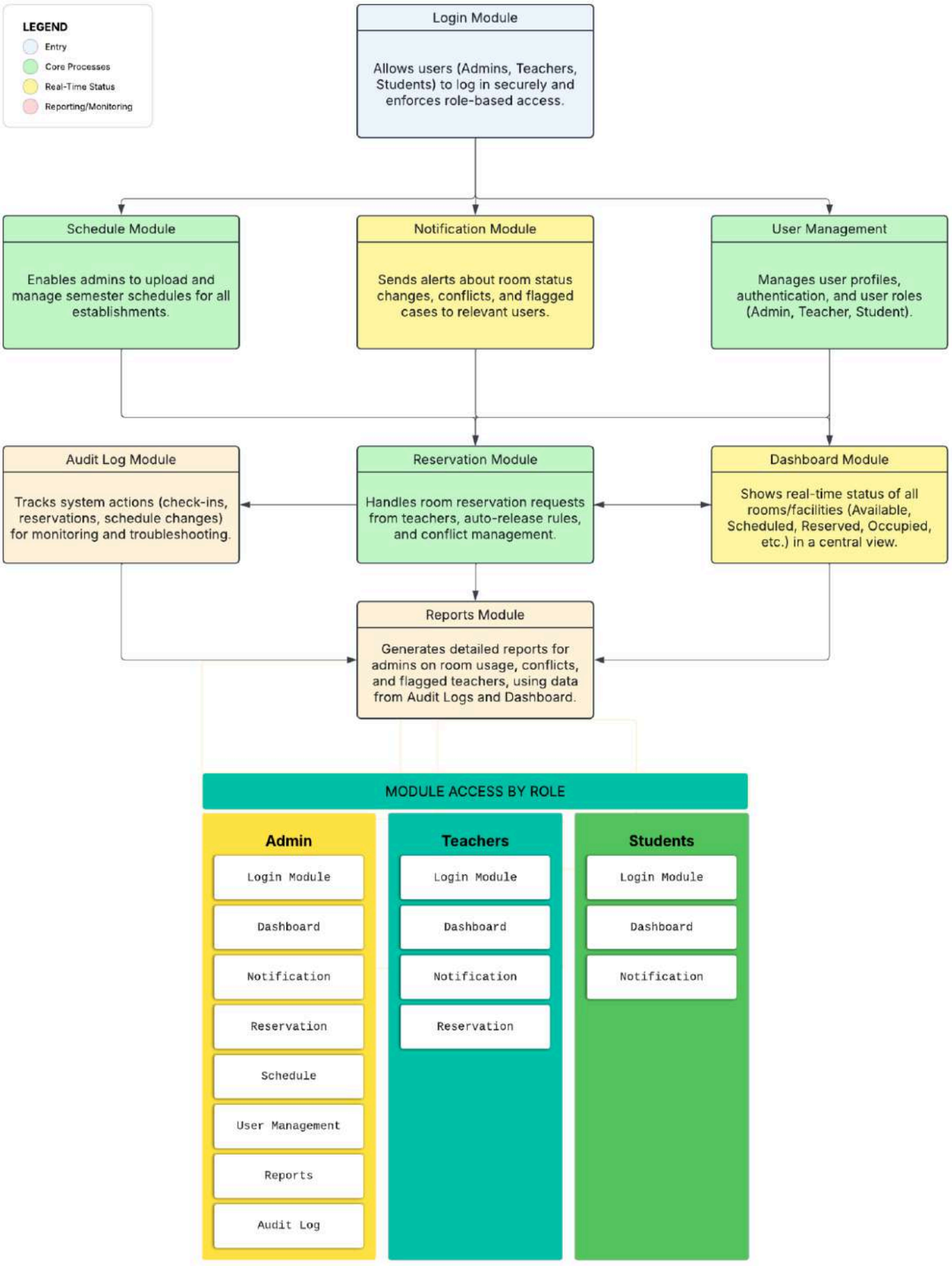
