UTM UNIVERSITI TEKNOLOGI MALAYSIA | Faculty of Computing

# SECD2523 Database

## Semester 1 2024/2025

## Phase 3 – Database Logical Design & SQL

### Section 05 Group 1

### Lecturer: Dr. Izyan Izzati binti Kamsani

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## 1.0 Introduction

The objective of this database project is to facilitate the effective management of a hostel system by addressing key operational areas, including student accommodation, payment processing, and maintenance request tracking. The primary objective is to develop a scalable and well-structured database that ensures data integrity, consistency, and ease of use for both administrators and users. The present phase is concerned with translating the conceptual database model, developed earlier, into a logical design that prepares the system for implementation using SQL.

The logical design process emphasises the elimination of data redundancy and inconsistency by applying rigorous normalisation techniques. By normalizing the data to Boyce-Codd Normal Form (BCNF), the design ensures that every attribute is functionally dependent solely on the primary key, resulting in a clean and efficient table structure. This approach optimises data storage and enhances query performance, enabling fast and accurate data retrieval.

The establishment of detailed relationships and dependencies among the entities constitutes a pivotal element of this phase, with these relationships forming the system's fundamental framework. The system facilitates tasks such as room assignments, tracking payment statuses, and managing maintenance requests, in addition to capturing student feedback, assigning administrators to specific responsibilities, and processing both cash and online payments. This ensures comprehensive support for all key functionalities.

This phase also reviews and doubles up on Business Rules while modifying the Conceptual ERD to fit within the scope of the project. These mean that the refinement of the data dictionary improves the understanding of entity attribute and relationship and makes functional requirement to be met in the design. At the end of the phase, the following materials are achieved: relational schemas and related SQL statements for data definition based on DDL and data manipulation based on DML.

This phase ensuring that the system will be scalable, reliable and easy to be used to ensure that it will have a proper foundation on the implementation of the database. As with any large volume applications, the logical design thus derived shall allow the system to operate in a streamlined manner while being capable of being extended or modified to meet future changes in business requirements.

## 2.0 Overview of project

The primary focus of this project is the creation of a database management system (DMS) that is compatible with the hostel management system. The DMS encompasses a range of functions, including room allocation, financial transactions, maintenance, and the management of student feedback on campus. The primary objective is the establishment of a reliable and functional data-handling system that can effectively manage a substantial volume of data and incorporate quality control mechanisms.

This system encompasses students, managers, rooms, payments, requests for maintenance, and guest feedback. According to the conceptual model, all entities contribute to the functionality of the system. Students, as the primary users of the system, require housing, methods for making payments, the ability to submit maintenance requests, and a channel for providing feedback. Their responsibilities include assigning rooms, handling fees and other payments, and maintaining the hostel's infrastructure to ensure its proper functioning. This project is comprised of numerous phases. The initial phases encompassed the generation of requirements from the business, the comprehension of business rules, and the creation of an initial architectural chart (ERD) to exhibit entities and their relationships. In this phase, the emphasis is directed towards the development of an efficient, detachable, and acceptable physical design of the logical database model, as well as the elimination of redundancy in data and the production of relation schemes. To enhance usability, the option to carry out these operations is incorporated directly into the database design.

For instance, while administrators will manage room allocations for students, payment statuses, and maintenance updates, students can raise maintenance issues, view due balances, and fill feedback forms. The system supports a range of payment methods, including cash and transfer services, depending on the user's needs. Other functions include scalability and enabling future enhancements of database functionalities.

The scalability of the system is also related to the number of users it should cater for as the hostel expands its services in terms of hostels, transactions, etc. The logical design of the system makes it possible for changes to be implemented in line with requirements without affecting the performance and credibility of the system.

Overall, the objective of this project is to deliver a comprehensive database solution that optimises hostel management processes, enhances user experience, and ensures operational efficiency. The logical database design developed in this phase serves as the foundation for implementing a robust and reliable system that meets the needs of all stakeholders.

# 3.0 Database conceptual design

## 3.1 Updated business rule

Student:

1. Each student can be assigned to one room.
2. Students make payments for hostel fees and services, with payment details recorded.
3. Students can submit maintenance requests and provide feedback on resolved requests.

Room:

1. Each room can accommodate multiple maintenance requests over time.
2. Rooms have specific attributes, such as type, status, and whether they include a bathroom.
3. Rooms are managed by administrators and assigned to students.

Payment:

1. Payments are made by students and processed by administrators.
2. Payment methods include cash and online transfers, with specific details recorded for each type.
3. Each payment transaction is linked to one student and one administrator.

Maintenance:

1. Maintenance requests are reported by students and include details such as issue type, description, assigned personnel, and status.
2. Each maintenance request is assigned to an administrator for resolution.
3. Completed maintenance requests are linked to feedback provided by students.

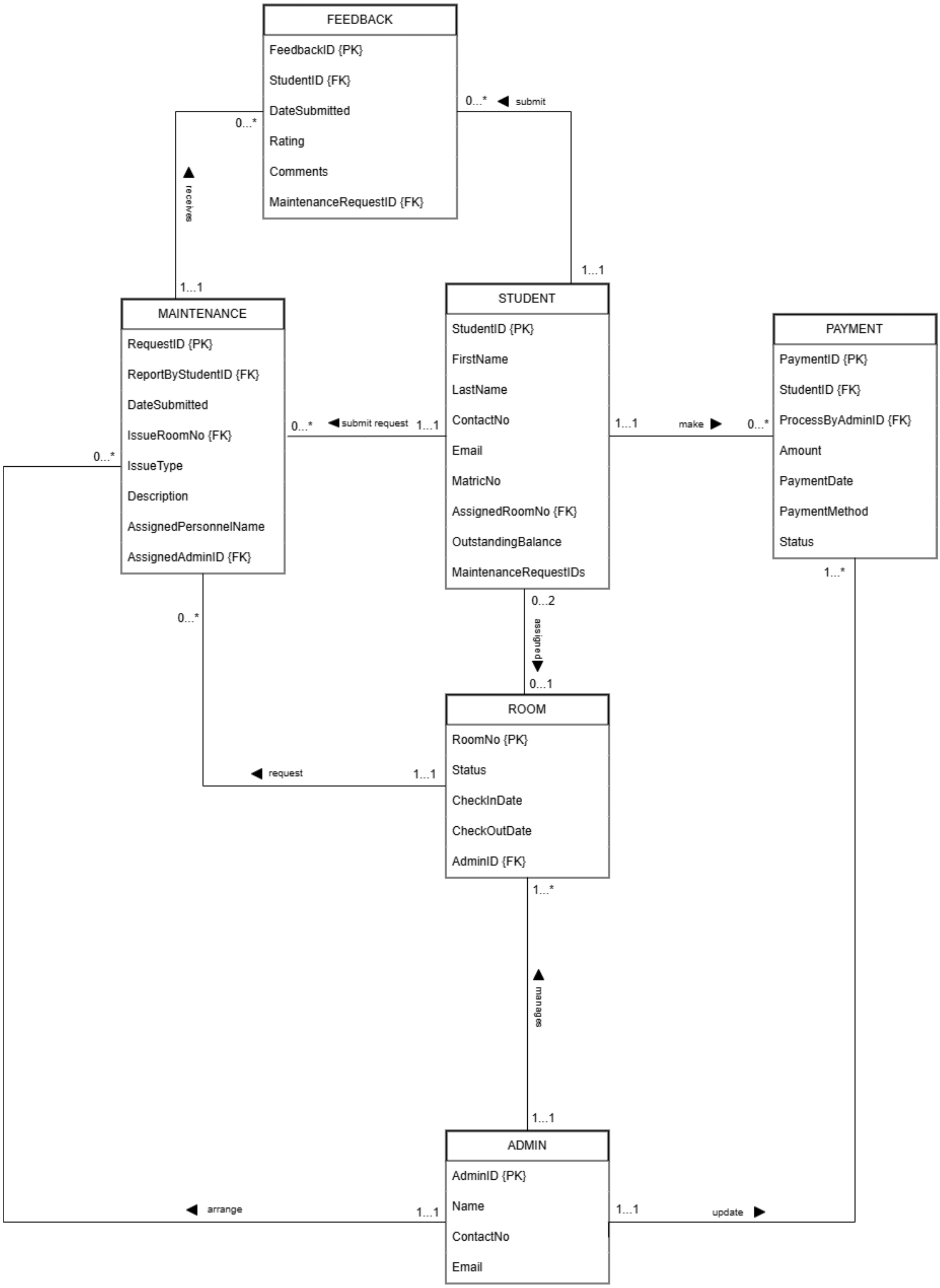
Administrator:

1. Administrators manage rooms, handle maintenance requests, and process payments.
2. They are categorized into specific roles: Fellow, Pengetua, and Staff, each with defined responsibilities.
3. Each administrator can manage multiple rooms and process multiple payments.

Feedback:

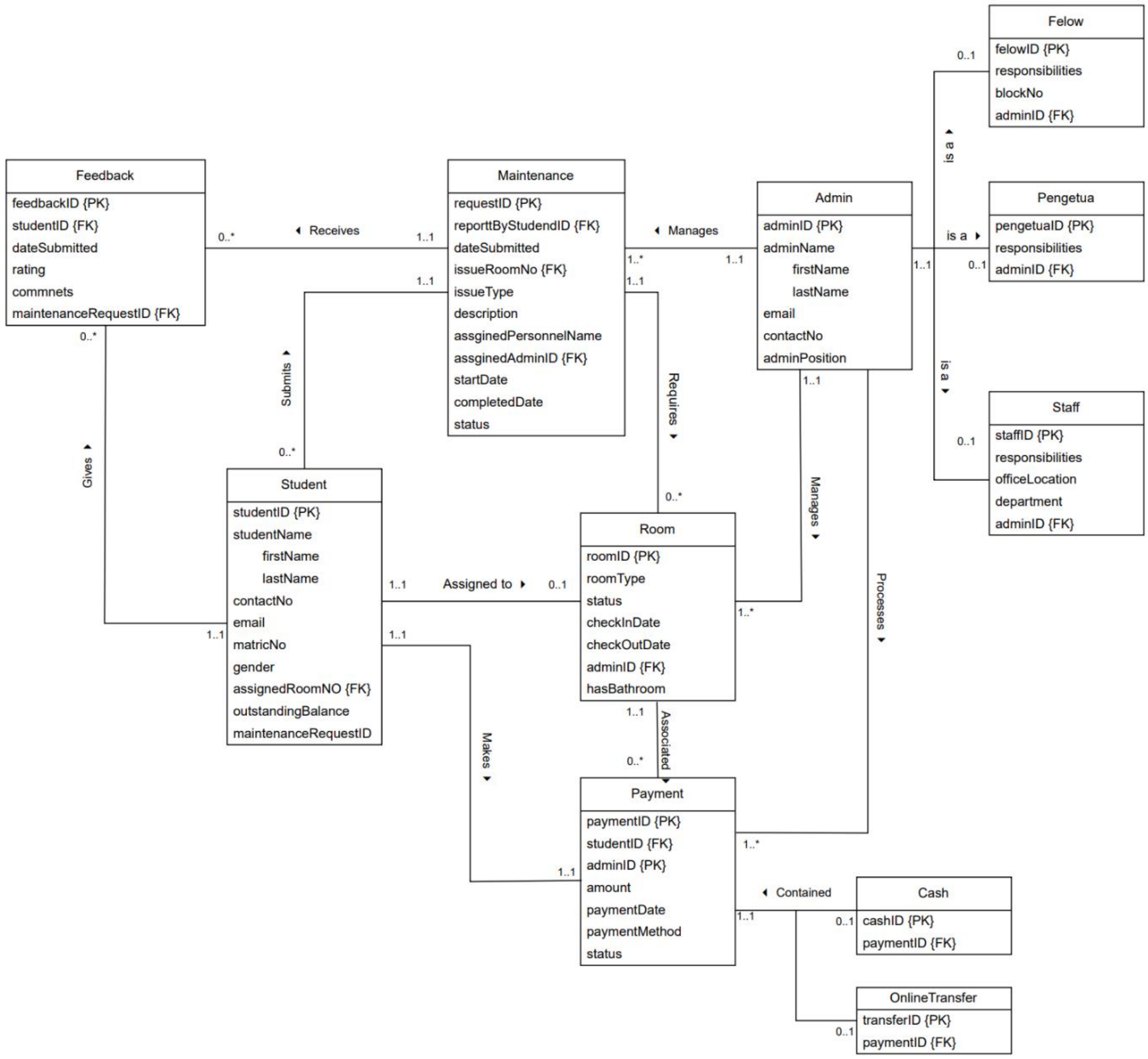
1. Students can provide feedback on maintenance services, including a rating and optional comments.
2. Feedback is linked to a specific maintenance request and used for evaluating service quality.

## 3.2 Conceptual ERD



# 4.0 DB logical design

## 4.1 Logical ERD



## 4.2 Updated Data Dictionary

### 4.2.1 Description of Entity

| Entity | Description | Occurrence |
|---|---|---|
| Student | Holds student's information related to hostel registration including personal details, room assignments, and payment records | Students make payments, submit maintenance requests, give feedback and are assigned rooms. |
| Admin | Holds administrator's information including different types of admin roles and their responsibilities | Admins manage rooms, handle maintenance requests and process payments. Can be Fellow, Pengetua, or Staff. |
| Room | Holds room's information including status, type and occupancy details | Rooms are assigned to students, can be subject to maintenance requests, and are managed by admins. |
| Payment | Holds payment transaction information for hostel fees and services | Records payments made by students, processed by admins, can be either cash or online transfer. |
| Maintenance | Holds maintenance request information including issue details and tracking | Records maintenance issues reported by students, assigned personnel and completion status. |
| Feedback | Holds feedback information for maintenance services | Students can submit feedback for maintenance requests including ratings and comments. |
| Cash | Holds cash payment transaction details | Specific payment type containing cash payment records. |
| OnlineTransfer | Holds online transfer payment transaction details | Specific payment type containing online transfer payment records. |

### 4.2.2 Description of Relationship

| Entity | Multiplicity | Relationship | Multiplicity | Entity |
|---|---|---|---|---|
| Student | 1..1 | Makes | 0..* | Payment |
|  | 1..1 | Assigned to | 0..1 | Room |
|  | 1..1 | Submits | 0..* | Maintenance |
|  | 1..1 | Gives | 0..* | Feedback |
| Maintenance | 1..1 | Receives | 0..* | Feedback |
| Room | 0..* | Requires | 1..1 | Maintenance |
|  | 1.1 | Associated | 0..* | Payment |
| Admin | 1..1 | Manages | 1..* | Room |
|  | 1..1 | Processes | 1..* | Payment |
|  | 1..1 | Manages | 0..* | Maintenance |
|  | 0..1 | Is a | 1..1 | Fellow |
|  | 0..1 | Is a | 1..1 | Pengetua |
|  | 0..1 | Is a | 1..1 | Staff |
| Payment | 1..1 | Contained | 0..1 | Cash |
|  | 1..1 | Contained | 0..1 | OnlineTransfer |

