
  o Mother's Name
  o Guardians Occupation
  o ID
  o Session
  o Year
  o Department
  o Hall Status
  o Room Number
  o HSC GPA
  o SSC GPA
  o CGPA

Output:

- Updated Profile: Changes are saved and updated in the system.
- Profile View: Displays the current profile information.

R4. Apply for Seat

Description: Enables students to apply for accommodation in the hall.

Input:

- Application Form: Includes personal details, academic information, and preferences.

Output:

- Application Submission: Confirmation message upon successful submission.
- Application Status: Students can track the status of their application.

R5. Pay Bill

Description: Facilitates the payment of hall fees via a secure online transaction system i.e SSLCOMMERZ .

Input:

- Payment Details: Includes fee amount, payment method, and card/bank details.

Output:

- Payment Confirmation: Receipt and confirmation message upon successful payment.
- Transaction History: Updated transaction history in the student's account.

4.1.1.B Admin (Provost)

R1. Login

Description: Allows provost and staff members to access the system for management tasks.

Input:

- Email (Gmail)/Username: Official email address/username.
- Password: Secure password.

Output:

- Management Dashboard Access: Upon successful authentication, the staff member is redirected to the management dashboard.
- Error Message: Displayed if the email or password is incorrect.
- Additional Functions

R2. Student List

Description: View and manage the list of registered students.

Input:

- Filters/Search Criteria: For sorting and searching student records.

Output:

- Student List: Displayed list of students with detailed information.
- Updated Records: Changes saved after updating student details.

R3. Room Details

Description: Access and update room allocation details.

Input:

- Room Information: Room number, occupancy status, assigned student.

Output:

- Room Allocation Updates: Updated room details.
- Room Occupancy Status: Displayed status of each room.

R4. CRUD Operations

Description: Provost can perform Create, Read, Update, and Delete operations on various system entities.

Entities: User Accounts, Student Info, Seat Allocations

Input:

- CRUD Details: Relevant data for creating, reading, updating, or deleting records.

Output:

- CRUD Confirmation: Confirmation messages for successful operations.
- Updated Data: Changes reflected in the system.

R5. Seat-Allocation (CRUD)

Description: Provost can manage seat allocations by performing CRUD operations.

Input:

- Seat Details: Information required for CRUD operations on seat allocations.

Output:

- Seat Allocation Updates: Confirmation of changes.
- Seat Data Display: Current seat allocation information.

R6. Seat Allocation Notice

Description: Provost can issue notices regarding seat allocations to students.

Input:

- Notice Content: Detailed content of the notice.
- Recipient List: List of students to receive the notice.

Output:

- Notice Delivery: Confirmation of notice sent.
- Notification to Students: Students receive the notice in their accounts and via email.

This document provides a detailed requirements analysis and specifications for the Student Hall Seat Management System, including the description, input, and output for each requirement, ensuring clarity and completeness for the system's design and implementation.

4.2. Non Functional Requirements:

4.2.1 User Interfaces

The "Hall Seat Management System" will have a web-based and application-based user interface that is minimal and user-friendly. The interface shall be accessible on desktop and mobile devices.

4.2.2 Scalability

This system is highly scalable, able to reshape it for full hall management system with acceptable high speed and with its previous function unchangeable. It is also able to maintain the pick load of the system and work correctly by its predefined procedure.

4.2.3. Performance

Response Time: The system should respond to user queries (e.g., seat availability) within a acceptable time frame.

Throughput: The system should support multiple concurrent users without performance degradation.

4.2.4 Reliability

Availability: The system should have an uptime of 99.9% to ensure continuous availability.

Backup and Recovery: The system must implement daily backups and be able to recover data within 1 hour in the event of a failure.

4.2.5 Security

Authentication and Authorization: The system should use secure authentication mechanisms (e.g., two-factor authentication) and role-based access control.