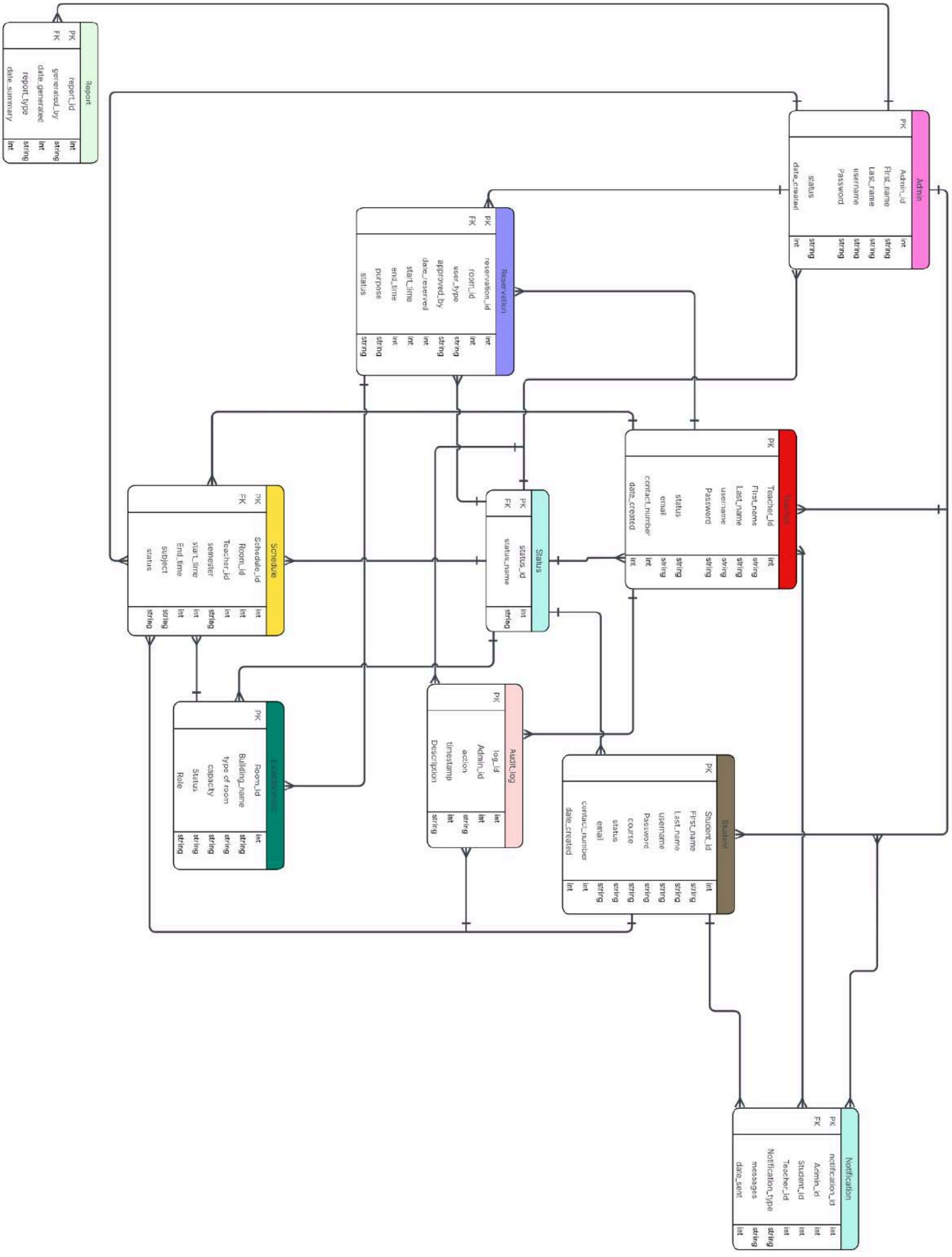
System Design Document (SDD)