### 4.2.3 Description of Attributes

| Entity | Atrributes | Description | Data Type | Null | Multi-Valued |
|---|---|---|---|---|---|
| Feedback | feedbackID | Uniquely identify a feedback (PK) | VARCHAR (10) | No | No |
| | studentID | Foreign key of Student which uniquely identify a student (FK) | VARCHAR (10) | No | No |
| | dateSubmitted | Date and time feedback was submitted | DATE | No | No |
| | rating | Rating value given for maintenance service | INT(1) | No | No |
| | comments | Comments provided for maintenance service | VARCHAR (500) | Yes | No |
| | maintenanceRequestID | Foreign key of Maintenance which uniquely identify a maintenance request (FK) | VARCHAR (10) | No | No |
| Maintenance | requestID | Uniquely identify a maintenance request (PK) | VARCHAR (10) | No | No |
| | reportbyStudentID | Foreign key of Student which uniquely identify a student who reported (FK) | VARCHAR (10) | No | No |
| | dateSubmitted | Date and time maintenance request was submitted | DATE | No | No |
| | issueRoomNo | Foreign key of Room which uniquely identify a room with issue (FK) | VARCHAR (10) | No | No |
| | issueType | Type of maintenance issue reported | VARCHAR (30) | No | No |
| | description | Detailed description of maintenance issue | VARCHAR (200) | No | No |
| | assignedPersonnelName | Assigned Personnel Name | VARCHAR (50) | No | No |
| | assignedAdminID | Foreign key of Admin which uniquely identify an admin assigned (FK) | VARCHAR (10) | No | No |
| | startDate | Date maintenance work started | DATE | No | No |
| | completedDate | Date maintenance work completed | DATE | Yes | No |
| | status | Current status of maintenance request | VARCHAR (20) | No | No |

| | | | | | |
|---|---|---|---|---|---|
| Student | studentID | Uniquely identify a student (PK) | VARCHAR (10) | No | No |
| | firstName | First name of student | VARCHAR (30) | No | No |
| | lastName | Last name of student | VARCHAR (30) | No | No |
| | contactNo | Contact number of student | VARCHAR (15) | No | No |
| | email | Email address of student | VARCHAR (50) | No | No |
| | matricNo | Matriculation number of student | VARCHAR (10) | No | No |
| | gender | Gender of student | VARCHAR (6) | No | No |
| | assignedRoomNo | Foreign key of Room which uniquely identify a room assigned (FK) | VARCHAR (10) | Yes | No |
| | outstandingBalance | Outstanding balance amount of student | DECIMAL (10,2) | Yes | No |
| Room | roomID | Uniquely identify a room (PK) | VARCHAR (20) | No | No |
| | roomType | Type classification of room | VARCHAR (20) | No | No |
| | status | Current occupancy status of room | VARCHAR (20) | No | No |
| | checkInDate | Date of student check-in to room | DATE | Yes | No |
| | checkOutDate | Date of student check-out from room | DATE | Yes | No |
| | adminID | Foreign key of Admin which uniquely identify admin managing room (FK) | VARCHAR (10) | No | No |
| | hasBathroom | Indicates presence of attached bathroom | BOOLEAN | No | No |
| Payment | paymentID | Uniquely identify a payment transaction (PK) | VARCHAR (10) | No | No |
| | studentID | Foreign key of Student which uniquely identify student making payment (FK) | VARCHAR (10) | No | No |
| | adminID | Foreign key of Admin which uniquely identify admin processing payment (FK) | VARCHAR (10) | No | No |

| | | | | | |
|---|---|---|---|---|---|
| | amount | Amount of payment transaction | DECIMAL (10,2) | No | No |
| | paymentDate | Date payment was made | DATE | No | No |
| | paymentMethod | Method used for payment transaction | VARCHAR (20) | No | No |
| | status | Current status of payment transaction | VARCHAR (20) | No | No |
| Admin | adminID | Uniquely identify an administrator (PK) | VARCHAR (10) | No | No |
| | firstName | First name of administrator | VARCHAR (30) | No | No |
| | lastName | Last name of administrator | VARCHAR (30) | No | No |
| | email | Email address of administrator | VARCHAR (50) | No | No |
| | contactNo | Contact number of administrators | VARCHAR (15) | No | No |
| | adminPosition | Position held by administrator | VARCHAR (30) | No | No |
| Felow | felowID | Uniquely identify a fellow (PK) | VARCHAR (10) | No | NO |
| | adminID | Foreign key of Admin which uniquely identify a fellow (PK) | VARCHAR (10) | No | No |
| | responsibilities | Job responsibilities of fellow | VARCHAR (200) | No | No |
| | blockNo | Residential address of fellow | VARCHAR (10) | No | No |
| Pengetua | pengetuaID | Uniquely identify a Pengetua (PK) | VARCHAR (10) | No | No |
| | adminID | Foreign key of Admin which uniquely identify a pengetua (FK) | VARCHAR (10) | No | No |
| | responsibilities | Job responsibilities of pengetua | VARCHAR (200) | No | No |
| Staff | staffID | Uniquely identify a Staff (PK) | VARCHAR (10) | No | No |
| | staffID | Uniquely identify a Staff (PK) | VARCHAR (10) | No | No |
| | responsibilities | Job responsibilities of staff | VARCHAR (200) | No | No |
| | officeLocation | Office location of staff | VARCHAR (100) | No | No |
| | department | Department of staff | VARCHAR (50) | No | No |
| Cash | cashID | Uniquely identify a cash payment (PK) | VARCHAR (15) | No | No |

| | | | | | |
|---|---|---|---|---|---|
| | paymentID | Foreign key of Payment which uniquely identify a payment transaction (FK) | VARCHAR (10) | No | No |
| OnlineTransfer | transferID | Uniquely identify an online transfer (PK) | VARCHAR (15) | No | No |
| | paymentID | Foreign key of Payment which uniquely identify a payment transaction (FK) | VARCHAR (10) | No | No |

## 4.3 Normalization

1. FEEDBACK (feedbackID, studentID, dateSubmitted, rating, comments, maintenanceRequestID)

   **fd1:** feedbackID → studentID, dateSubmitted, rating, comments, maintenanceRequestID

   **1NF&2NF&3NF&BNCF:**

   FEEDBACK (<u>feedbackID</u>, studentID, dateSubmitted, rating, comments, maintenanceRequestID)

2. MAINTENANCE (requestID, reportbyStudentID, dateSubmitted, issueRoomNo, issueType, description, assignedPersonelName, assignedAdminID, startDate, completedDate, status)

   **fd1:** requestID → reportbyStudentID, dateSubmitted, issueRoomNo, issueType, description, assignedPersonelName, assignedAdminID, startDate, completedDate, status

   **1NF&2NF&3NF&BNCF:**

   MAINTENANCE (<u>requestID</u>, reportbyStudentID, dateSubmitted, issueRoomNo, issueType, description, assignedPersonelName, assignedAdminID, startDate, completedDate, status)

3. STUDENT (studentID, firstName, lastName, contactNo, email, matricNo, gender, assignedRoomNo, outstandingBalance, maintenanceRequestID)

   **fd1:** studentID → firstName, lastName, contactNo, email, matricNo, gender, assignedRoomNo, outstandingBalance, maintenanceRequestID

   **1NF&2NF&3NF&BNCF:**

   STUDENT (<u>studentID</u>, firstName, lastName, contactNo, email, matricNo, gender, assignedRoomNo, outstandingBalance, maintenanceRequestID)

4. ROOM (roomID, roomType, status, checkInDate, checkOutDate, adminID, hasBathroom)

   **fd1:** roomID → roomType, status, checkInDate, checkOutDate, adminID, hasBathroom

**1NF&2NF&3NF&BNCF:**

ROOM (roomID, roomType, status, checkInDate, checkOutDate, adminID, hasBathroom)

5. PAYMENT (paymentID, studentID, adminID, amount, paymentDate, paymentMethod, status)

   **fd1:** paymentID → studentID, adminID, amount, paymentDate, paymentMethod, status

   **1NF&2NF&3NF&BNCF:**

   PAYMENT (paymentID, studentID, adminID, amount, paymentDate, paymentMethod, status)

6. ADMIN (adminID, firstName, lastName, email, contactNo, adminPosition)

   **fd1:** adminID → firstName, lastName, email, contactNo, adminPosition

   **1NF&2NF&3NF&BNCF:**

   ADMIN (adminID, firstName, lastName, email, contactNo, adminPosition)

7. FELOW (felowID, adminID, responsibilities, blockNo)

   **fd1:** felowID → adminID, responsibilities, blockNo

   **1NF&2NF&3NF&BNCF:**

   FELOW (felowID, adminID, responsibilities, blockNo)

8. PENGETUA (pengetuaID, adminID, responsibilities)

   **fd1:** pengetuaID → adminID, responsibilities

   **1NF&2NF&3NF&BNCF:**

   PENGETUA (pengetuaID, adminID, responsibilities)

9. STAFF (staffID, adminID, responsibilities, officeLocation, department)

   **fd1:** staffID → adminID, responsibilities, officeLocation, department

   **1NF&2NF&3NF&BNCF:**

   STAFF (staffID, adminID, responsibilities, officeLocation, department)

10. CASH (cashID, paymentID)

    **fd1:** cashID → paymentID

**1NF&2NF&3NF&BNCF:**

CASH (cashID, paymentID)

11. ONLINETRANSFER (transferID, paymentID)

**fd1:** transferID → paymentID

**1NF&2NF&3NF&BNCF:**

ONLINETRANSFER (transferID, paymentID)

## 5.0 Relational DB Schemas (after normalization)

Feedback (feedbackID, dateSubmitted, rating, comments, *studentID, maintenanceRequestID*)

Maintenance (requestID, dateSubmitted, issueType, description, assignedPersonelName, startDate, completedDate, status, reportbyStudentID, *issueRoomNo, assignedAdminID*)

Student (studentID, firstName, lastName, contactNo, email, matricNo, gender, outstandingBalance, *assignedRoom, maintenanceRequestID*)

Room (roomID, roomType, status, checkInDate, checkOutDate, hasBathroom, *adminID*)

Payment (paymentID, amount, paymentDate, paymentMethod, status, *studentID, adminID*)

Admin (adminID, firstName, lastName, email, contactNo, adminPosition)

Felow (felowID, adminID, responsibilities, blockNo)

Pengetua (pengetuaID, adminID, responsibilities)

Staff (staffID, adminID, responsibilities, officeLocation, department)

Cash (cashID, *paymentID*)

OnlineTransfer (transferID, *paymentID*)

Feedback

| feedbackID | dateSubmitted | rating | comment | studentID | maintenanceRequestID |
|---|---|---|---|---|---|

Maintenance

| request ID | date Submitted | issue Type | description | assigned Personel Name | start Date | completed Date | status | reportby StudentID | issue RoomNo | assigned AdminID |
|---|---|---|---|---|---|---|---|---|---|---|

Student

| student ID | first Name | last Name | contact No | email | matric No | gender | outstanding Balance | Assigned Room | maintenance RequestID |
|---|---|---|---|---|---|---|---|---|---|

Room

| roomID | roomType | status | checkInDate | checkOutDate | hasBathroom | adminID |
|---|---|---|---|---|---|---|

Payment

| paymentID | amount | paymentDate | paymentMethod | status | studentID | adminID |
|---|---|---|---|---|---|---|

Admin

| adminID | fisrtName | lastName | email | contactNo | adminPosition |
|---|---|---|---|---|---|

Felow

| felowID | adminID | responsibilities | blockNo |
|---|---|---|---|

Pengetua

| pengetuaID | adminID | responsibilities |
|---|---|---|

Staff

| staffID | adminID | responsibilities | officeLocation | department |
|---|---|---|---|---|

Cash

| cashID | PaymentID |
|---|---|

OnlineTransfer

| | |
|---|---|
| transferID | paymentID |

# 6.0 SQL Statements (DDL & DML)

## 6.1 DDL

/*Create Table*/

<<Feeback>> entity

```
CREATE TABLE Feedback (
        feedbackID VARCHAR(10) PRIMARY KEY,
        studentID VARCHAR(10) NOT NULL,
        dateSubmitted DATE NOT NULL,
        rating INT(1) NOT NULL,
        comments VARCHAR(500),
        maintenanceRequestID VARCHAR(10) NOT NULL,
        FOREIGN KEY (studentID) REFERENCES Student(studentID),
        FOREIGN KEY (maintenanceRequestID) REFERENCES Maintenance (requestID)
);
```

<<Maintenance>> entity

```
CREATE TABLE Maintenance (
        requestID VARCHAR(10) PRIMARY KEY,
        reportbyStudentID VARCHAR(10) NOT NULL,
        dateSubmitted DATE NOT NULL,
        issueRoomNo VARCHAR(10) NOT NULL,
        issueType VARCHAR(30) NOT NULL,
        description VARCHAR(30) NOT NULL,
        assignedPersonelName VARCHAR(50) NOT NULL,
        assignedAdminID VARCHAR(10) NOT NULL,
        startDate DATE NOT NULL,
        completedDate DATE,
        status VARCHAR(20) NOT NULL,
        FOREIGN KEY (issueRoomNo) REFERENCES Room(roomID),
        FOREIGN KEY (assignedAdminID) REFERENCES Admin(adminID)
);
```

<<Student>> entity

```
CREATE TABLE Student (
    studentID VARCHAR(10) PRIMARY KEY,
    firstName VARCHAR(30) NOT NULL,
    lastName VARCHAR(30) NOT NULL,
    contactNo VARCHAR(15) NOT NULL,
    email VARCHAR(50) NOT NULL,
    matricNo VARCHAR(10) NOT NULL,
    gender VARCHAR(6) NOT NULL,
    assignedRoomNo VARCHAR(10),
    outstandingBalance DECIMAL(10,2),
    maintenanceRequestID VARCHAR(10),
    FOREIGN KEY (assignedRoomNo) REFERENCES Room(roomID),
);
```

<<Room>> entity

```
CREATE TABLE Room(
    roomID VARCHAR(20) PRIMARY KEY,
    roomType VARCHAR(20) NOT NULL,
    status VARCHAR(20) NOT NULL,
    checkInDate DATE,
    checkOutDate DATE,
    adminID VARCHAR(10) NOT NULL,
    hasBathroom BOOLEAN NOT NULL,
    FOREIGN KEY (adminID) REFERENCES Admin(adminID)
);
```

<<Payment>> entity

```
CREATE TABLE Payment (
        paymentID VARCHAR(10) PRIMARY KEY,
        studentID VARCHAR(10) NOT NULL,
        adminID VARCHAR(10) NOT NULL,
        amount DECIMAL(10,2) NOT NULL,
        paymentDate DATE NOT NULL,
        paymentMethod VARCHAR(20) NOT NULL,
        status VARCHAR(20) NOT NULL,
        FOREIGN KEY (studentID) REFERENCES Student(studentID),
        FOREIGN KEY (adminID) REFERENCES Admin(adminID)
);
```