Data Encryption: All sensitive data should be encrypted both at rest and in transit.
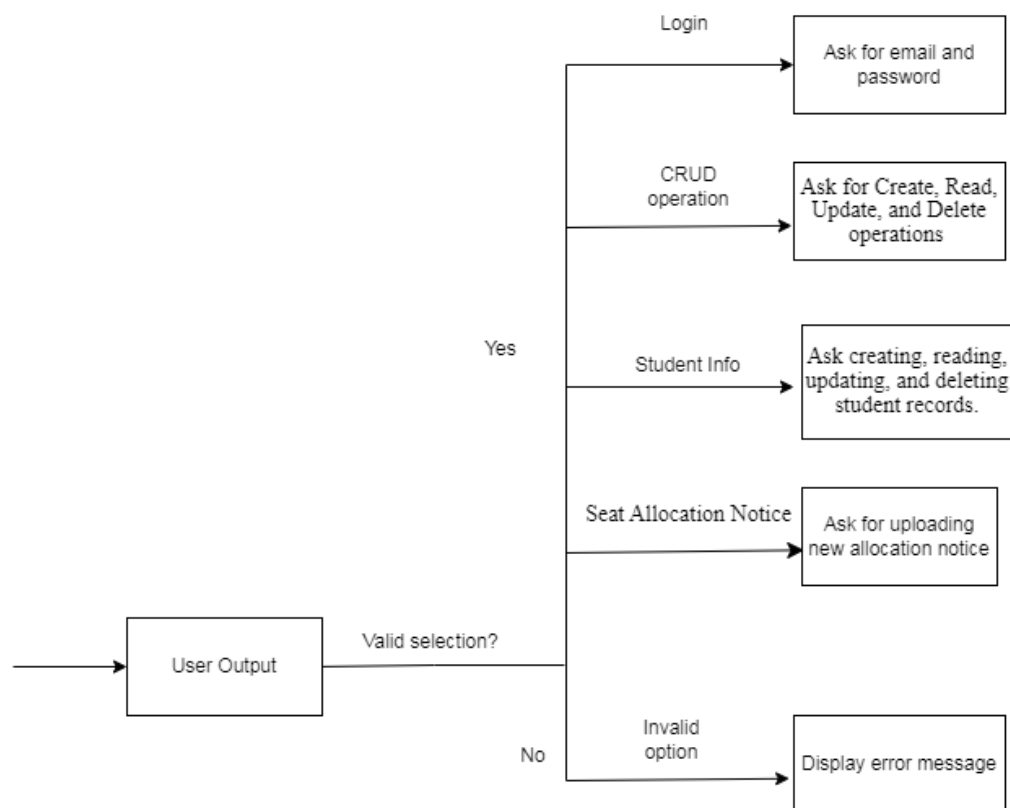
4.2.6 Portability

Deployment Environment: The system should be portable across different environments.