1. System Architecture

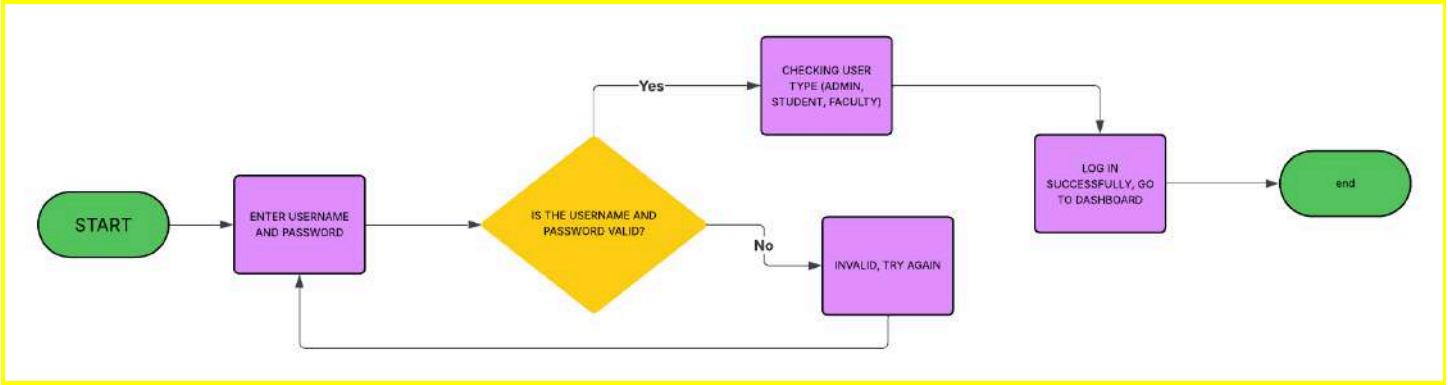


2. Database Design ERD



3. Process Design

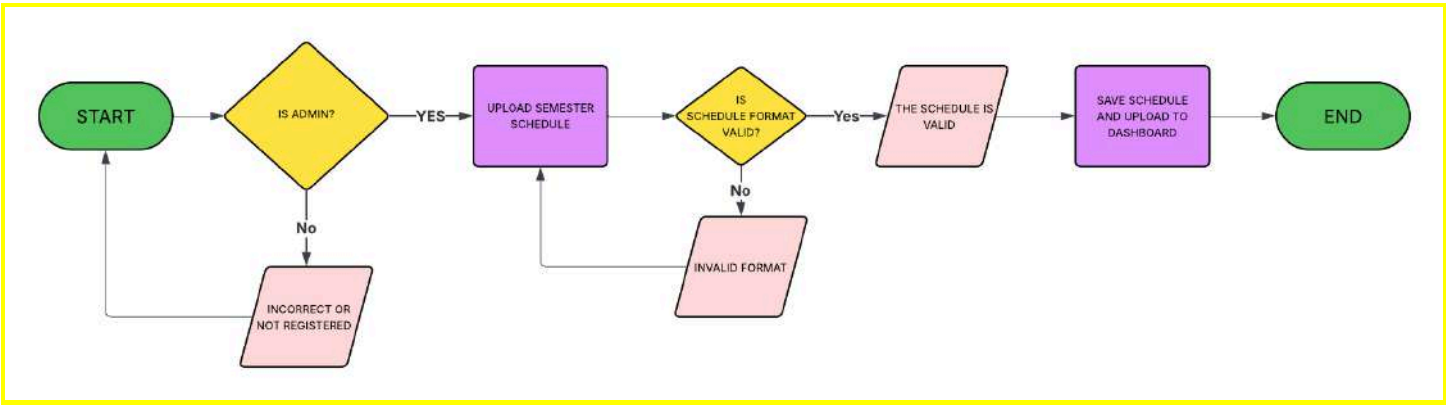
Process 1: Log-in process (User authentication and role-based access)



Step-by-Step Explanation:

1. Enters username and password.
2. System validates credentials & check user type.
    - If valid, user is logged in and redirected to actual dashboard of a specific user-type.
    - If invalid, error message is shown and user retries.

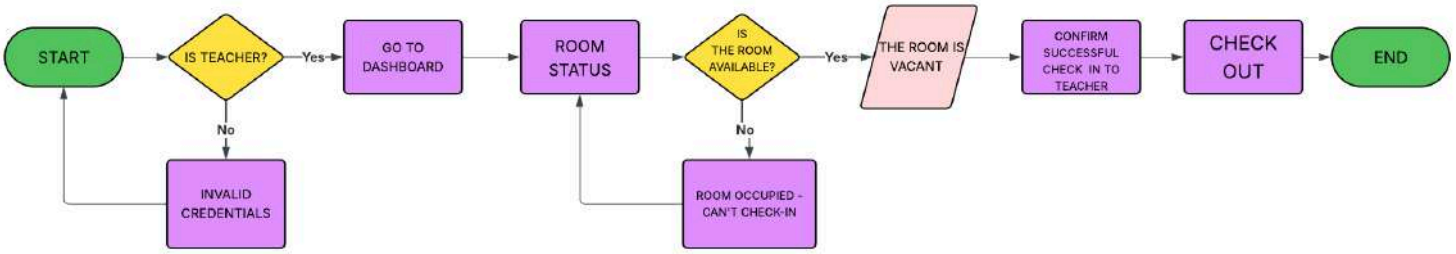
Process 2: Admin Upload Schedule Process (Upload and validate semester schedule)