<<Admin>> entity

```
CREATE TABLE Admin (
        adminID VARCHAR(10) PRIMARY KEY,
        firstName VARCHAR(30) NOT NULL,
        lastName VARCHAR(30) NOT NULL,
        email VARCHAR(50) NOT NULL,
        adminPosition VARCHAR(30) NOT NULL
        contactNo VARCHAR(15) NOT NULL;
);
```

<<Felow>> entity

```
CREATE TABLE Felow (
        felowID VARCHAR(10) PRIMARY KEY,
        responsibilities VARCHAR(200) NOT NULL,
        blockNo VARCHAR(200) NOT NULL,
        adminID VARCHAR(10) NOT NULL,
        FOREIGN KEY (adminID) REFERENCES Admin(adminID)
);
```

<<Pengetua>> entity

```
CREATE TABLE Pengetua (
        pengetuaID VARCHAR(10) PRIMARY KEY,
        responsibilites VARCHAR(200) NOT NULL,
        adminID VARCHAR(10) NOT NULL,
        FOREIGN KEY (adminID) REFERENCES Admin(adminID)
);
```

<<Staff>> entity

```
CREATE TABLE Staff (
        staffID VARCHAR(10) PRIMARY KEY,
        responsibilities VARCHAR(200) NOT NULL,
        officeLocation VARCHAR(100) NOT NULL,
        department VARCHAR(50) NOT NULL,
        adminID VARCHAR(10) NOT NULL,
        FOREIGN KEY (adminID) REFERENCES Admin(adminID)
);
```

<<Cash>> entity

```
CREATE TABLE Cash (
        cashID VARCHAR(15) PRIMARY KEY,
        paymentID VARCHAR(10) NOT NULL,
        FOREIGN KEY (paymentID) REFERENCES Payment(paymentID)
);
```

<<OnlineTransfer>> entity

```
CREATE TABLE OnlineTransfer (
        transferID VARCHAR(15) PRIMARY KEY,
        paymentID VARCHAR(10) NOT NULL,
        FOREIGN KEY (paymentID) REFERENCES Payment(paymentID)
);


/*Apply Changes*/

ALTER TABLE Maintenance
ADD CONSTRAINT FOREIGN KEY (reportbyStudentID) REFERENCES
Student(studentID);

ALTER TABLE Student
ADD CONSTRAINT FOREIGN KEY (maintenanceRequestID) REFERENCES
Maintenance (RequestID)
```

### 6.2 DML

**<<Student>>**

```
INSERT INTO Student

VALUES ('S001', 'Sophia', 'Davis', '012-9683938', 'sophia@gmail.com', 'A23CS0001',
'FEMALE', 'M25-101', 0.00, NULL),

('S002','James', 'Miller', '012-3462893', 'james@gmail.com', 'A23CS0002', 'MALE',
'M23-303', 25.50, NULL),

('S003', 'Olivia', 'Wilson', '012-7473938', 'olivia@gmail.com', 'A23CS0003', 'FEMALE',
'MA7-210', 0.00, 'M005'),

('S004', 'William', 'Moore', '012-9847479', 'wiliam@gmail.com', 'A23CS0004', 'MALE',
'MA1-111', 10.00, NULL),

('S005', 'Cloe', 'Taylor', '012-8574783', 'chloe@gmail.com', 'A23CS0005', 'FEMALE',
'M19-123', 8.50, NULL);
```

**<<Admin>>**

```
INSERT INTO Admin

VALUES ('A001', 'Amir', 'John', 'amir@gmail.com', 'Felow', '011-1111111'),

('A002', 'Alice', 'Walker','alice@gmail.com', 'Staf', '011-1212122'),

('A003', 'Micheal', 'Smith', 'micheal@gmail.com', 'Pengetua', '011-2527282'),

('A004', 'Emily', 'Brown', 'emily@gmail.com', 'Felow', '011-6753442'),
('A005', 'David', 'Johnson', 'david@gmail.com', 'Staff', '011-0918887');
('A006', 'Beatrice', 'Lee', 'beatricelee@email.com', 'Staff', '011-81746293'),
('A007', 'Charlie', 'Tan', 'charlietan@company.com', 'Felow', '013-38426649'),
('A008', 'David', 'Ng', 'davidng@hotmail.com', 'Felow', '011-4288272'),
('A009', 'Emily', 'Chen', 'emilychen@yahoo.com', 'Felow', '012-6623499'),
('A010', 'James', 'Smith', 'jamessmith@example.com', 'Staff', '016-555-1234'),
('A011', 'Sarah', 'Jones', 'sarahjones@example.com', 'Staff', '017-444-5678'),
('A012', 'David', 'Lee', 'davidlee@example.com', 'Staff', '018-333-9012'),
('A013', 'Emily', 'Garcia', 'emilygarcia@example.com', 'Staff', '019-222-7890'),
('A014', 'Michael', 'Brown', 'michaelbrown@example.com', 'Staff', '020-111-4321');
```

<<Room>>

```
INSER INTO Room
VALUES ('M25-101', 'Double', 'Occupied', '2024-10-01', NULL, 'A00
1', FALSE),
('M23-303', 'Double', 'Occupied', '2024-10-02', NULL, 'A00
4', FALSE),
('MA7-210', 'Double', 'Occupied', '2024-10-01', NULL, 'A00
1', FALSE),
('MA1-111', 'Single', 'Occupied', '2024-10-10', NULL, 'A00
4', TRUE),
('M19-123', 'Single', 'Occupied', '2024-10-05', NULL, 'A00
1', FALSE),
('MA1-222', 'Single', 'Available', '2023-07-25', '2024-05-
22', 'A004', TRUE),
('M27-101', 'Double', 'Available', '2023-09-05', '2024-08-
13', 'A001', FALSE),
('M20-109', 'Double', 'Available', '2023-05-15', '2024-03-
10', 'A001', FALSE);
```

<<Maintenance>>

```sql
INSERT INTO Maintenance

VALUES ('M001', 'S003', '2024-10-12', 'MA7-210', 'Electric', 'Socket cannot function',
'Christopher Martinex', 'A001', '2024-11-06', '2024-11-07 ', 'DONE'),

('M002', 'S003', '2024-10-12', 'MA7-210', 'Lock', 'Key lost, cannot.', 'Daniel
Hernandez', 'A004', '2024-12-15', '2024-12-15 ', 'DONE'),

('M003', 'S004', '2024-12-13', 'MA1-111', 'BATHROOM', 'Water Paip broken',
'Kimberly Nelson', 'A004', '2024-12-15', '2024-12-15', 'DONE'),

('M004', 'S005;', '2024-11-25', 'M19-123', 'Furniture', 'Window broken', 'Daniel
Hernandez', 'A004', '2024-11-26', '2024-11-26', 'DONE'),

('M005', 'S003', '2024-10-29', 'MA7-210', 'Electricity', 'Light Malfunction',
'Christopher Martinex', 'A004', '2024-10-30', '2024-11-01', 'IN PROGRESS');
```

<<Feedback>>

```sql
INSERT INTO Feedback

VALUES ('F001', 'S003', '2024-11-08', 5, 'Solved the issue very fast', 'M001'),

('F002', 'S003', '2024-12-16', 4, 'Good service but took longer than expected', 'M002'),

('F003', 'S004', '2024-12-16', 3, 'Service was okay', 'M003'),

('F004', 'S005', '2024-11-27', 5, 'Very prompt and efficient service', 'M004'),

('F005', 'S003', '2024-11-02', 5, 'Good Service and fast', 'M006');
```

<<Pengetua>>

```sql
INSERT INTO Pengetua

VALUE ('P001','Supervise Staff','A003');
```

<<Felow>>

```sql
INSERT INTO Felow

VALUES ('E001','Manages block MA1', 'MA1', 'A001'),

('E002', 'Manages block MA7, M19', 'MA7', 'A004'),

('E003', 'Manages block M22,M23', 'MA1', 'A007'),

('E004', 'Manages block M16,M17', 'M18', 'A008'),

('E005', 'Manages block MA4,MA5,MA6', 'M18', 'A009');
```

<<Staff>>

```
INSERT INTO Staff
VALUES ('T001', 'Manage Hostel System', 'M01', 'IT', 'A002'),
('T002', 'Organize hostel activities', 'M01', 'Student Welfare', 'A005'),
('T003', 'Organize hostel activities', 'M01', 'Student Welfare', 'A006'),
('T004', 'Handle disciplinary issue', 'M01', 'Discipline', 'A010'),
('T005', 'Handle disciplinary issue', 'M01', 'Discipline', 'A011'),
('T006', 'Manage sport facilities', 'M01', 'Sport & Recreation', 'A012'),
('T007', 'Manage sport facilities', 'M01', 'Sport & Recreation', 'A013'),
('T008', 'Manages Hostel System', 'M01', 'IT', 'A014');
```

<<OnlineTransfer>>

```
INSERT INTO Payment
VALUES ('P001', 'S005', 'A002', 10.00, '2024-10-05','CASH', 'Completed'),
('P002', 'S001', 'A003', 50.00, '2024-10-10', 'CASH', 'Completed'),
('P003', 'S002', 'A004', 120.00, '2024-10-15', 'CASH', 'Completed'),
('P004', 'S003', 'A005', 80.00, '2024-10-20', 'CASH', 'Completed'),
('P005', 'S004', 'A001', 150.00, '2024-10-25', 'CASH', 'Completed'),
('P006', 'S001', 'A006', 75.00, '2024-11-01', 'Online Transfer', 'Completed'),
('P007', 'S002', 'A007', 100.00, '2024-11-05', 'Online Transfer', 'Completed'),
('P008', 'S003', 'A008', 90.00, '2024-11-10', 'Online Transfer', 'Completed'),
('P009', 'S004', 'A009', 110.00, '2024-11-15', 'Online Transfer', 'Completed'),
('P010', 'S005', 'A010', 130.00, '2024-11-20', 'Online Transfer', 'Completed');
```

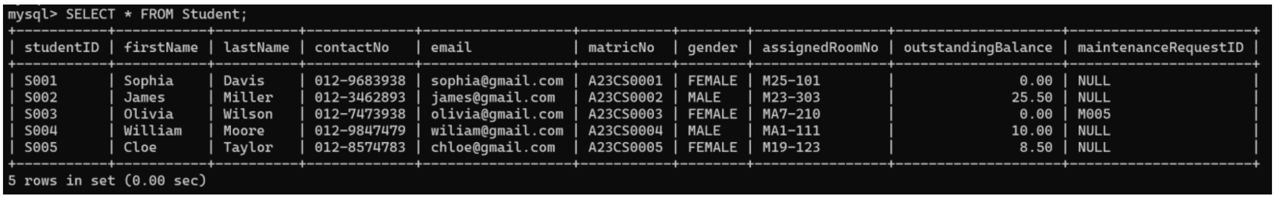
<<Cash>>

```
INSERT INTO Cash
VALUES ('C001','P001'),
('C002','P002'),
('C003', 'P003'),
('C004', 'P004'),
('C005', 'P005');
```

**<<OnlineTransfer>>**

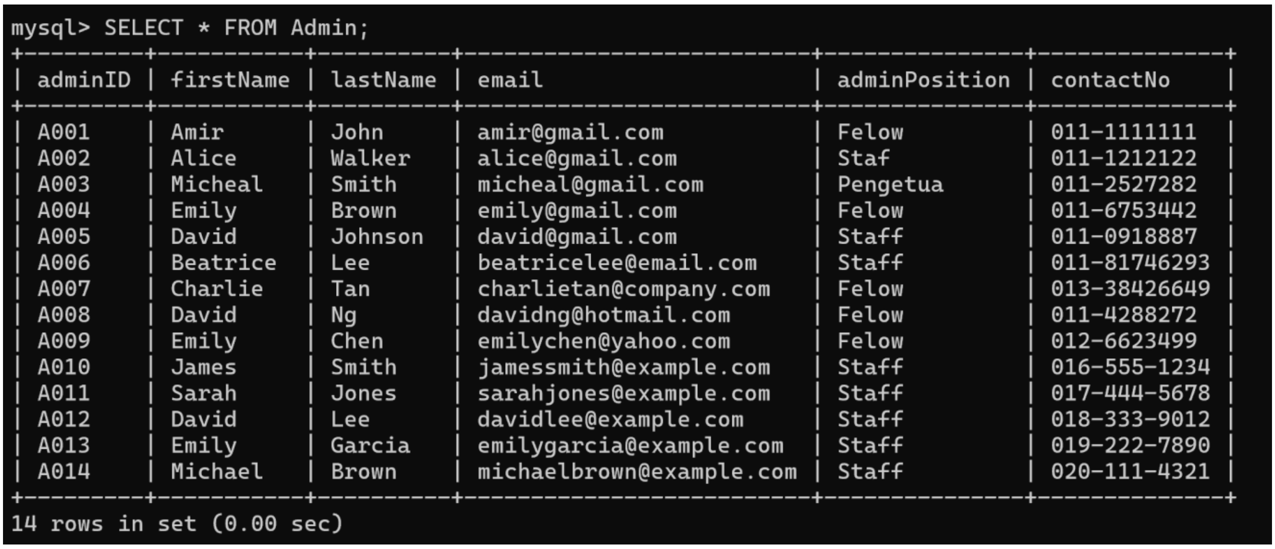
```
INSERT INTO OnlineTransfer
VALUES ('O001','P006'),
('O002','P007'),
('O003', 'P008'),
('O004', 'P009'),
('O005', 'P010');
```

**Output**



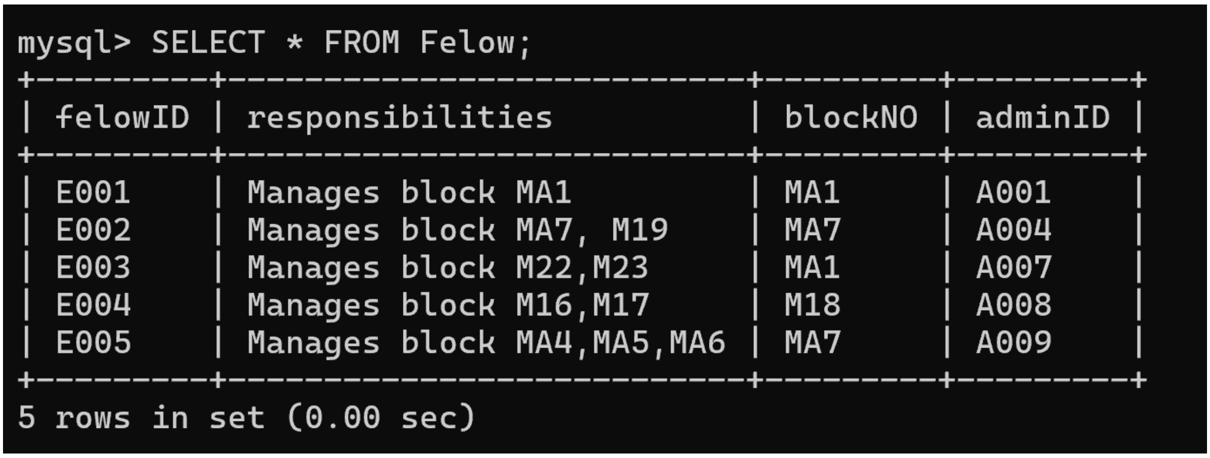
```
mysql> SELECT * FROM Student;
+-----------+-----------+----------+-------------+------------------+-----------+--------+----------------+--------------------+----------------------+
| studentID | firstName | lastName | contactNo   | email            | matricNo  | gender | assignedRoomNo | outstandingBalance | maintenanceRequestID |
+-----------+-----------+----------+-------------+------------------+-----------+--------+----------------+--------------------+----------------------+
| S001      | Sophia    | Davis    | 012-9683938 | sophia@gmail.com | A23CS0001 | FEMALE | M25-101        |               0.00 | NULL                 |
| S002      | James     | Miller   | 012-3462893 | james@gmail.com  | A23CS0002 | MALE   | M23-303        |              25.50 | NULL                 |
| S003      | Olivia    | Wilson   | 012-7473938 | olivia@gmail.com | A23CS0003 | FEMALE | MA7-210        |               0.00 | M005                 |
| S004      | William   | Moore    | 012-9847479 | wiliam@gmail.com | A23CS0004 | MALE   | MA1-111        |              10.00 | NULL                 |
| S005      | Cloe      | Taylor   | 012-8574783 | chloe@gmail.com  | A23CS0005 | FEMALE | M19-123        |               8.50 | NULL                 |
+-----------+-----------+----------+-------------+------------------+-----------+--------+----------------+--------------------+----------------------+
5 rows in set (0.00 sec)
```