Interoperability: The system should be able to integrate with other existing systems and databases within the institution.
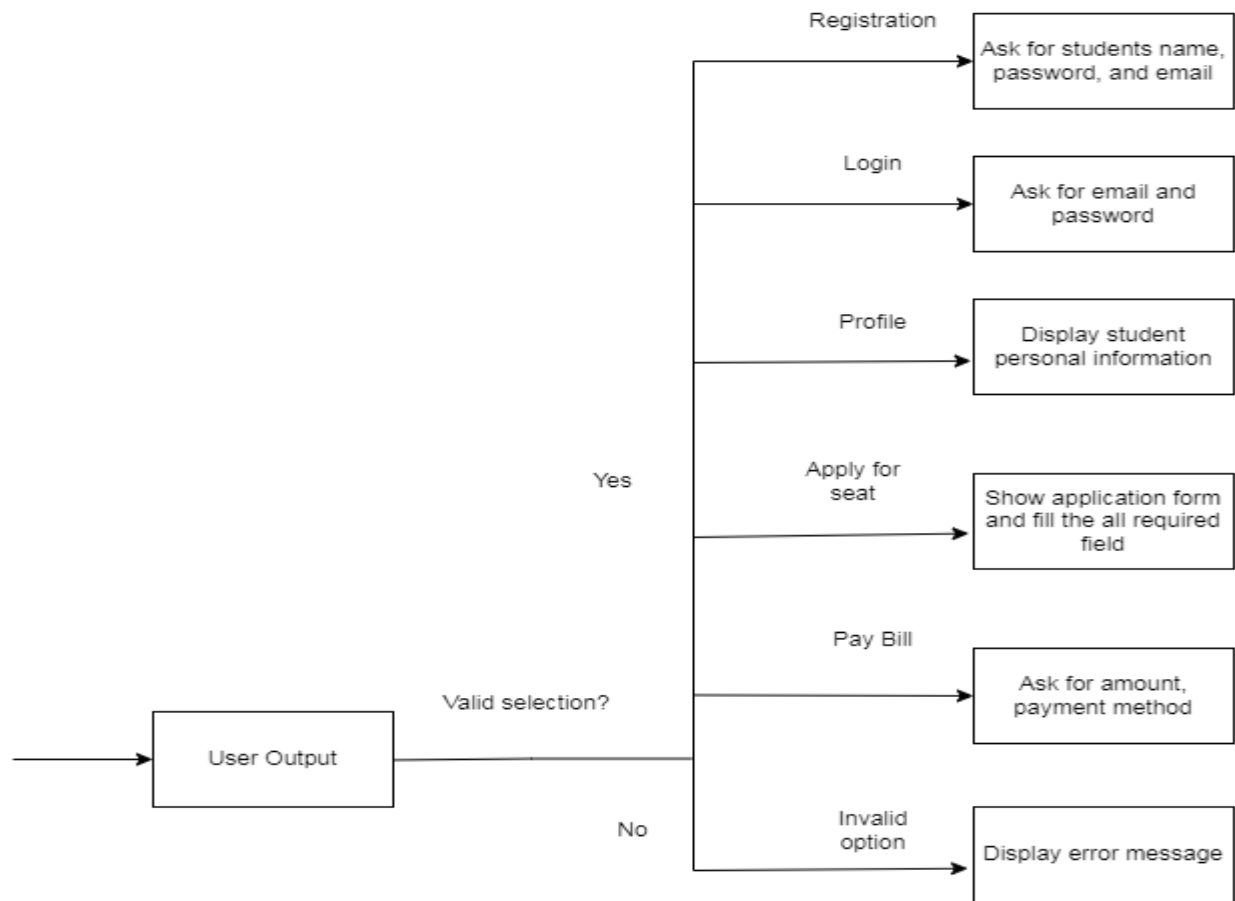
5. Decision Tree:

The decision table gives a graphic view of the processing logic involved in HSMS.

5.1 Decision Tree for Admin(Provost):

5.2 Decision tree for Student:

6. Decision Table:

6.1 Student:

Conditions:

Valid User	No	Yes	Yes	Yes	Yes	Yes
Login	-	Yes	No	No	No	No
Registration	-	No	Yes	No	No	No
Profile		No	No	Yes	No	No
Apply for seat		No	No	No	Yes	No
Pay Bill		No	No	No	No	Yes
Actions:						
Display error message	X	-	-	-		
Ask for Personal Details			X	-		
Show personal details				X		
Ask for email	-	X	X	-		
Ask for password	-	X	X	-		
Show application form					X	
Payment						X

6.2 Admin(Provost):

Condition:

Valid User	No	Yes	Yes	Yes
Login	-	Yes	No	No
Student List		No	Yes	No
Room Details		No	No	Yes
Actions:				
Display error message	X	-	-	-
Ask for email	-	X		-
Ask for password	-	X		-
Ask for query		-	X	-
Access room details		-	-	X

Condition:

Valid User	No	Yes	Yes	Yes	Yes
Login	-	Yes	No	No	No
Student Info			Yes		
CRUD Operation				Yes	
Seat Allocation Notice					Yes
Actions:					
Display error message	X	-	-	-	
Ask for email	-	X		-	
Ask for password	-	X		-	
Create, Read, Update, Delete student, staff entities				X	
Upload Notice		-	-	-	X
Update student Record		-	X	-	