Step-by-Step Explanation:

1. System check admin credentials.
    a. Yes: Allow access to semester upload.
    b. No: Invalid credentials.
2. Admin uploads semester schedule file.
3. System validates schedule format and data consistency.
    a. If invalid, shows error and prompts correction.
4. If valid, schedule is saved to the system and linked to relevant rooms.
5. Process ends.

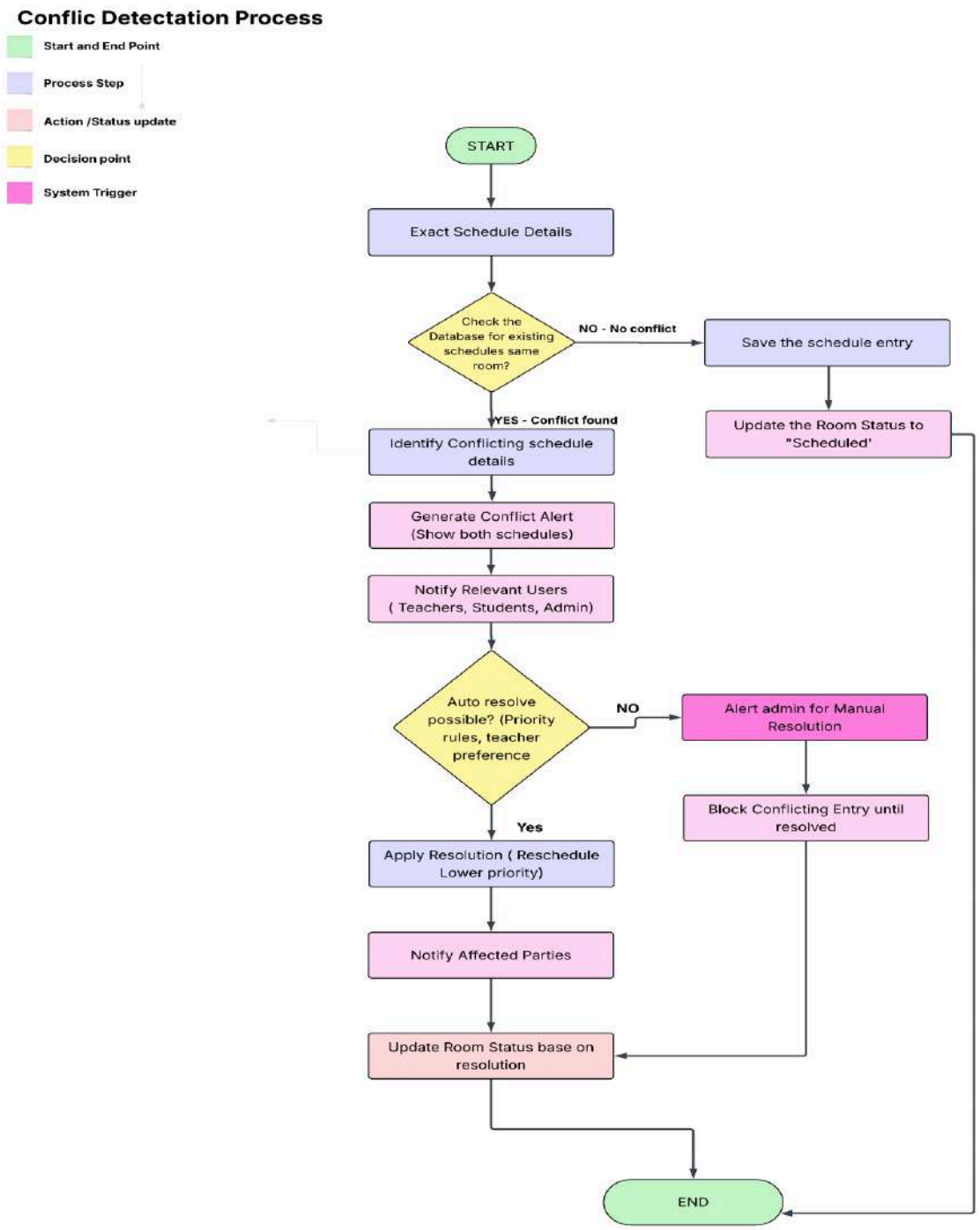
Process 3: Teacher Check-in/out Process (Scan QR/check-in to update room status)