**Diagram 6.2.1 shows the Student Entity**



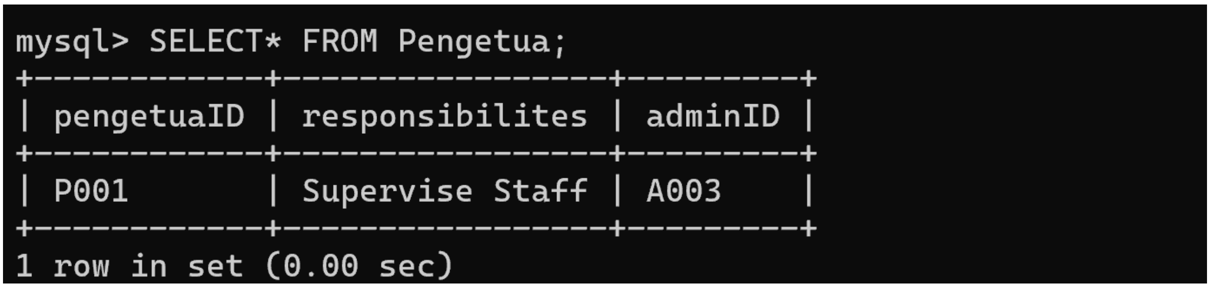
```
mysql> SELECT * FROM Admin;
+---------+-----------+----------+--------------------------+---------------+--------------+
| adminID | firstName | lastName | email                    | adminPosition | contactNo    |
+---------+-----------+----------+--------------------------+---------------+--------------+
| A001    | Amir      | John     | amir@gmail.com           | Felow         | 011-1111111  |
| A002    | Alice     | Walker   | alice@gmail.com          | Staf          | 011-1212122  |
| A003    | Micheal   | Smith    | micheal@gmail.com        | Pengetua      | 011-2527282  |
| A004    | Emily     | Brown    | emily@gmail.com          | Felow         | 011-6753442  |
| A005    | David     | Johnson  | david@gmail.com          | Staff         | 011-0918887  |
| A006    | Beatrice  | Lee      | beatricelee@email.com    | Staff         | 011-81746293 |
| A007    | Charlie   | Tan      | charlietan@company.com   | Felow         | 013-38426649 |
| A008    | David     | Ng       | davidng@hotmail.com      | Felow         | 011-4288272  |
| A009    | Emily     | Chen     | emilychen@yahoo.com      | Felow         | 012-6623499  |
| A010    | James     | Smith    | jamessmith@example.com   | Staff         | 016-555-1234 |
| A011    | Sarah     | Jones    | sarahjones@example.com   | Staff         | 017-444-5678 |
| A012    | David     | Lee      | davidlee@example.com     | Staff         | 018-333-9012 |
| A013    | Emily     | Garcia   | emilygarcia@example.com  | Staff         | 019-222-7890 |
| A014    | Michael   | Brown    | michaelbrown@example.com | Staff         | 020-111-4321 |
+---------+-----------+----------+--------------------------+---------------+--------------+
14 rows in set (0.00 sec)
```

**Diagram 6.2.2 shows the Admin Entity**



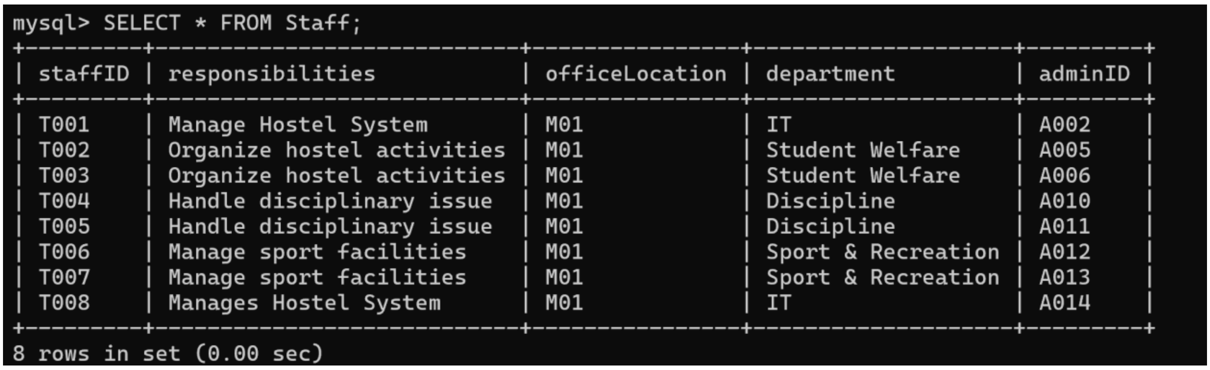
```
mysql> SELECT * FROM Felow;
+---------+---------------------------+---------+---------+
| felowID | responsibilities          | blockNO | adminID |
+---------+---------------------------+---------+---------+
| E001    | Manages block MA1         | MA1     | A001    |
| E002    | Manages block MA7, M19    | MA7     | A004    |
| E003    | Manages block M22,M23     | MA1     | A007    |
| E004    | Manages block M16,M17     | M18     | A008    |
| E005    | Manages block MA4,MA5,MA6 | MA7     | A009    |
+---------+---------------------------+---------+---------+
5 rows in set (0.00 sec)
```

**Diagram 6.2.3 shows the Felow Entity**



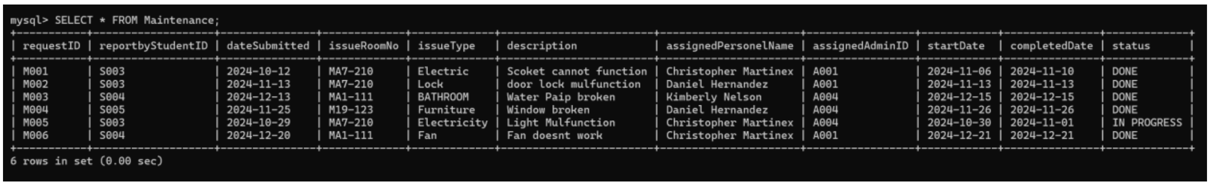
```
mysql> SELECT* FROM Pengetua;
+------------+------------------+---------+
| pengetuaID | responsibilites  | adminID |
+------------+------------------+---------+
| P001       | Supervise Staff  | A003    |
+------------+------------------+---------+
1 row in set (0.00 sec)
```

**Diagram 6.2.4 shows Pengetua Entity**



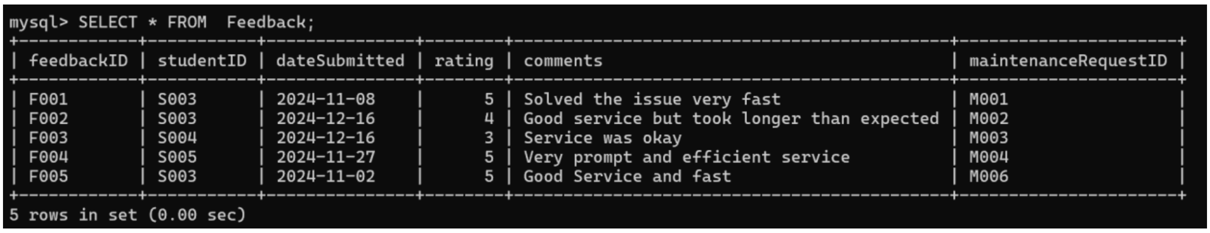
```
mysql> SELECT * FROM Staff;
+---------+----------------------------+----------------+--------------------+---------+
| staffID | responsibilities           | officeLocation | department         | adminID |
+---------+----------------------------+----------------+--------------------+---------+
| T001    | Manage Hostel System       | M01            | IT                 | A002    |
| T002    | Organize hostel activities | M01            | Student Welfare    | A005    |
| T003    | Organize hostel activities | M01            | Student Welfare    | A006    |
| T004    | Handle disciplinary issue  | M01            | Discipline         | A010    |
| T005    | Handle disciplinary issue  | M01            | Discipline         | A011    |
| T006    | Manage sport facilities    | M01            | Sport & Recreation | A012    |
| T007    | Manage sport facilities    | M01            | Sport & Recreation | A013    |
| T008    | Manages Hostel System      | M01            | IT                 | A014    |
+---------+----------------------------+----------------+--------------------+---------+
8 rows in set (0.00 sec)
```

**Diagram 6.2.5 shows Staff Entity**



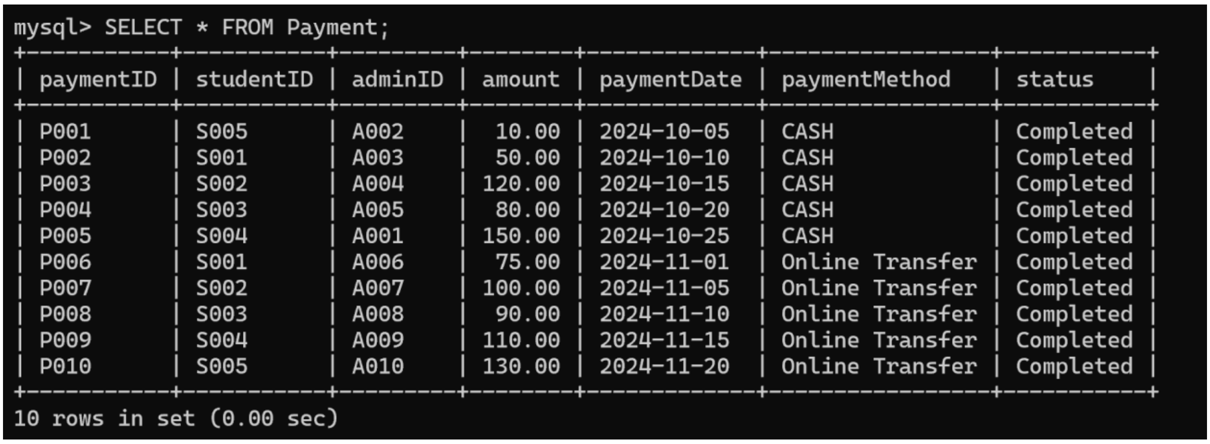
```
mysql> SELECT * FROM Maintenance;
+-----------+-------------------+---------------+-------------+-------------+------------------------+----------------------+-----------------+------------+---------------+-------------+
| requestID | reportbyStudentID | dateSubmitted | issueRoomNo | issueType   | description            | assignedPersonelName | assignedAdminID | startDate  | completedDate | status      |
+-----------+-------------------+---------------+-------------+-------------+------------------------+----------------------+-----------------+------------+---------------+-------------+
| M001      | S003              | 2024-10-12    | MA7-210     | Electric    | Scoket cannot function | Christopher Martinex | A001            | 2024-11-06 | 2024-11-10    | DONE        |
| M002      | S003              | 2024-11-13    | MA7-210     | Lock        | door lock mulfunction  | Daniel Hernandez     | A001            | 2024-11-13 | 2024-11-13    | DONE        |
| M003      | S004              | 2024-12-13    | MA1-111     | BATHROOM    | Water Paip broken      | Kimberly Nelson      | A004            | 2024-12-15 | 2024-12-15    | DONE        |
| M004      | S005              | 2024-11-25    | M19-123     | Furniture   | Window broken          | Daniel Hernandez     | A004            | 2024-11-26 | 2024-11-26    | DONE        |
| M005      | S003              | 2024-10-29    | MA7-210     | Electricity | Light Mulfunction      | Christopher Martinex | A004            | 2024-10-30 | 2024-11-01    | IN PROGRESS |
| M006      | S004              | 2024-12-20    | MA1-111     | Fan         | Fan doesnt work        | Christopher Martinex | A001            | 2024-12-21 | 2024-12-21    | DONE        |
+-----------+-------------------+---------------+-------------+-------------+------------------------+----------------------+-----------------+------------+---------------+-------------+
6 rows in set (0.00 sec)
```

**Diagram 6.2.6 shows Maintenance Entity**



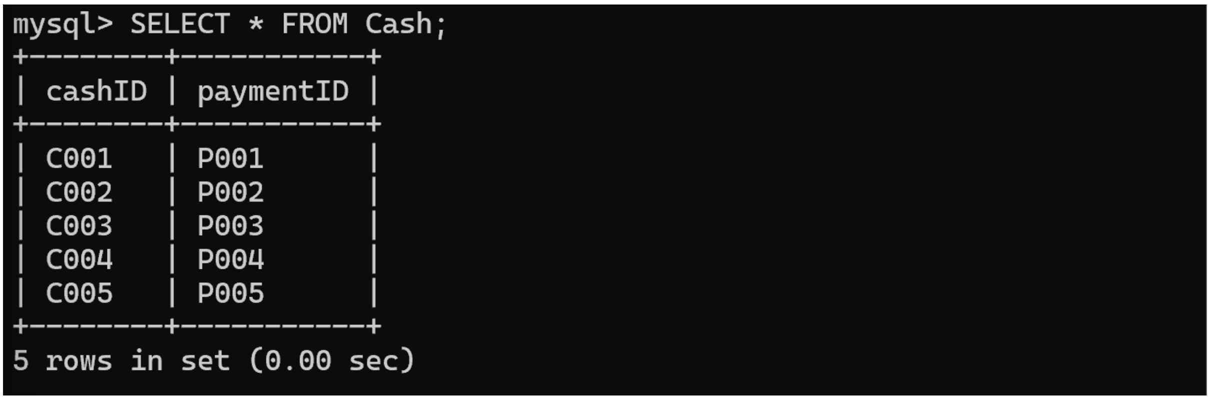
```
mysql> SELECT * FROM  Feedback;
+------------+-----------+---------------+--------+--------------------------------------------+----------------------+
| feedbackID | studentID | dateSubmitted | rating | comments                                   | maintenanceRequestID |
+------------+-----------+---------------+--------+--------------------------------------------+----------------------+
| F001       | S003      | 2024-11-08    |      5 | Solved the issue very fast                 | M001                 |
| F002       | S003      | 2024-12-16    |      4 | Good service but took longer than expected | M002                 |
| F003       | S004      | 2024-12-16    |      3 | Service was okay                           | M003                 |
| F004       | S005      | 2024-11-27    |      5 | Very prompt and efficient service          | M004                 |
| F005       | S003      | 2024-11-02    |      5 | Good Service and fast                      | M006                 |
+------------+-----------+---------------+--------+--------------------------------------------+----------------------+
5 rows in set (0.00 sec)
```