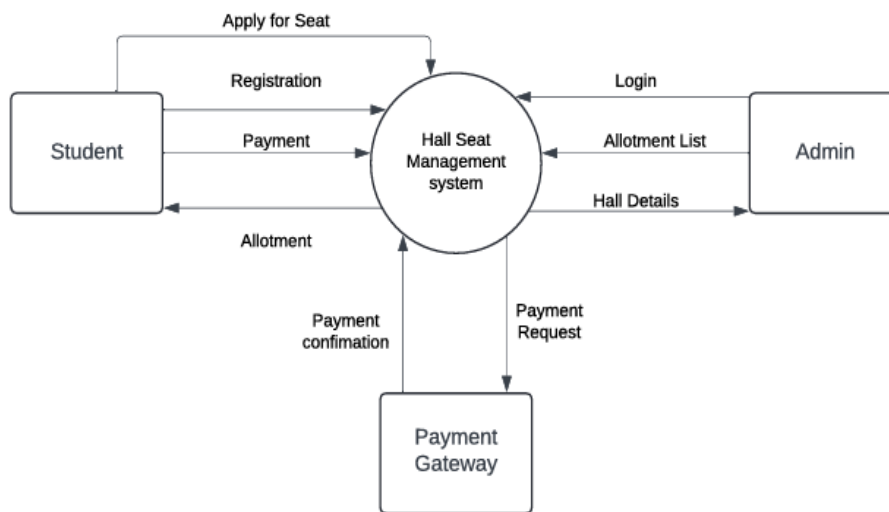# 7. Design

7.1 Data Flow Diagram
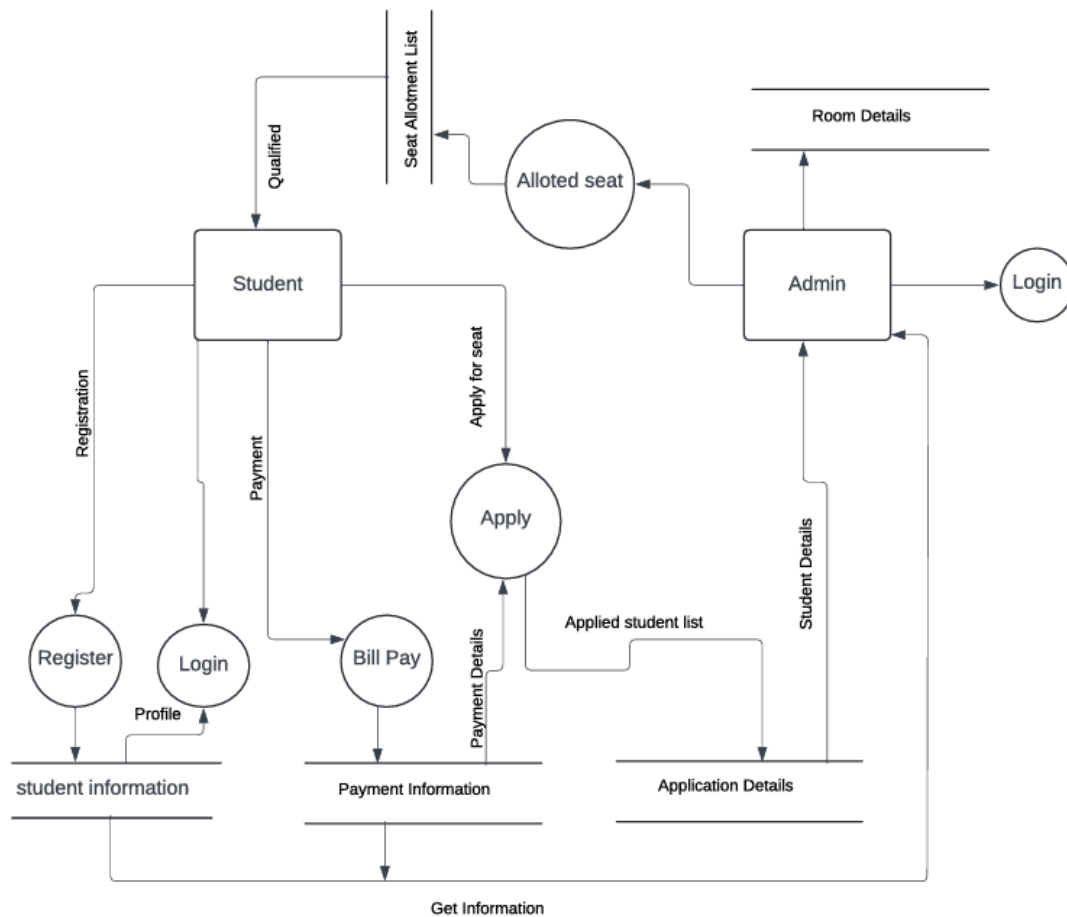

Figure-1 : Level-0 DFD
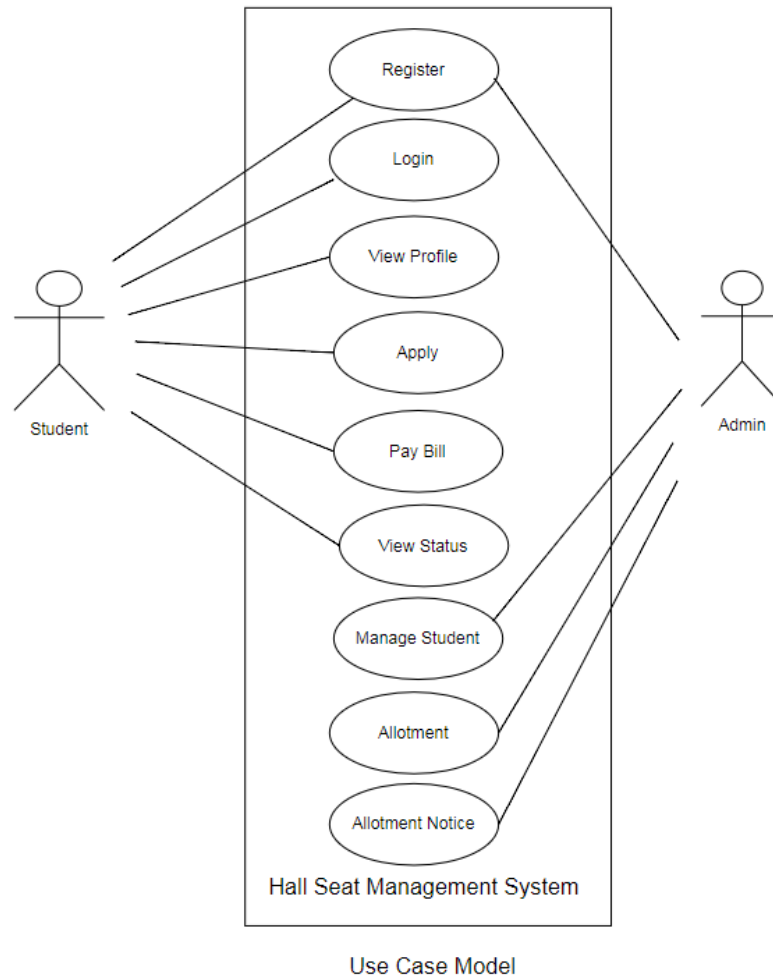
Figure -2 : Level-1 DFD

8. Use Case Model:

The use case model for the Hall Seat Management System (HSMS) identifies the primary interactions between students, administrators, and the system. Below are the identified use cases along with a textual description of each use case.

8.1 Actors:

8.1.1 Student: The main user of the system who can apply for a seat, view seat allocation, make payments, and view profile information.