Step-by-Step Explanation:

1. System validates credentials.
    - If invalid, displays error and prompts retry.
2. On success, teacher selects room for check-in.
3. System checks room status.
    - If room is occupied, teacher cannot check in and is notified.
    - If room is vacant, teacher confirms check-in.
4. Room status is updated to "Occupied".
5. After class/session, teacher checks out.
6. System updates room status to "Vacant" and logs the event.
7. Process ends.

Process 4: Conflict Detection Process (Detect overlapping schedules automatically)



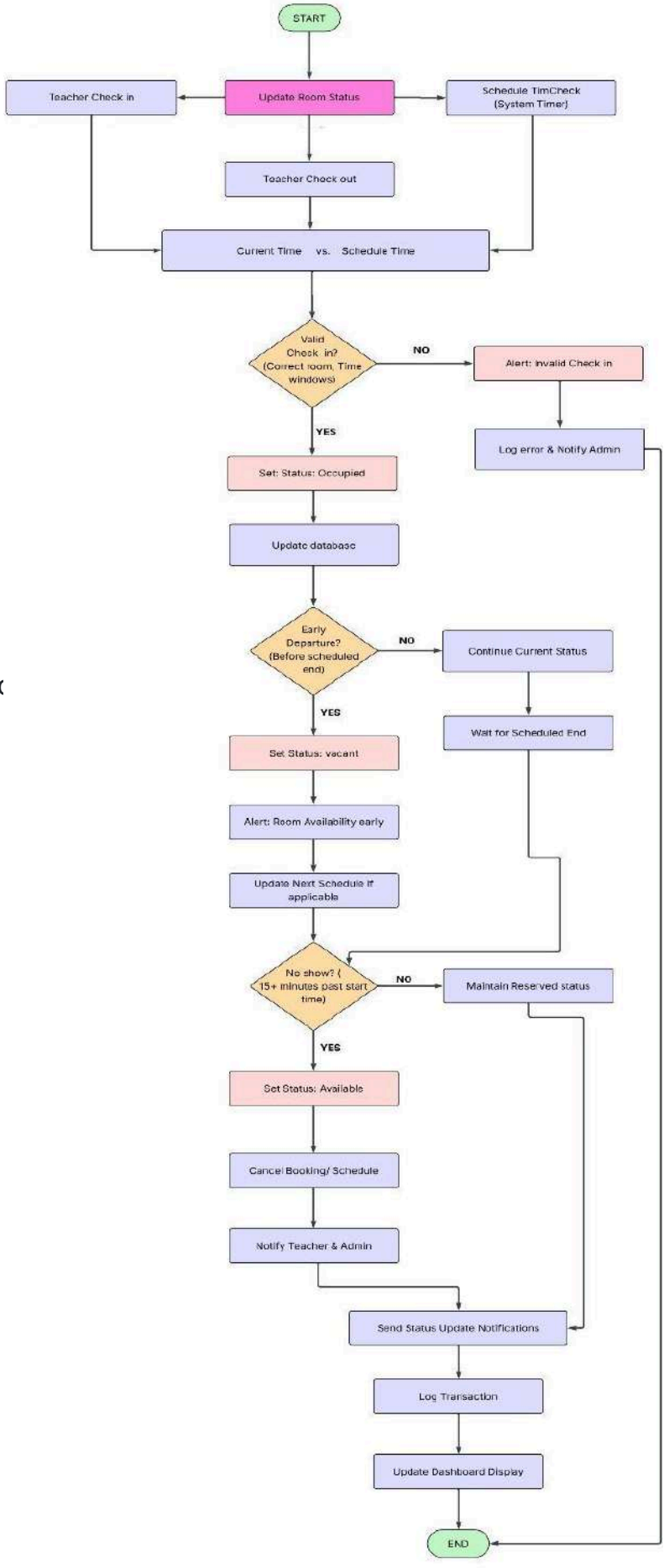
Step-by-Site Explanation:

1. Admin or teacher inputs a new schedule/reservation.
2. System reads schedule details (subject, teacher, room, time, duration).
3. System searches for existing schedules for same room and overlapping times.
4. Decision: Is there a conflict?
    - If no, saves schedule and updates room status.
    - If yes, system identifies conflict details and alerts relevant users.
5. System checks if conflict can be auto-resolved (priority, subject, booking order).
    - If yes, reschedules and updates database; notifies affected users.
    - If no, blocks entry and alerts admin for manual resolution.
6. Process ends when conflict is resolved and room status is updated.

Process 5: Room Status Update Process (Automatic updates to Available/Occupied/Vacant)

Step-by-Site Explanation:

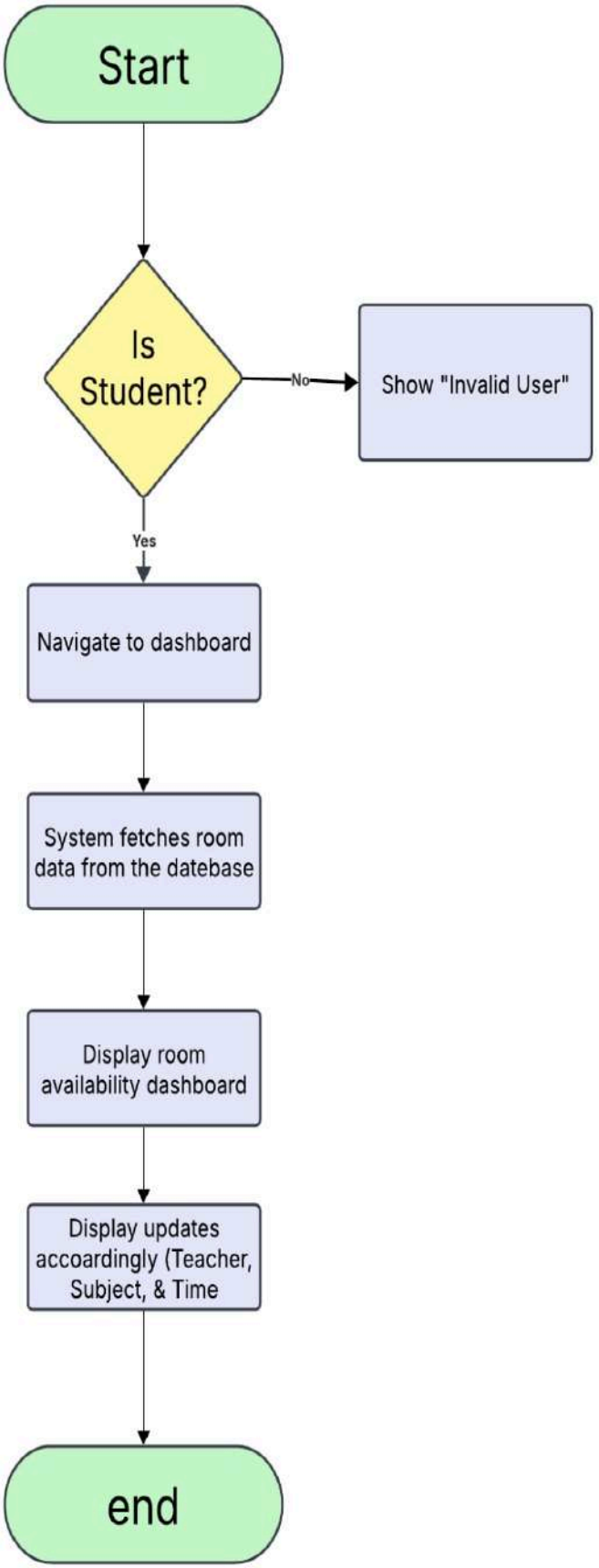
1. System or teacher triggers scheduled room status check.
2. System compares current time to scheduled time.
3. Teacher checks in (manual or system-triggered by RFID/login).
    - System verifies if check-in is valid (correct time, room).
    - If valid, marks room as "Occupied".
    - If invalid, logs error and alerts admin.
4. During session, system monitors for early departure or no-show.
    - Early check-out marks room "Vacant" alerts admin.
    - No-show (after grace period) cancels booking and updates status.
5. At scheduled end time, system marks room "Vacant", updates database, and notifies next user or housekeeping.
6. All status changes are logged and dashboard updated in real time.
7. Process ends.