**Diagram 6.2.7 shows Feedback Entity**



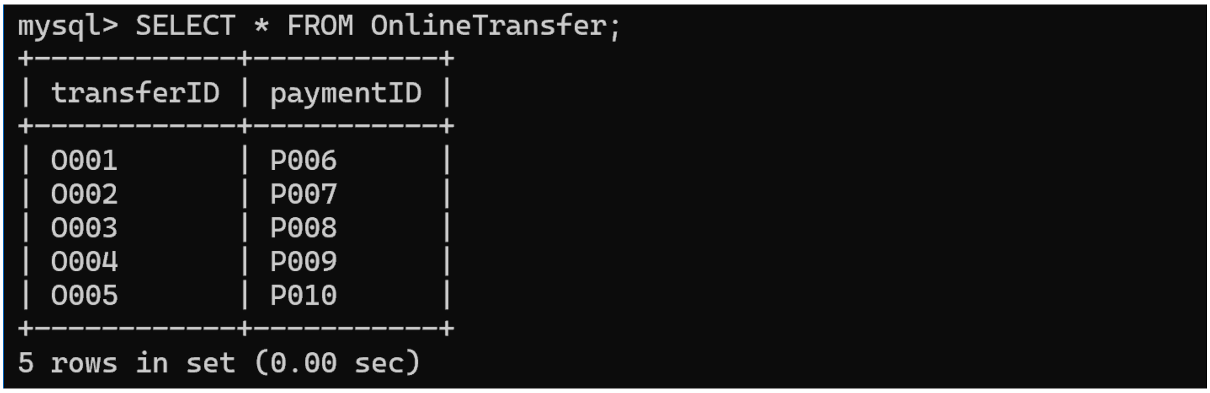
```
mysql> SELECT * FROM Payment;
+-----------+-----------+---------+--------+-------------+-----------------+-----------+
| paymentID | studentID | adminID | amount | paymentDate | paymentMethod   | status    |
+-----------+-----------+---------+--------+-------------+-----------------+-----------+
| P001      | S005      | A002    |  10.00 | 2024-10-05  | CASH            | Completed |
| P002      | S001      | A003    |  50.00 | 2024-10-10  | CASH            | Completed |
| P003      | S002      | A004    | 120.00 | 2024-10-15  | CASH            | Completed |
| P004      | S003      | A005    |  80.00 | 2024-10-20  | CASH            | Completed |
| P005      | S004      | A001    | 150.00 | 2024-10-25  | CASH            | Completed |
| P006      | S001      | A006    |  75.00 | 2024-11-01  | Online Transfer | Completed |
| P007      | S002      | A007    | 100.00 | 2024-11-05  | Online Transfer | Completed |
| P008      | S003      | A008    |  90.00 | 2024-11-10  | Online Transfer | Completed |
| P009      | S004      | A009    | 110.00 | 2024-11-15  | Online Transfer | Completed |
| P010      | S005      | A010    | 130.00 | 2024-11-20  | Online Transfer | Completed |
+-----------+-----------+---------+--------+-------------+-----------------+-----------+
10 rows in set (0.00 sec)
```

**Diagram 6.2.8 shows Payment Entity**



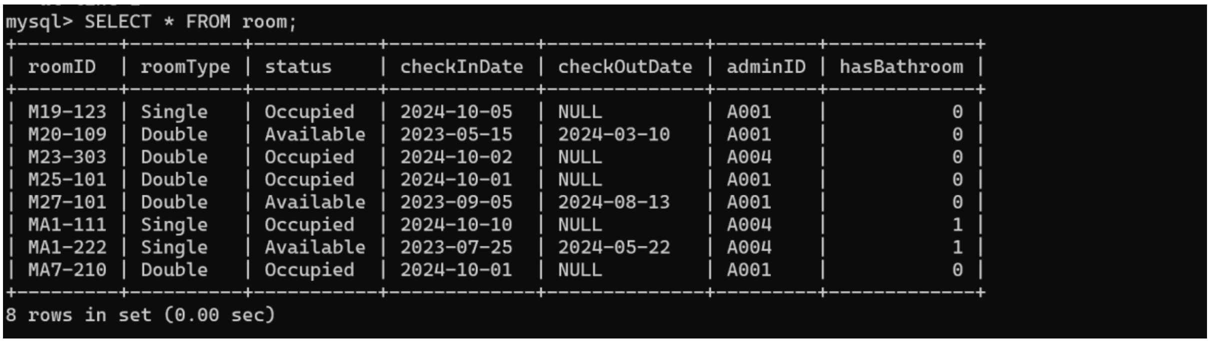
```
mysql> SELECT * FROM Cash;
+--------+-----------+
| cashID | paymentID |
+--------+-----------+
| C001   | P001      |
| C002   | P002      |
| C003   | P003      |
| C004   | P004      |
| C005   | P005      |
+--------+-----------+
5 rows in set (0.00 sec)
```

**Diagram 6.2.9 shows Cash Entity**



```
mysql> SELECT * FROM OnlineTransfer;
+------------+-----------+
| transferID | paymentID |
+------------+-----------+
| O001       | P006      |
| O002       | P007      |
| O003       | P008      |
| O004       | P009      |
| O005       | P010      |
+------------+-----------+
5 rows in set (0.00 sec)
```

**Diagram 6.2.10 shows OnlineTransfer Entity**



```
mysql> SELECT * FROM room;
+---------+----------+-----------+-------------+--------------+---------+-------------+
| roomID  | roomType | status    | checkInDate | checkOutDate | adminID | hasBathroom |
+---------+----------+-----------+-------------+--------------+---------+-------------+
| M19-123 | Single   | Occupied  | 2024-10-05  | NULL         | A001    |           0 |
| M20-109 | Double   | Available | 2023-05-15  | 2024-03-10   | A001    |           0 |
| M23-303 | Double   | Occupied  | 2024-10-02  | NULL         | A004    |           0 |
| M25-101 | Double   | Occupied  | 2024-10-01  | NULL         | A001    |           0 |
| M27-101 | Double   | Available | 2023-09-05  | 2024-08-13   | A001    |           0 |
| MA1-111 | Single   | Occupied  | 2024-10-10  | NULL         | A004    |           1 |
| MA1-222 | Single   | Available | 2023-07-25  | 2024-05-22   | A004    |           1 |
| MA7-210 | Double   | Occupied  | 2024-10-01  | NULL         | A001    |           0 |
+---------+----------+-----------+-------------+--------------+---------+-------------+
8 rows in set (0.00 sec)
```

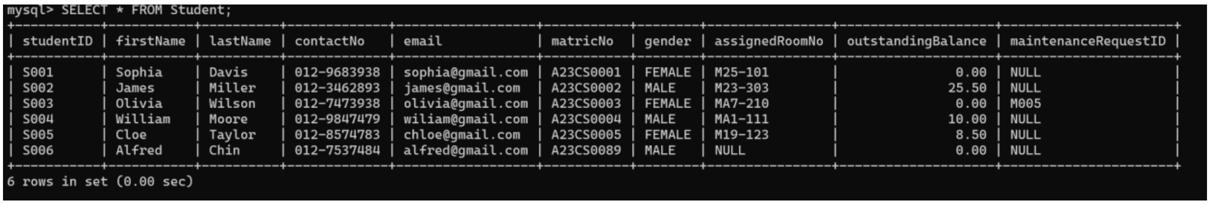
**Diagram 6.2.11 shows Room Entity**

## Situation:

1. When new student registers the system

**INSERT INTO Student**

**VALUES ('S006', 'Alfred', 'Chin', '012-7537484', 'alfred@gmail.com', 'A23CS0089', 'MALE', NULL, 0.00, NULL);**



```
mysql> SELECT * FROM Student;
+-----------+-----------+----------+-------------+------------------+-----------+--------+----------------+--------------------+----------------------+
| studentID | firstName | lastName | contactNo   | email            | matricNo  | gender | assignedRoomNo | outstandingBalance | maintenanceRequestID |
+-----------+-----------+----------+-------------+------------------+-----------+--------+----------------+--------------------+----------------------+
| S001      | Sophia    | Davis    | 012-9683938 | sophia@gmail.com | A23CS0001 | FEMALE | M25-101        |               0.00 | NULL                 |
| S002      | James     | Miller   | 012-3462893 | james@gmail.com  | A23CS0002 | MALE   | M23-303        |              25.50 | NULL                 |
| S003      | Olivia    | Wilson   | 012-7473938 | olivia@gmail.com | A23CS0003 | FEMALE | MA7-210        |               0.00 | M005                 |
| S004      | William   | Moore    | 012-9847479 | wiliam@gmail.com | A23CS0004 | MALE   | MA1-111        |              10.00 | NULL                 |
| S005      | Cloe      | Taylor   | 012-8574783 | chloe@gmail.com  | A23CS0005 | FEMALE | M19-123        |               8.50 | NULL                 |
| S006      | Alfred    | Chin     | 012-7537484 | alfred@gmail.com | A23CS0089 | MALE   | NULL           |               0.00 | NULL                 |
+-----------+-----------+----------+-------------+------------------+-----------+--------+----------------+--------------------+----------------------+
6 rows in set (0.00 sec)
```

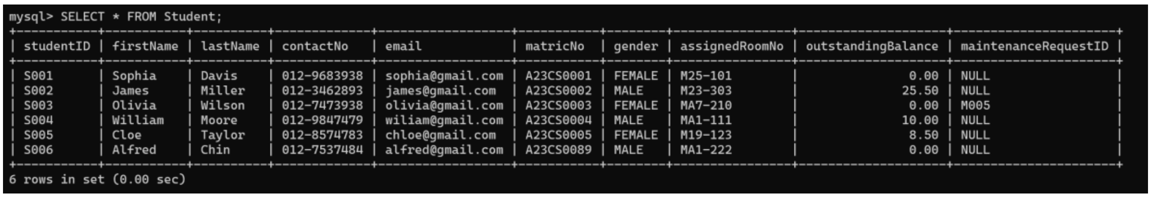
**Diagram 6.2.12 shows Updated Student Entity**

2. Student register room
**UPDATE Student**
**SET assignedRoomNo ='MA1-222'**
**WHERE studentID='S006';**

**UPDATE Room**
**SET status='Occupied'**
**WHERE roomID='MA1-222';**

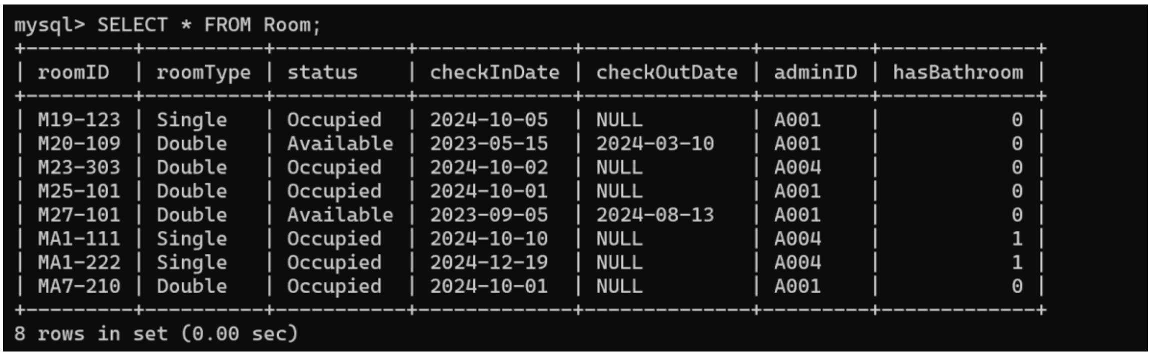
**UPDATE Room**
**SET checkOutDate=NULL**
**WHERE roomID='MA1-222';**

**UPDATE Room**
**SET checkInDate='2024-12-19'**
**WHERE roomID='MA1-222';**



```
mysql> SELECT * FROM Student;
+-----------+-----------+----------+-------------+------------------+-----------+--------+----------------+--------------------+----------------------+
| studentID | firstName | lastName | contactNo   | email            | matricNo  | gender | assignedRoomNo | outstandingBalance | maintenanceRequestID |
+-----------+-----------+----------+-------------+------------------+-----------+--------+----------------+--------------------+----------------------+
| S001      | Sophia    | Davis    | 012-9683938 | sophia@gmail.com | A23CS0001 | FEMALE | M25-101        |               0.00 | NULL                 |
| S002      | James     | Miller   | 012-3462893 | james@gmail.com  | A23CS0002 | MALE   | M23-303        |              25.50 | NULL                 |
| S003      | Olivia    | Wilson   | 012-7473938 | olivia@gmail.com | A23CS0003 | FEMALE | MA7-210        |               0.00 | M005                 |
| S004      | William   | Moore    | 012-9847479 | wiliam@gmail.com | A23CS0004 | MALE   | MA1-111        |              10.00 | NULL                 |
| S005      | Cloe      | Taylor   | 012-8574783 | chloe@gmail.com  | A23CS0005 | FEMALE | M19-123        |               8.50 | NULL                 |
| S006      | Alfred    | Chin     | 012-7537484 | alfred@gmail.com | A23CS0089 | MALE   | MA1-222        |               0.00 | NULL                 |
+-----------+-----------+----------+-------------+------------------+-----------+--------+----------------+--------------------+----------------------+
6 rows in set (0.00 sec)
```

**Diagram 6.2.13 shows Student Entity after register**

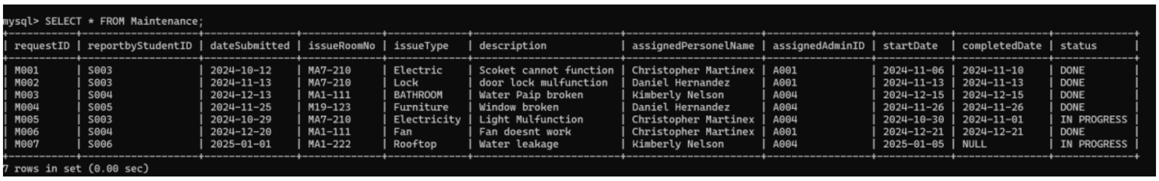


```
mysql> SELECT * FROM Room;
+---------+----------+-----------+-------------+--------------+---------+-------------+
| roomID  | roomType | status    | checkInDate | checkOutDate | adminID | hasBathroom |
+---------+----------+-----------+-------------+--------------+---------+-------------+
| M19-123 | Single   | Occupied  | 2024-10-05  | NULL         | A001    |           0 |
| M20-109 | Double   | Available | 2023-05-15  | 2024-03-10   | A001    |           0 |
| M23-303 | Double   | Occupied  | 2024-10-02  | NULL         | A004    |           0 |
| M25-101 | Double   | Occupied  | 2024-10-01  | NULL         | A001    |           0 |
| M27-101 | Double   | Available | 2023-09-05  | 2024-08-13   | A001    |           0 |
| MA1-111 | Single   | Occupied  | 2024-10-10  | NULL         | A004    |           1 |
| MA1-222 | Single   | Occupied  | 2024-12-19  | NULL         | A004    |           1 |
| MA7-210 | Double   | Occupied  | 2024-10-01  | NULL         | A001    |           0 |
+---------+----------+-----------+-------------+--------------+---------+-------------+
8 rows in set (0.00 sec)
```