8.1.2 Admin (Provost): The admin manages the seat allocation, view student applications, and handle student information.

Use Case Model

8.2 Use Case Descriptions:

U1: Register Student

Description: This use case allows a new student to register with the system by providing their details such as name, email, and other required information.

Scenario 1: Mainline sequence

Student: Select the register option from the homepage.

System: Displays a registration form prompting the student to enter necessary details such as name, email, password, and personal information.

Student: Fills out the form and submits it.

System: Sends a verification email to the student for account activation.

System: Displays a confirmation message once the student's account is successfully activated.

Scenario 2: Error in registration

System: Displays an error if the email provided is already registered or if required fields are missing.

System: Prompts the student to re-enter the correct information or use another email.

U2: Login

Description: This use case allows registered students or admins to log in to their accounts.

Scenario 1: Mainline sequence

Student/Admin: Selects the login option.

System: Prompts the user to enter the email and password.

Student/Admin: Enters the credentials and submits the form.

System: Validates the credentials and grants access to the student dashboard or admin management panel.

Scenario 2: Invalid credentials

System: Displays an error message if the email or password is incorrect.

System: Prompts the user to try again or reset the password.

U3: View Profile

Description: Allows students to view and update their personal and academic information.

Scenario 1: Mainline sequence

Student: Selects the view profile option.

System: Displays the student's personal, academic, and hall details.

Student: Updates any necessary information (e.g., profile picture, phone number).

System: Saves the updated profile and displays a success message.

U4: Apply for Seat

Description: This use case enables students to apply for a hall seat by submitting their personal and academic details.

Scenario 1: Mainline sequence

Student: Selects the apply for seat option from their dashboard.

System: Displays a seat application form requesting details such as personal info, academic record, and seat preferences.

Student: Fills out and submits the form.

System: Saves the application and displays a confirmation message.

Scenario 2: Missing information

System: Displays an error message if any required fields in the application are missing.

System: Prompts the student to fill in the missing information.

U5: Pay Bill

Description: Allows students to pay hall fees online.

Scenario 1: Mainline sequence

Student: Selects the pay bill option.

System: Displays the outstanding fee amount and payment options (e.g., credit card, SSLCOMMERZ).

Student: Enters payment details and submits.

System: Processes the payment, updates the transaction history, and displays a payment confirmation receipt.

Scenario 2: Failed payment

System: Displays an error message if the payment fails.

System: Prompts the student to retry with valid payment details.

U6: View Application Status

Description: Students can track the status of their seat application (e.g., pending, approved, rejected).

Scenario 1: Mainline sequence

Student: Selects the application status option.

System: Displays the current status of the seat application (e.g., processing, approved, or rejected).

System: Displays any relevant messages, such as the expected time for allocation or reasons for rejection.

U7: Manage Students (Admin)

Description: Admins can view, update, or remove student records.

Scenario 1: Mainline sequence

Admin: Selects the manage students option.

System: Displays a list of registered students with their details.

Admin: Filters, searches, and selects a student to update or delete.

System: Confirms the changes and updates the student record accordingly.

U8: Manage Room Allocations (Admin)

Description: Admins can assign students to specific rooms and halls based on availability.

Scenario 1: Mainline sequence

Admin: Selects the manage room allocations option.

System: Displays the list of available rooms, along with occupancy status.

Admin: Selects a room and assigns it to a student.

System: Updates the seat allocation and reflects the changes.

U9: Issue Seat Allocation Notices (Admin)

Description: Admins can issue notices regarding seat allocations to students.

Scenario 1: Mainline sequence

Admin: Selects the issue seat allocation notice option.