Process 6: Student View Process (View real-time room/establishment availability)

Step-by-Site Explanation:

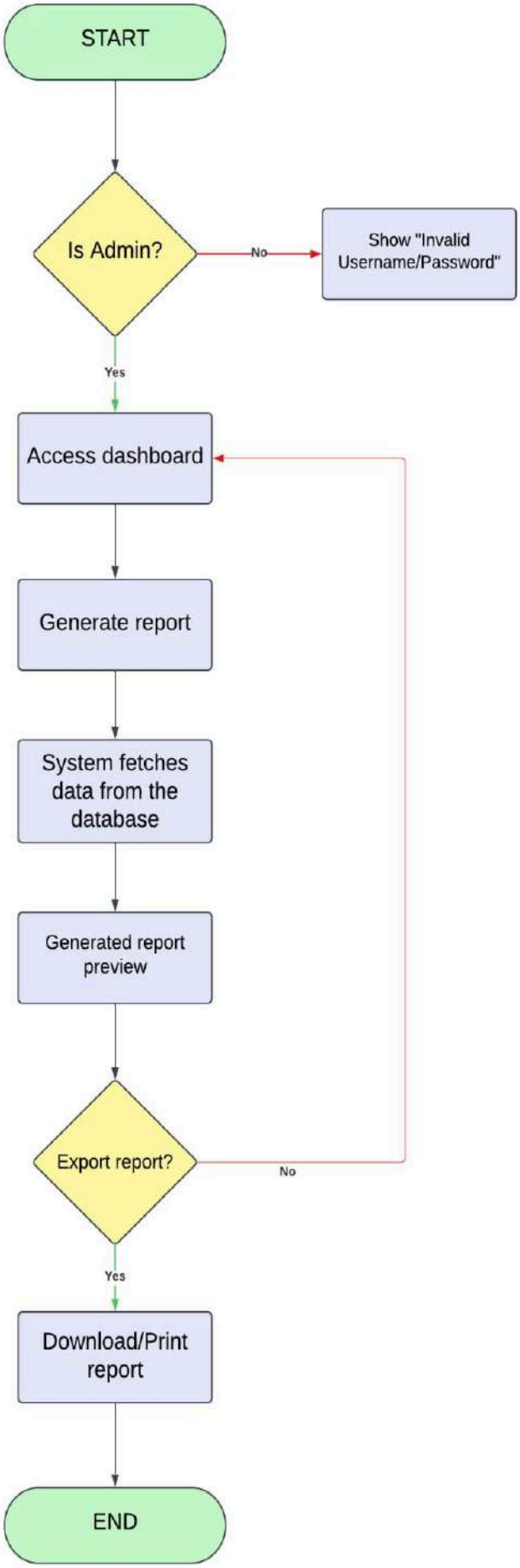
1. Student logs in with credentials.
2. System validates login.
    - If invalid, error message and retry.
3. Student navigates dashboard.
4. System fetches real-time room status and schedules from database.
5. Dashboard displays all rooms and their current status (Available, Occupied, Reserved).
6. Student can filter/search for rooms by teacher, subject, or time.
7. Process ends when student logs out or exits.



Process 7: Report Generation Process (Admin generates reports on usage and flagged teachers)

Step-by-Site Explanation:

1. Admin logs in and credentials are validated.
    - If invalid, error and process ends.
2. Admin accesses dashboard and selects "Generate Report".
3. System fetches data on room usage and flagged teachers.
4. System generates and previews summary report.
5. Admin chooses to export (download/print) the report or returns to dashboard.
6. Process ends.



DATA FLOW DIAGRAM

The DFD is in landscape to make it more readable.