**Diagram 6.2.14 shows Room Entity after register**

3. When maintenance request is submitted by student and admin assigned technician to solve the issue.

   **INSERT INTO Maintenance**
   **VALUES ( 'M007', 'S006', '2025-01-01', 'MA1-222', 'Rooftop', 'Water leakage', 'Kimberly Nelson', 'A004', '2025-01-05', NULL, 'IN PROGRESS');**



```
ysql> SELECT * FROM Maintenance;
+-----------+-------------------+---------------+-------------+-------------+------------------------+----------------------+-----------------+------------+---------------+-------------+
| requestID | reportbyStudentID | dateSubmitted | issueRoomNo | issueType   | description            | assignedPersonelName | assignedAdminID | startDate  | completedDate | status      |
+-----------+-------------------+---------------+-------------+-------------+------------------------+----------------------+-----------------+------------+---------------+-------------+
| M001      | S003              | 2024-10-12    | MA7-210     | Electric    | Scoket cannot function | Christopher Martinex | A001            | 2024-11-06 | 2024-11-10    | DONE        |
| M002      | S003              | 2024-11-13    | MA7-210     | Lock        | door lock mulfunction  | Daniel Hernandez     | A001            | 2024-11-13 | 2024-11-13    | DONE        |
| M003      | S004              | 2024-12-13    | MA1-111     | BATHROOM    | Water Paip broken      | Kimberly Nelson      | A004            | 2024-12-15 | 2024-12-15    | DONE        |
| M004      | S005              | 2024-11-25    | M19-123     | Furniture   | Window broken          | Daniel Hernandez     | A004            | 2024-11-26 | 2024-11-26    | DONE        |
| M005      | S003              | 2024-10-29    | MA7-210     | Electricity | Light Mulfunction      | Christopher Martinex | A004            | 2024-10-30 | 2024-11-01    | IN PROGRESS |
| M006      | S004              | 2024-12-20    | MA1-111     | Fan         | Fan doesnt work        | Christopher Martinex | A001            | 2024-12-21 | 2024-12-21    | DONE        |
| M007      | S006              | 2025-01-01    | MA1-222     | Rooftop     | Water leakage          | Kimberly Nelson      | A004            | 2025-01-05 | NULL          | IN PROGRESS |
+-----------+-------------------+---------------+-------------+-------------+------------------------+----------------------+-----------------+------------+---------------+-------------+
7 rows in set (0.00 sec)
```

**Diagram 6.2.15 shows Maintenance Entity when new maintenance appear**

4. When the maintenance is completed

   **UPDATE Maintenance**

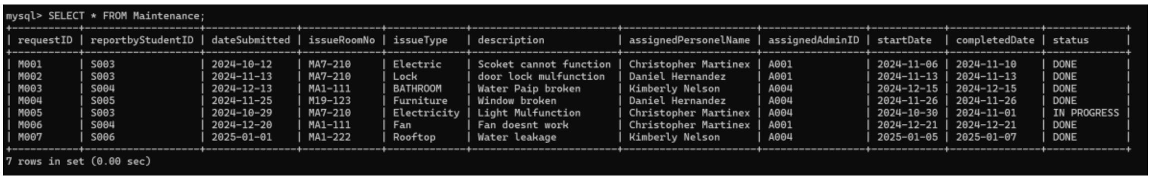
   **SET completedDate='2025-01-07'**

   **WHERE requestID='M007';**

   **UPDATE Maintenance**

   **SET status='DONE'**

   **WHERE requestID='M007';**

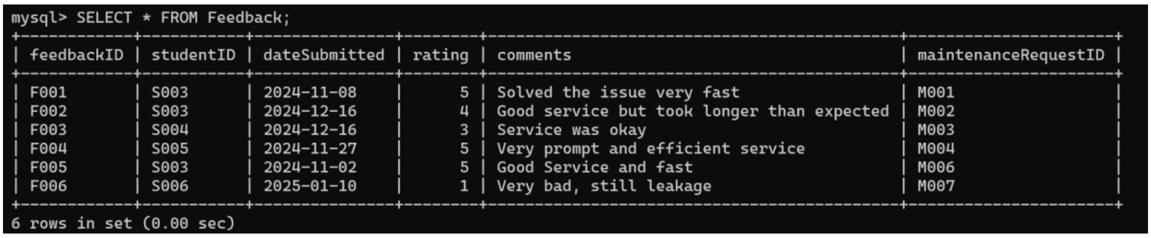


```
mysql> SELECT * FROM Maintenance;
+-----------+-------------------+---------------+-------------+-------------+------------------------+----------------------+-----------------+------------+---------------+-------------+
| requestID | reportbyStudentID | dateSubmitted | issueRoomNo | issueType   | description            | assignedPersonelName | assignedAdminID | startDate  | completedDate | status      |
+-----------+-------------------+---------------+-------------+-------------+------------------------+----------------------+-----------------+------------+---------------+-------------+
| M001      | S003              | 2024-10-12    | MA7-210     | Electric    | Scoket cannot function | Christopher Martinex | A001            | 2024-11-06 | 2024-11-10    | DONE        |
| M002      | S003              | 2024-11-13    | MA7-210     | Lock        | door lock mulfunction  | Daniel Hernandez     | A001            | 2024-11-13 | 2024-11-13    | DONE        |
| M003      | S004              | 2024-12-13    | MA1-111     | BATHROOM    | Water Paip broken      | Kimberly Nelson      | A004            | 2024-12-15 | 2024-12-15    | DONE        |
| M004      | S005              | 2024-11-25    | M19-123     | Furniture   | Window broken          | Daniel Hernandez     | A004            | 2024-11-26 | 2024-11-26    | DONE        |
| M005      | S003              | 2024-10-29    | MA7-210     | Electricity | Light Mulfunction      | Christopher Martinex | A004            | 2024-10-30 | 2024-11-01    | IN PROGRESS |
| M006      | S004              | 2024-12-20    | MA1-111     | Fan         | Fan doesnt work        | Christopher Martinex | A001            | 2024-12-21 | 2024-12-21    | DONE        |
| M007      | S006              | 2025-01-01    | MA1-222     | Rooftop     | Water leakage          | Kimberly Nelson      | A004            | 2025-01-05 | 2025-01-07    | DONE        |
+-----------+-------------------+---------------+-------------+-------------+------------------------+----------------------+-----------------+------------+---------------+-------------+
7 rows in set (0.00 sec)
```

**Diagram 6.2.16 shows Maintenance Entity when maintenance process is completed**

5. Students give feedback for the maintenance

**INSERT INTO Feedback**
**VALUES ('F006', 'S006','2025-01-10', 1, 'Very bad, still leakage', 'M007');**

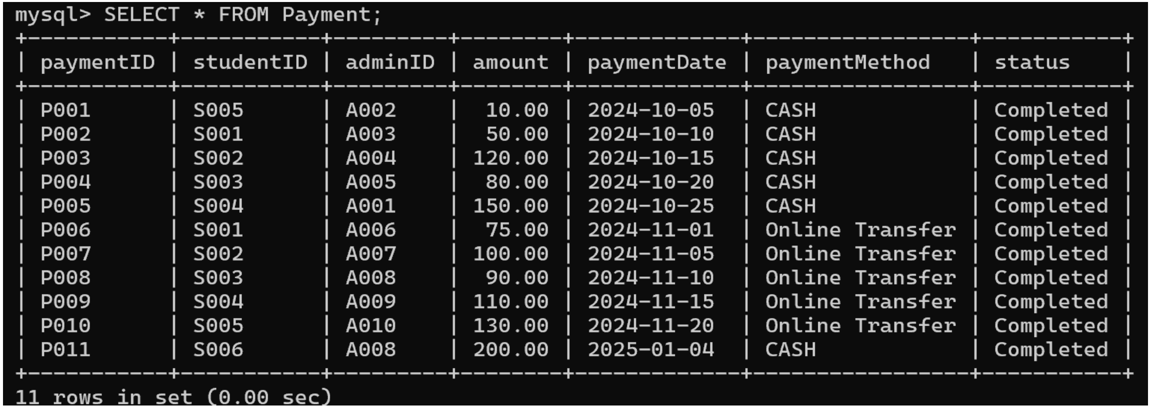


```
mysql> SELECT * FROM Feedback;
+------------+-----------+---------------+--------+--------------------------------------------+----------------------+
| feedbackID | studentID | dateSubmitted | rating | comments                                   | maintenanceRequestID |
+------------+-----------+---------------+--------+--------------------------------------------+----------------------+
| F001       | S003      | 2024-11-08    |      5 | Solved the issue very fast                 | M001                 |
| F002       | S003      | 2024-12-16    |      4 | Good service but took longer than expected | M002                 |
| F003       | S004      | 2024-12-16    |      3 | Service was okay                           | M003                 |
| F004       | S005      | 2024-11-27    |      5 | Very prompt and efficient service          | M004                 |
| F005       | S003      | 2024-11-02    |      5 | Good Service and fast                      | M006                 |
| F006       | S006      | 2025-01-10    |      1 | Very bad, still leakage                    | M007                 |
+------------+-----------+---------------+--------+--------------------------------------------+----------------------+
6 rows in set (0.00 sec)
```

**Diagram 6.2.17 shows Feedback Entity after submit feedback for maintenance**

**6.** Student makes payment

**INSERT INTO Payment**
**VALUES ('P011', 'S006', 'A008', 200.00, '2025-01-04', 'CASH', 'Completed');**



```
mysql> SELECT * FROM Payment;
+-----------+-----------+---------+--------+-------------+-----------------+-----------+
| paymentID | studentID | adminID | amount | paymentDate | paymentMethod   | status    |
+-----------+-----------+---------+--------+-------------+-----------------+-----------+
| P001      | S005      | A002    |  10.00 | 2024-10-05  | CASH            | Completed |
| P002      | S001      | A003    |  50.00 | 2024-10-10  | CASH            | Completed |
| P003      | S002      | A004    | 120.00 | 2024-10-15  | CASH            | Completed |
| P004      | S003      | A005    |  80.00 | 2024-10-20  | CASH            | Completed |
| P005      | S004      | A001    | 150.00 | 2024-10-25  | CASH            | Completed |
| P006      | S001      | A006    |  75.00 | 2024-11-01  | Online Transfer | Completed |
| P007      | S002      | A007    | 100.00 | 2024-11-05  | Online Transfer | Completed |
| P008      | S003      | A008    |  90.00 | 2024-11-10  | Online Transfer | Completed |
| P009      | S004      | A009    | 110.00 | 2024-11-15  | Online Transfer | Completed |
| P010      | S005      | A010    | 130.00 | 2024-11-20  | Online Transfer | Completed |
| P011      | S006      | A008    | 200.00 | 2025-01-04  | CASH            | Completed |
+-----------+-----------+---------+--------+-------------+-----------------+-----------+
11 rows in set (0.00 sec)
```

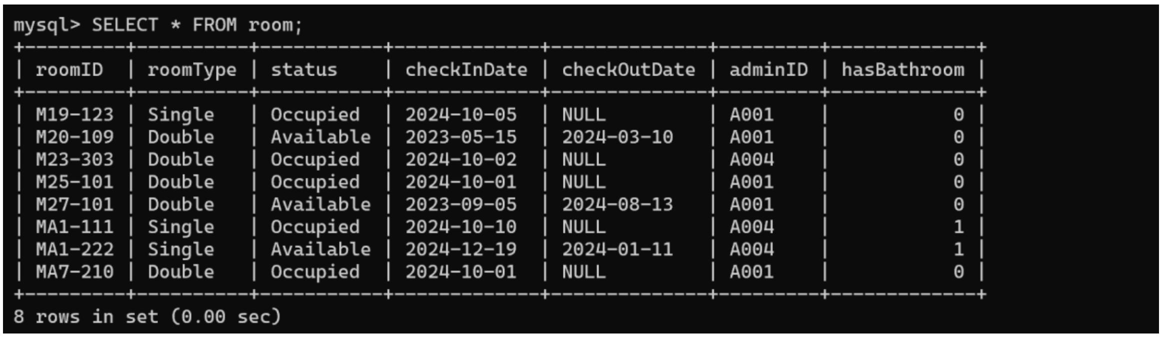
**Diagram 6.2.18 shows Payment Entity when payment is made**

**7.** Student withdraws and checkouts from the hostel

**UPDATE Room**
**SET checkOutDate='2024-01-11'**
**WHERE roomID='MA1-222';**

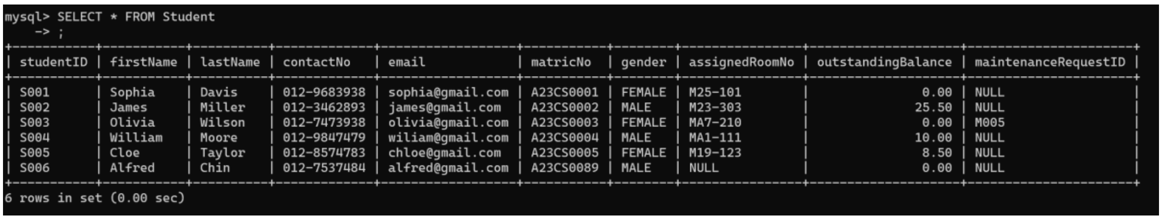
**UPDATE Room**
**SET status='Available'**
**WHERE roomID='MA1-222';**

**UPDATE Student**
**SET assignedRoomNo=NULL**
**WHERE studentID='S006';**



```
mysql> SELECT * FROM room;
+---------+----------+-----------+-------------+--------------+---------+-------------+
| roomID  | roomType | status    | checkInDate | checkOutDate | adminID | hasBathroom |
+---------+----------+-----------+-------------+--------------+---------+-------------+
| M19-123 | Single   | Occupied  | 2024-10-05  | NULL         | A001    |           0 |
| M20-109 | Double   | Available | 2023-05-15  | 2024-03-10   | A001    |           0 |
| M23-303 | Double   | Occupied  | 2024-10-02  | NULL         | A004    |           0 |
| M25-101 | Double   | Occupied  | 2024-10-01  | NULL         | A001    |           0 |
| M27-101 | Double   | Available | 2023-09-05  | 2024-08-13   | A001    |           0 |
| MA1-111 | Single   | Occupied  | 2024-10-10  | NULL         | A004    |           1 |
| MA1-222 | Single   | Available | 2024-12-19  | 2024-01-11   | A004    |           1 |
| MA7-210 | Double   | Occupied  | 2024-10-01  | NULL         | A001    |           0 |
+---------+----------+-----------+-------------+--------------+---------+-------------+
8 rows in set (0.00 sec)
```