System: Displays a form where the admin can write the notice and select the recipient list (students).
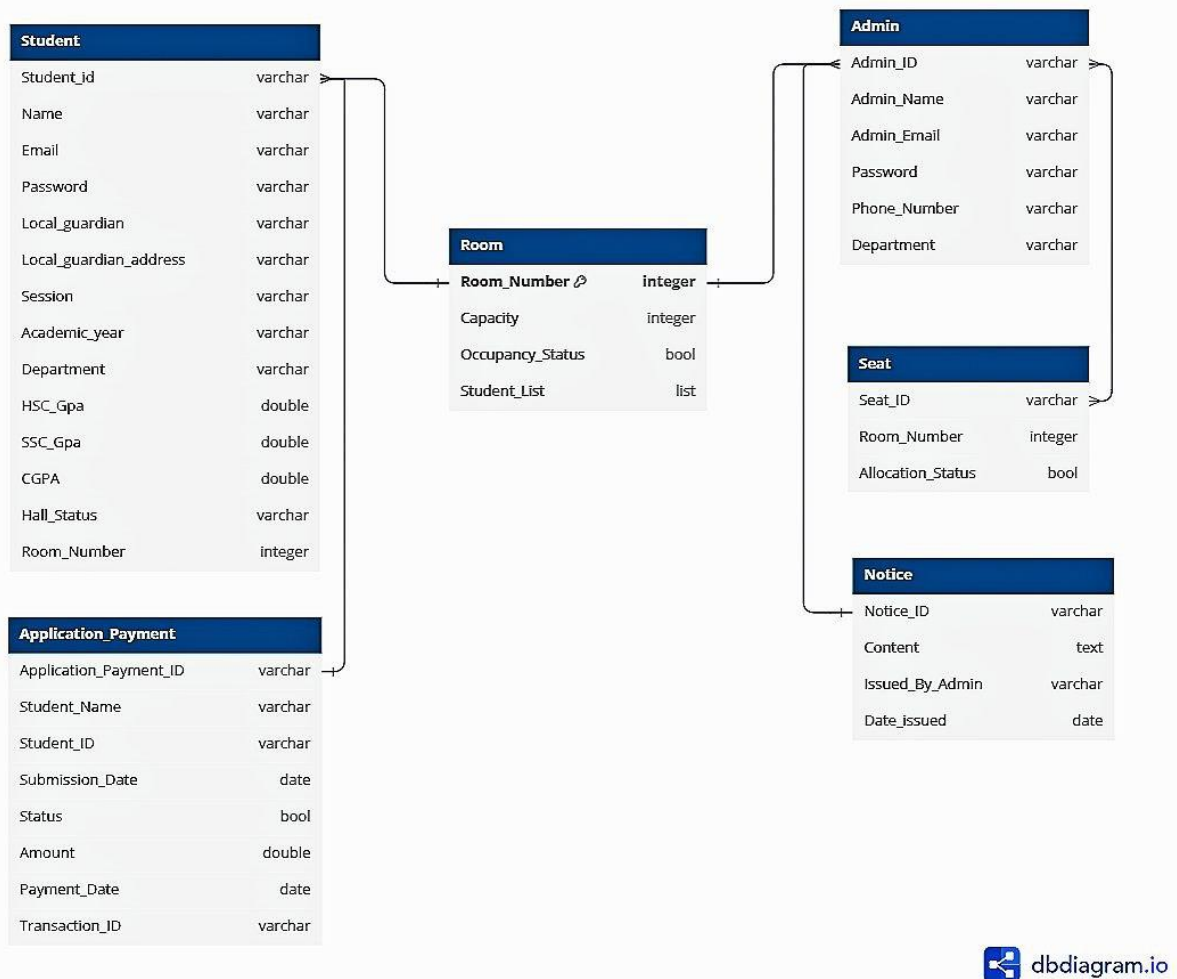
Admin: Submits the notice.

System: Sends the notice to the selected students and displays a confirmation.

Scenario 2: Failed to issue notice

System: Displays an error message if there is an issue with sending the notice.

Admin: Re-attempts to send the notice after correcting any errors.

9. Class Diagram

10. Conclusion:

The Hall Seat Management System provides efficient and user-friendly functionality for both students and administrators. The system covers the entire hall seat allocation process, from registration and application submission to seat allocation and payment. Admins manage the backend operations, including student information and room assignments, through an intuitive dashboard.