**Functional and non-functional requirements for the Courtroom and Resource Management system:**

**Functional Requirements**

1. The system must allow users (Clerks, Judges, Admins) to view a list of available courtrooms in real-time.
2. Availability must include detailed attributes such as room capacity, technology (video conferencing equipment), and accessibility.
3. Users must be able to schedule hearings by selecting available courtrooms and specifying the date, time, and duration.
4. The system should check for scheduling conflicts before confirming the hearing.
5. The system must validate the availability of courtrooms, resources, and required equipment before scheduling or allocation.
6. This process should be included in both scheduling hearings and resource allocation workflows.
7. The system must provide a calendar interface for users to view the complete schedule of courtrooms, highlighting booked and available time slots.
8. The calendar should allow filtering by date, courtroom, or judge.
9. Admins must be able to allocate resources (courtroom, equipment, clerical support) for specific hearings or events.
10. Resource allocation must consider dependencies such as courtroom availability and required equipment.
11. The system must notify the user when a scheduling or resource conflict arises.
12. Admins must have tools to resolve conflicts by rescheduling hearings, reallocating resources, or marking priority cases.
13. Admins must be able to update courtroom configurations, such as capacity, equipment, or availability status ("Under Maintenance").
14. Updates should trigger automatic recalculations of courtroom availability.
15. Admins must be able to generate reports on courtroom usage, resource allocation, and scheduling conflicts.
16. Reports should include metrics such as utilization rates, resolved conflicts, and hearing statistics.
17. Judges and Clerks must be able to request additional resources (e.g., courtrooms, special equipment) for specific hearings or cases.
18. Requests should be logged for approval by Admins.
19. The system must enforce role-based access:
20. Clerk: Schedule hearings, view courtrooms, request resources.
21. Judge: View schedules, request resources.
22. Admin: Full access, including resolving conflicts, updating courtroom details, and generating reports.

**Non-Functional Requirements**

1. The system must handle up to 100 simultaneous users with minimal latency (2 seconds for viewing courtrooms or calendars).
2. The system should process scheduling operations within 5 seconds.
3. The system should support the addition of new courtrooms, resources, and users without performance degradation.
4. The calendar view should scale to support multiple courtrooms across multiple dates without slowing down.
5. The system must ensure 99.9% uptime to prevent disruptions to courtroom management.
6. Scheduled hearings and resource allocations must not be lost due to system failures.
7. The system must have an intuitive interface, with clear navigation for Clerks, Judges, and Admins.
8. The calendar interface must be user-friendly, supporting drag-and-drop for rescheduling hearings.
9. Role-based access control (RBAC) must be implemented to restrict access to certain functionalities based on user roles.
10. Data (courtroom schedules, hearing details) must be encrypted during transmission and storage.

**Use Case Name:**Courtroom and Resource Management

Actor:Clerk, Judge, Admin

**Description/Scenario:**

1. The Clerk/judge logs into the system with appropriate credentials and navigates to the "Courtroom and Resource Management" module.
2. The actor selects an option:

Clerk or Judge: Views courtroom availability or schedules hearings.

Admin: Allocates resources, resolves conflicts, or updates courtroom details.

1. The Clerk inputs the case details (case ID, date, duration).
2. The system checks for conflicts and verifies resource availability.
3. If no conflicts are found, the system schedules the hearing and updates the calendar.
4. If conflicts are detected, the system suggests alternative slots or rooms.
5. The actor selects the required resources (courtrooms, equipment).
6. The system validates the selection and updates resource status accordingly.
7. The system flags conflicts, such as overlapping bookings or unavailable equipment.
8. The Admin reallocates resources or reschedules hearings to resolve the issue.
9. The Admin modifies room configurations (capacity, equipment status).
10. The system updates all dependent modules, ensuring no conflicts arise.
11. The system logs all actions (scheduling, resource allocation, updates) for auditing purposes.
12. The Clerk/judge exits the module or continues with additional tasks.

**Exceptions:**

1. If no suitable courtroom is available for the requested time slot, the system displays an error message: "No available courtroom for the selected time. Please choose another time or room."
2. If a scheduling conflict occurs, the system blocks the action and suggests alternative slots: "Selected courtroom is already booked. Try a different time or room."
3. If required fields (e.g., case ID, date) are missing, the system displays an error message: "Please complete all mandatory fields.
4. Resource Not Found:

If a resource (e.g., courtroom or equipment) is unavailable due to maintenance, the system displays a message: Selected resource is under maintenance and cannot be allocated.

1. Unauthorized Access:

If the actor lacks permissions to perform a specific task, the system denies access: You are not authorized to perform this action.

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Precondition:

1. The actor must be logged into the system with valid credentials.
2. Courtroom details (availability, capacity) must already be configured in the system.
3. Hearing and case data must exist in the system database.
4. The system must be operational and connected to the resource database.

6. Postcondition:

1. The courtroom is successfully allocated or scheduled for the requested hearing.
2. The calendar and availability statuses are updated in real-time.
3. Any scheduling conflicts are resolved, and updated details are communicated to the relevant actors.
4. All actions are logged in the audit trail for future reference.
5. Resource usage data is recorded and available for reporting.