**Diagram 6.2.19 shows Room Enitty after student withdraws**



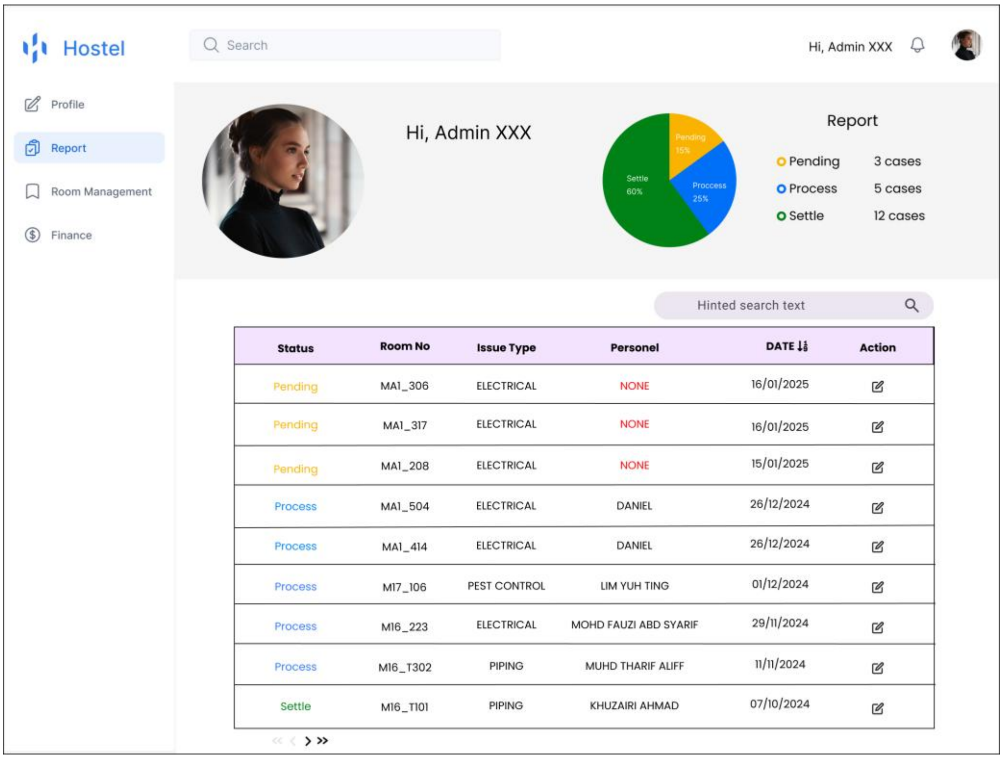
```
mysql> SELECT * FROM Student
    -> ;
+-----------+-----------+----------+-------------+------------------+-----------+--------+----------------+--------------------+----------------------+
| studentID | firstName | lastName | contactNo   | email            | matricNo  | gender | assignedRoomNo | outstandingBalance | maintenanceRequestID |
+-----------+-----------+----------+-------------+------------------+-----------+--------+----------------+--------------------+----------------------+
| S001      | Sophia    | Davis    | 012-9683938 | sophia@gmail.com | A23CS0001 | FEMALE | M25-101        |               0.00 | NULL                 |
| S002      | James     | Miller   | 012-3462893 | james@gmail.com  | A23CS0002 | MALE   | M23-303        |              25.50 | NULL                 |
| S003      | Olivia    | Wilson   | 012-7473938 | olivia@gmail.com | A23CS0003 | FEMALE | MA7-210        |               0.00 | M005                 |
| S004      | William   | Moore    | 012-9847479 | wiliam@gmail.com | A23CS0004 | MALE   | MA1-111        |              10.00 | NULL                 |
| S005      | Cloe      | Taylor   | 012-8574783 | chloe@gmail.com  | A23CS0005 | FEMALE | M19-123        |               8.50 | NULL                 |
| S006      | Alfred    | Chin     | 012-7537484 | alfred@gmail.com | A23CS0089 | MALE   | NULL           |               0.00 | NULL                 |
+-----------+-----------+----------+-------------+------------------+-----------+--------+----------------+--------------------+----------------------+
6 rows in set (0.00 sec)
```

**Diagram 6.2.20 shows Student Entity after student withdraw**

# 7.0 Interface

## Admin View

### Report Management



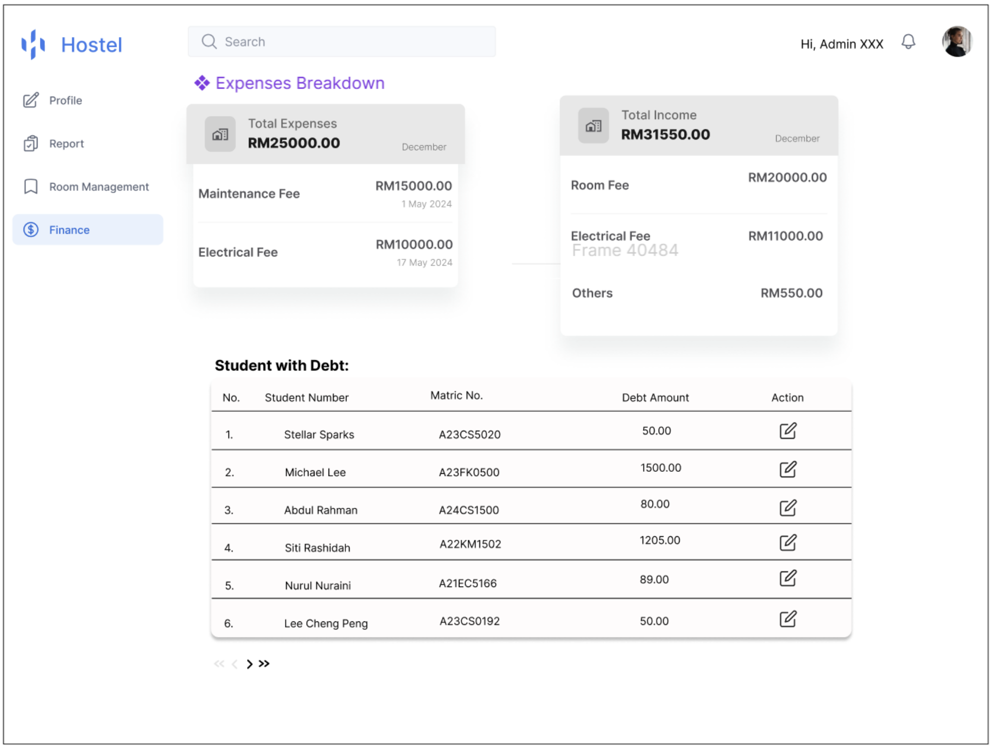
Report

| | |
|---|---|
| ○ Pending | 3 cases |
| ○ Process | 5 cases |
| ○ Settle | 12 cases |

Hinted search text

| Status | Room No | Issue Type | Personel | DATE | Action |
|---|---|---|---|---|---|
| Pending | MA1_306 | ELECTRICAL | NONE | 16/01/2025 | ✎ |
| Pending | MA1_317 | ELECTRICAL | NONE | 16/01/2025 | ✎ |
| Pending | MA1_208 | ELECTRICAL | NONE | 15/01/2025 | ✎ |
| Process | MA1_504 | ELECTRICAL | DANIEL | 26/12/2024 | ✎ |
| Process | MA1_414 | ELECTRICAL | DANIEL | 26/12/2024 | ✎ |
| Process | M17_106 | PEST CONTROL | LIM YUH TING | 01/12/2024 | ✎ |
| Process | M16_223 | ELECTRICAL | MOHD FAUZI ABD SYARIF | 29/11/2024 | ✎ |
| Process | M16_T302 | PIPING | MUHD THARIF ALIFF | 11/11/2024 | ✎ |
| Settle | M16_T101 | PIPING | KHUZAIRI AHMAD | 07/10/2024 | ✎ |

### Financial Management



| Total Expenses | RM25000.00 | December |
|---|---|---|
| Maintenance Fee | RM15000.00<br>1 May 2024 | |
| Electrical Fee | RM10000.00<br>17 May 2024 | |

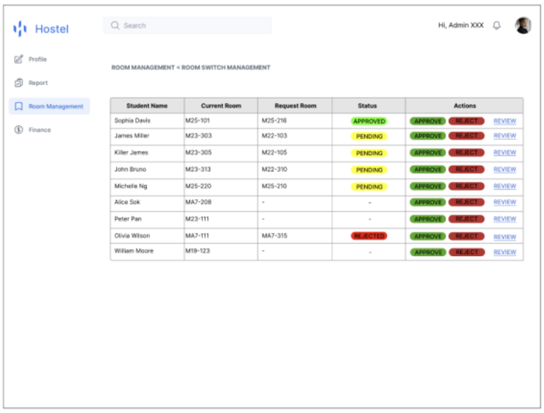
| Total Income | RM31550.00 | December |
|---|---|---|
| Room Fee | RM20000.00 | |
| Electrical Fee | RM11000.00 | |
| Others | RM550.00 | |

Student with Debt:

| No. | Student Number | Matric No. | Debt Amount | Action |
|---|---|---|---|---|
| 1. | Stellar Sparks | A23CS5020 | 50.00 | ✎ |
| 2. | Michael Lee | A23FK0500 | 1500.00 | ✎ |
| 3. | Abdul Rahman | A24CS1500 | 80.00 | ✎ |
| 4. | Siti Rashidah | A22KM1502 | 1205.00 | ✎ |
| 5. | Nurul Nuraini | A21EC5166 | 89.00 | ✎ |
| 6. | Lee Cheng Peng | A23CS0192 | 50.00 | ✎ |

# Room Management

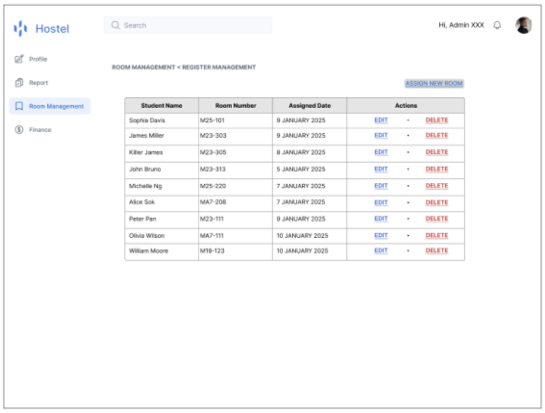
Room Management- Room Switch Management



ROOM MANAGEMENT < ROOM SWITCH MANAGEMENT

| Student Name | Current Room | Request Room | Status | Actions |
|---|---|---|---|---|
| Sophia Davis | M25-101 | M25-216 | APPROVED | APPROVE REJECT REVIEW |
| James Miller | M23-303 | M22-103 | PENDING | APPROVE REJECT REVIEW |
| Killer James | M23-305 | M22-105 | PENDING | APPROVE REJECT REVIEW |
| John Bruno | M23-313 | M22-310 | PENDING | APPROVE REJECT REVIEW |
| Michelle Ng | M25-220 | M25-210 | PENDING | APPROVE REJECT REVIEW |
| Alice Sok | MA7-208 | - | - | APPROVE REJECT REVIEW |
| Peter Pan | M23-111 | - | - | APPROVE REJECT REVIEW |
| Olivia Wilson | MA7-111 | MA7-315 | REJECTED | APPROVE REJECT REVIEW |
| William Moore | M19-123 | - | - | APPROVE REJECT REVIEW |

Room Management - Register Management



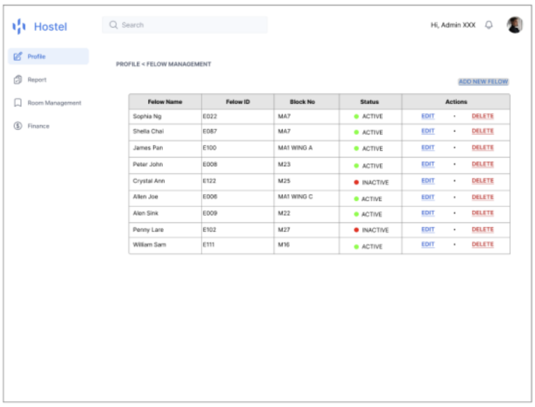
ROOM MANAGEMENT < REGISTER MANAGEMENT

ASSIGN NEW ROOM

| Student Name | Room Number | Assigned Date | Actions |
|---|---|---|---|
| Sophia Davis | M25-101 | 9 JANUARY 2025 | EDIT • DELETE |
| James Miller | M23-303 | 9 JANUARY 2025 | EDIT • DELETE |
| Killer James | M23-305 | 8 JANUARY 2025 | EDIT • DELETE |
| John Bruno | M23-313 | 5 JANUARY 2025 | EDIT • DELETE |
| Michelle Ng | M25-220 | 7 JANUARY 2025 | EDIT • DELETE |
| Alice Sok | MA7-208 | 7 JANUARY 2025 | EDIT • DELETE |
| Peter Pan | M23-111 | 9 JANUARY 2025 | EDIT • DELETE |
| Olivia Wilson | MA7-111 | 10 JANUARY 2025 | EDIT • DELETE |
| William Moore | M19-123 | 10 JANUARY 2025 | EDIT • DELETE |

# User Management

User Management - Felow Management

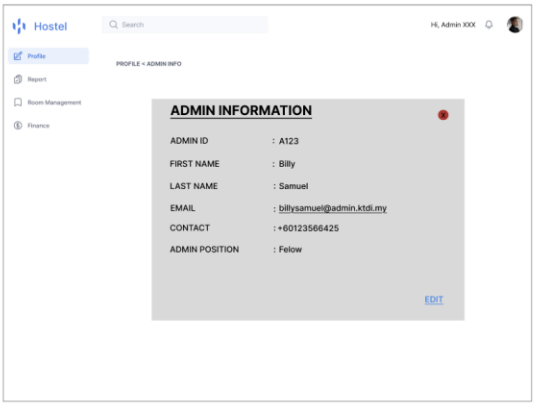


PROFILE < FELOW MANAGEMENT

ADD NEW FELOW

| Felow Name | Felow ID | Block No | Status | Actions |
|---|---|---|---|---|
| Sophia Ng | E022 | MA7 | ● ACTIVE | EDIT • DELETE |
| Shella Chai | E087 | MA7 | ● ACTIVE | EDIT • DELETE |
| James Pan | E100 | MA1 WING A | ● ACTIVE | EDIT • DELETE |
| Peter John | E008 | M23 | ● ACTIVE | EDIT • DELETE |
| Crystal Ann | E122 | M25 | ● INACTIVE | EDIT • DELETE |
| Allen Joe | E006 | MA1 WING C | ● ACTIVE | EDIT • DELETE |
| Alen Sink | E009 | M22 | ● ACTIVE | EDIT • DELETE |
| Penny Lare | E102 | M27 | ● INACTIVE | EDIT • DELETE |
| William Sam | E111 | M16 | ● ACTIVE | EDIT • DELETE |

