

**Figure 1: ERD Diagram**

The entity relationship diagram (ERD) depicts the RFID access control and attendance database system. The "Users" table relates to "Access\_Denied" and "Access" tables in a many-to-many relationship, reflecting instances of denied and granted access. Similarly, the "Access" table has a many-to-many connection with the "Faculty" table, indicating multiple faculty members can have access to various rooms.

Furthermore, there is a many-to-one association between "Users" and "Security," showcasing that users can possess different security levels. Similarly, "Accesspoints" has a many-to-one relationship with "Security," highlighting that access points are associated with specific security levels.

The "Accesspoints" table is linked to both "Access\_Denied" and "Access" tables in a one-to-many relationship, indicating that access points record instances of both denied and granted access.

Lastly, a one-to-many connection between "Security" and "Faculty" denotes that a particular security level can be assigned to multiple faculty members, enhancing the overall control and security of the system.

**Figure 2 :Swimlane Diagram**

In the 3-swimlane diagram, the RFID access control process unfolds across three distinct lanes: the "RFID Reader," "Security System," and "Data Base."

### 1. RFID Reader Lane:

- When the system is powered, the RFID is in a waiting state for a scan.
- If the RFID Reader is waiting for a scan, it pauses for further scans for a specific duration.
- After the pause, if enough time has passed, the RFID goes back to waiting for a scan. If not, it remains in the paused state.

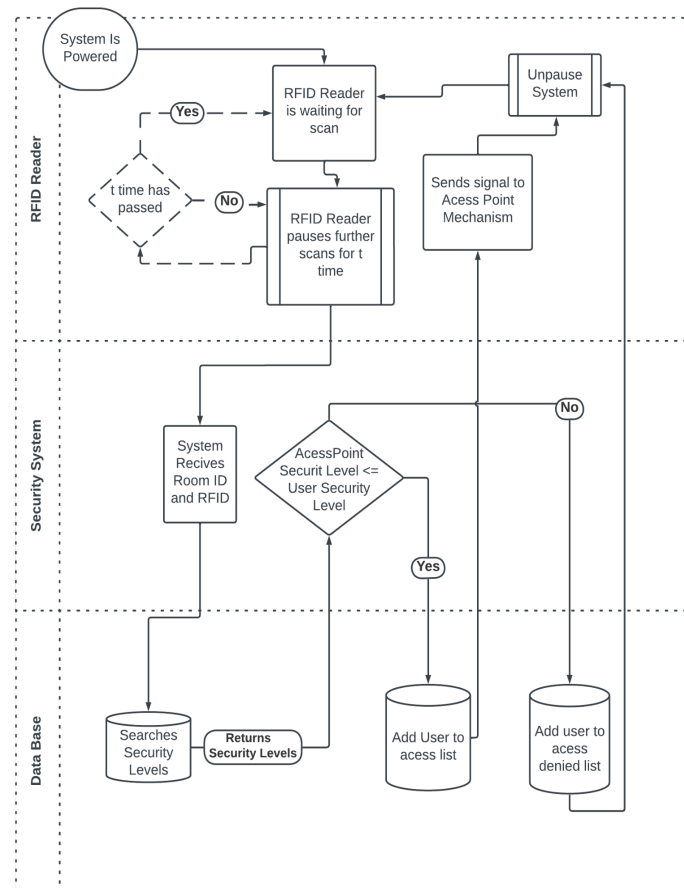
### 2. Security System Lane:

- The RFID Reader, when paused for further scans, eventually receives the Room ID and RFID information from the system.
- The system then proceeds to search for security levels associated with the received Room ID and RFID.