User Management - Admin Info



PROFILE < ADMIN INFO

ADMIN INFORMATION

ADMIN ID : A123

FIRST NAME : Billy

LAST NAME : Samuel

EMAIL : billysamuel@admin.ktdi.my

CONTACT : +60123566425

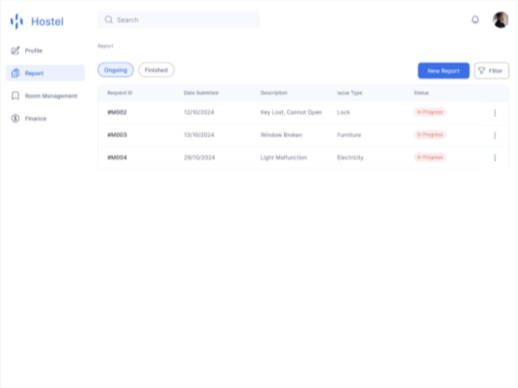
ADMIN POSITION : Felow

EDIT

## Student View:

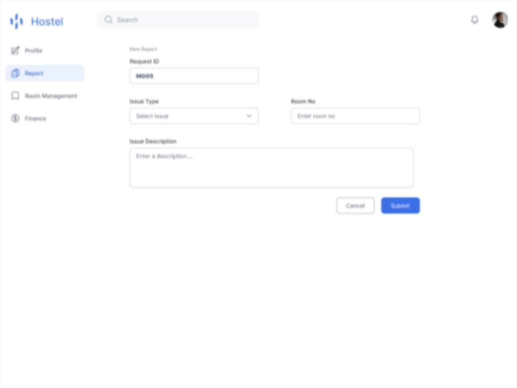
### Report

Report Status



| Request ID | Date Submited | Description | Issue Type | Status |
|---|---|---|---|---|
| #M002 | 12/10/2024 | Key Lost, Cannot Open | Lock | In Progress |
| #M003 | 13/10/2024 | Window Broken | Furniture | In Progress |
| #M004 | 29/10/2024 | Light Malfunction | Electricity | In Progress |

Report Issue



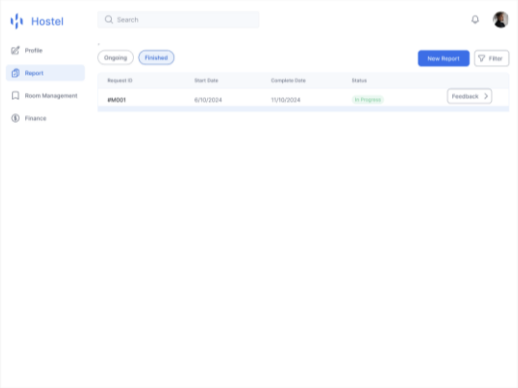
Request ID: M005

Issue Type

Room No

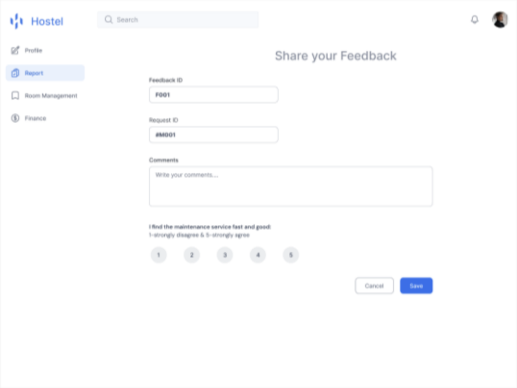
Issue Description

Report Finished



| Request ID | Start Date | Complete Date | Status |
|---|---|---|---|
| #M001 | 6/10/2024 | 11/10/2024 | In Progress |

Feedback



Share your Feedback

Feedback ID: F001

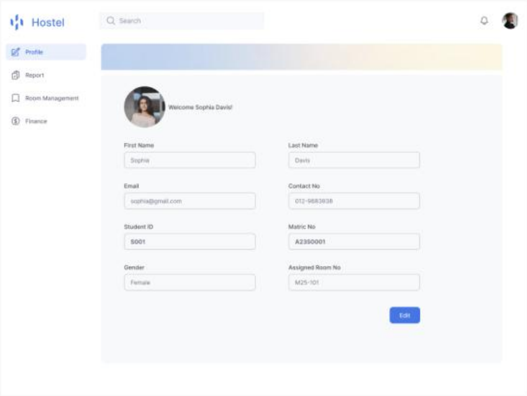
Request ID: #M001

Comments

I find the maintenance service fast and good:
1-strongly disagree & 5-strongly agree

### Profile

ViewProfile



Welcome Sophia Davis!

First Name: Sophia

Last Name: Davis

Email: sophia@gmail.com

Contact No: 012-9683938

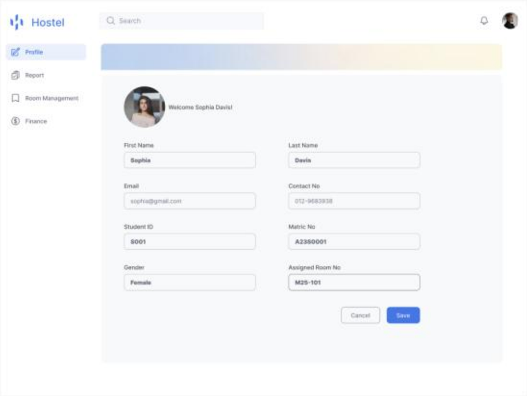
Student ID: S001

Matric No: A23S0001

Gender: Female

Assigned Room No: M25-101

EditProfile



Welcome Sophia Davis!

First Name: Sophia

Last Name: Davis

Email: sophia@gmail.com

Contact No: 012-9683938

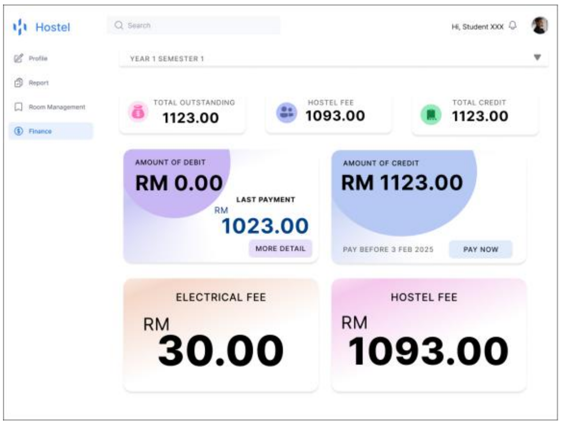
Student ID: S001

Matric No: A23S0001

Gender: Female

Assigned Room No: M25-101

## Financial Management



YEAR 1 SEMESTER 1

TOTAL OUTSTANDING 1123.00

HOSTEL FEE 1093.00

TOTAL CREDIT 1123.00

AMOUNT OF DEBIT RM 0.00

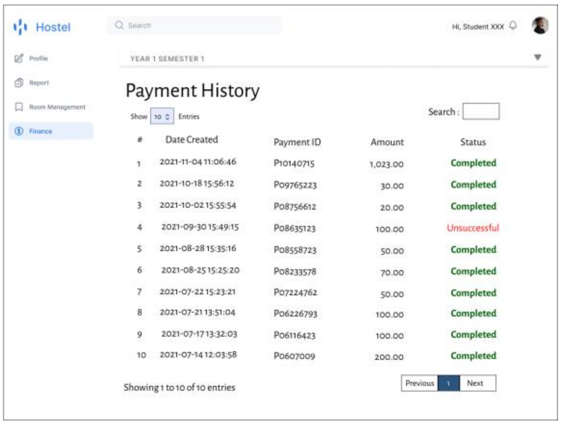
LAST PAYMENT RM 1023.00

AMOUNT OF CREDIT RM 1123.00

PAY BEFORE 3 FEB 2025

ELECTRICAL FEE RM 30.00

HOSTEL FEE RM 1093.00



YEAR 1 SEMESTER 1

### Payment History

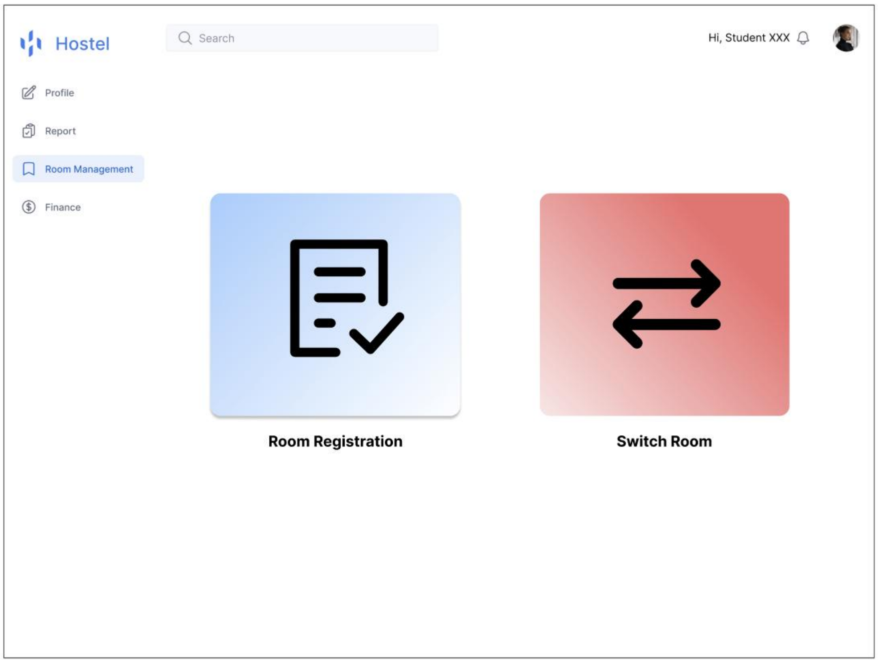
Show 10 Entries

Search :

| # | Date Created | Payment ID | Amount | Status |
|---|---|---|---|---|
| 1 | 2021-11-04 11:06:46 | P10140715 | 1,023.00 | Completed |
| 2 | 2021-10-18 15:56:12 | P09765223 | 30.00 | Completed |
| 3 | 2021-10-02 15:55:54 | P08756612 | 20.00 | Completed |
| 4 | 2021-09-30 15:49:15 | P08635123 | 100.00 | Unsuccessful |
| 5 | 2021-08-28 15:35:16 | P08558723 | 50.00 | Completed |
| 6 | 2021-08-25 15:25:20 | P08233578 | 70.00 | Completed |
| 7 | 2021-07-22 15:23:21 | P07224762 | 50.00 | Completed |
| 8 | 2021-07-21 13:51:04 | P06226793 | 100.00 | Completed |
| 9 | 2021-07-17 13:32:03 | P06116423 | 100.00 | Completed |
| 10 | 2021-07-14 12:03:58 | P0607009 | 200.00 | Completed |

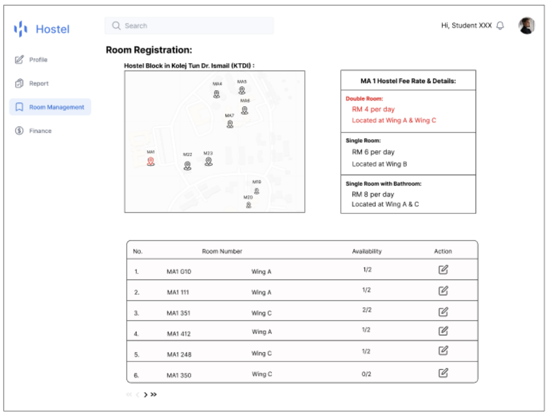
Showing 1 to 10 of 10 entries

## Room Management (Main Page)



# Room Management (Registration & Switch Room)

Room Management (Register)



**Room Registration:**

**Hostel Block in Kolej Tun Dr. Ismail (KTDI) :**

**MA 1 Hostel Fee Rate & Details:**

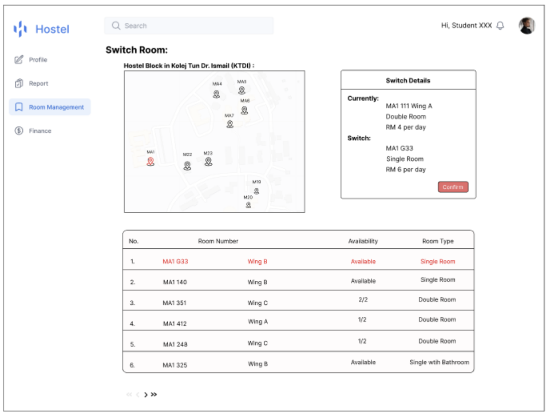
**Double Room:**
RM 4 per day
Located at Wing A & Wing C

**Single Room:**
RM 6 per day
Located at Wing B

**Single Room with Bathroom:**
RM 8 per day
Located at Wing A & C

| No. | Room Number | | Availability | Action |
|---|---|---|---|---|
| 1. | MA1 G10 | Wing A | 1/2 | ✎ |
| 2. | MA1 111 | Wing A | 1/2 | ✎ |
| 3. | MA1 351 | Wing C | 2/2 | ✎ |
| 4. | MA1 412 | Wing A | 1/2 | ✎ |
| 5. | MA1 248 | Wing C | 1/2 | ✎ |
| 6. | MA1 350 | Wing C | 0/2 | ✎ |

Room Management (Switch Room)



**Switch Room:**

**Hostel Block in Kolej Tun Dr. Ismail (KTDI) :**

**Switch Details**

**Currently:**
MA1 111 Wing A
Double Room
RM 4 per day

**Switch:**
MA1 G33
Single Room
RM 6 per day

| No. | Room Number | | Availability | Room Type |
|---|---|---|---|---|
| 1. | MA1 G33 | Wing B | Available | Single Room |
| 2. | MA1 140 | Wing B | Available | Single Room |
| 3. | MA1 351 | Wing C | 2/2 | Double Room |
| 4. | MA1 412 | Wing A | 1/2 | Double Room |
| 5. | MA1 248 | Wing C | 1/2 | Double Room |
| 6. | MA1 325 | Wing B | Available | Single wtih Bathroom |

## 8.0 Summary

In this phase, we focused on refining the database design by converting the conceptual model into a logical structure. This involved creating a Logical Entity Relationship Diagram (ERD) to better represent the relationships and attributes of the system. Each entity was analysed to identify primary keys, relationships, and dependencies, ensuring a clear and efficient database design.

Normalization played a significant role in this phase, helping to organize data into well-structured tables. Through this process, we eliminated data redundancy and maintained consistency by breaking down the entities into simpler forms. For example, entities like Student, Room, Admin, Payment, Feedback, Maintenance, Felow, Pengetua, Staff, Cash and Online Transfer were normalized up to the Boyce-Codd Normal Form (BCNF), ensuring every attribute depended solely on the primary key.

The result includes a set of relational schemas that are well-structured and optimized for data retrieval and management. This foundation is essential for ensuring the database supports key operations such as managing student accommodations, processing payments, and handling maintenance requests efficiently. Overall, the logical design ensures that the system is scalable, reliable, and ready for implementation using mySQL.