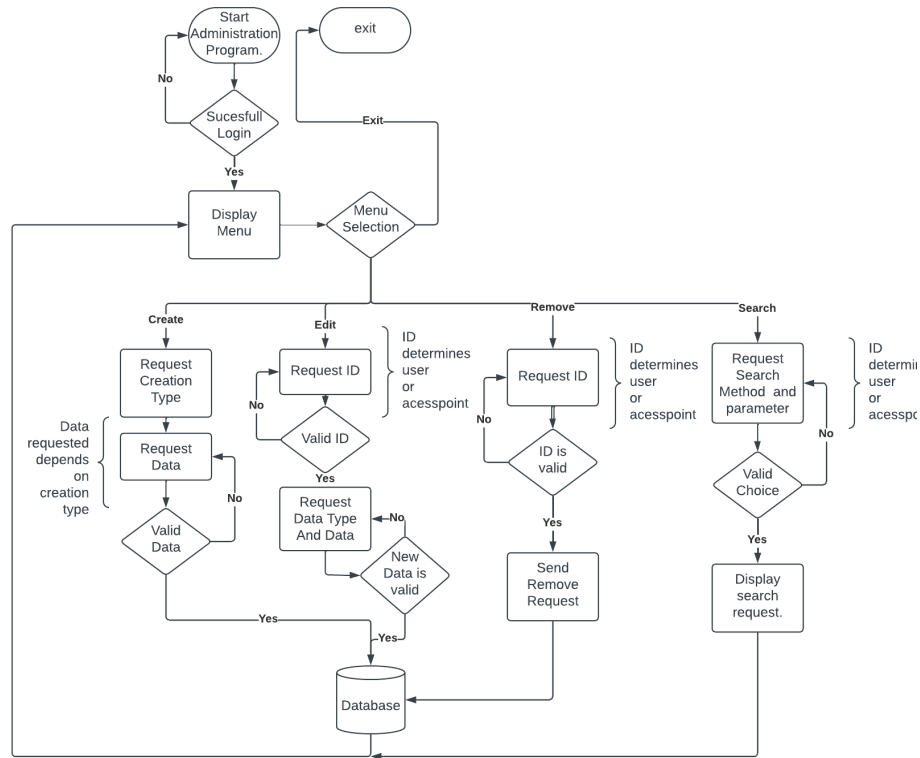
- Upon finding the security levels, the system checks if the AccessPoint Security Level is less than or equal to the User Security Level.

### 3. Data Base Lane:

- If the AccessPoint Security Level is not less than or equal to the User Security Level, the system adds the user to the access denied list, unpauses the system, and returns the RFID Reader to the waiting state for a scan.
- If the AccessPoint Security Level is satisfactory, the user is added to the access list, a signal is sent to the Access Point Mechanism, and the system is unpaused. The RFID Reader then resumes waiting for a scan.



This 3-swimlane diagram clearly delineates the responsibilities and interactions among the RFID Reader, Security System, and Database during the RFID access control process.



**Figure 3: Administration Software Activity Diagram**

The Administration Software Activity Diagram diagram illustrates the flow of an administration program, starting with the login process and branching into various menu options.

**1. Start Administration Program:**

- Initiates the administration program, leading to a login attempt.

**2. Successful Login:**

- If the login is unsuccessful, the program loops back to start the administration program.
- If successful, the program proceeds to display the menu.

**3. Display Menu:**

- Users make selections from the menu, leading to different actions.

**4. Menu Selection - Exit:**

- Choosing to exit the program terminates the process.

**5. Menu Selection - Create:**

- Initiates the creation process by requesting the creation type and data.
- Validates the entered data. If invalid, the program returns to requesting data.
- If data is valid, the information is sent to the database.

#### **6. Menu Selection - Edit:**

- Requests the ID to be edited.
- Validates the entered ID. If invalid, the program returns to requesting an ID.
- If ID is valid, it proceeds to request data type and new data.
- Validates the new data. If invalid, the program returns to requesting data.
- If new data is valid, it is sent to the database.

#### **7. Menu Selection - Remove:**

- Requests the ID to be removed.
- Validates the entered ID. If invalid, the program returns to requesting an ID.
- If the ID is valid, it sends a removal request to the database.

#### **8. Menu Selection - Search:**

- Requests the search method and parameters.
- Validates the chosen parameters. If invalid, the program returns to requesting search parameters.
- If parameters are valid, it displays the search results from the database.

#### **9. Database - Display Menu:**

- After any action is performed, the program returns to the menu, creating a loop in the process.

This Administration Software Activity diagram provides an overview of the administration program's functionality and the sequence of actions based on user interactions.