Here’s a comprehensive class diagram for the Hospital Management System (HMS) based on the use cases and actors provided. This diagram will include the relevant classes, their attributes, methods, and access modifiers.

Class Diagram Overview

Key Classes and Relationships

1. Administrator
2. Doctor
3. Nurse
4. Receptionist
5. Patient
6. Lab Technician
7. Pharmacist
8. Radiologist
9. Surgeon
10. EmergencyResponseTeam
11. InsuranceCoordinator
12. Appointment
13. Prescription
14. MedicalRecord
15. LabTest
16. Medication
17. Room
18. Equipment

Class Diagram with Access Modifiers

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| Administrator |

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| --- |
|  |

| - username: String |

| - password: String |

| - role: String |

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| + manageUserAccounts() |

| + assignRoles() |

| + configureSettings() |

| + generateReports() |

| + manageDepartments() |

| + manageRooms() |

| + trackEquipment() |

| + generateStatistics() |

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| Doctor |

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| - id: String |

| - name: String |

| - specialization: String |

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| + viewPatientRecords() |

| + createPrescription() |

| + scheduleAppointment() |

| + updatePatientStatus() |

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| Nurse |

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| - id: String |

| - name: String |

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| + viewPatientRecords() |

| + administerMedications() |

| + monitorVitalSigns() |

| + updatePatientStatus() |

| + communicateWithDoctors()|

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| Receptionist |

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| - id: String |

| - name: String |

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| + registerPatient() |

| + scheduleAppointment() |

| + manageWaitingList() |

| + handleQueries() |

| + processBilling() |

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| Patient |

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| - id: String |

| - name: String |

| - dateOfBirth: Date |

| - medicalHistory: String |

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| + viewAppointmentSchedule()|

| + accessMedicalRecords() |

| + requestPrescriptionRefill()|

| + payBillsOnline() |

| + communicateWithStaff() |

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| Lab Technician |

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| - id: String |

| - name: String |

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| + receiveLabRequests() |

| + conductLabTests() |

| + enterTestResults() |

| + manageInventory() |

| + communicateWithDoctors()|

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| Pharmacist |

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| - id: String |

| - name: String |

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| + manageInventory() |

| + fillPrescription() |

| + dispenseMedications() |

| + updateMedicationRecords()|

| + communicateWithDoctors()|

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| Radiologist |

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| - id: String |

| - name: String |

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| + viewImagingRequests() |

| + conductImagingTests() |

| + interpretResults() |

| + updatePatientRecords() |

| + communicateWithDoctors()|

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| Surgeon |

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| - id: String |

| - name: String |

| - specialty: String |

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| + scheduleSurgeries() |

| + conductSurgeries() |

| + updatePatientStatus() |

| + communicateWithStaff() |

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| EmergencyResponseTeam |

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| - id: String |

| - name: String |

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| + handleEmergency() |

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| InsuranceCoordinator |

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| - id: String |

| - name: String |

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| + integrateInsurance() |

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| Appointment |

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| - appointmentId: String |

| - patientId: String |

| - doctorId: String |

| - date: Date |

| - time: Time |

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| + schedule() |

| + cancel() |

| + reschedule() |

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| Prescription |

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| - prescriptionId: String |

| - doctorId: String |

| - patientId: String |

| - medicationId: String |

| - dosage: String |

| - instructions: String |

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| + create() |

| + update() |

| + delete() |

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| MedicalRecord |

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| - recordId: String |

| - patientId: String |

| - doctorId: String |

| - notes: String |

| - date: Date |

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| + updateRecord() |

| + viewRecord() |

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| LabTest |

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| - testId: String |

| - patientId: String |

| - labTechnicianId: String |

| - testType: String |

| - results: String |

| - dateConducted: Date |

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| + conductTest() |

| + enterResults() |

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| Medication |

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| - medicationId: String |

| - name: String |

| - dosage: String |

| - quantity: Integer |

| - expirationDate: Date |

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| + manageInventory() |

| + updateMedication() |

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| Room |

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| - roomId: String |

| - type: String |

| - status: String |

| - capacity: Integer |

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| + assignRoom() |

| + releaseRoom() |

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| Equipment |

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| - equipmentId: String |

| - name: String |

| - status: String |

| - lastMaintenance: Date |

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| + trackEquipment() |

| + updateStatus() |

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Explanation of Access Modifiers

+ (Public): The method or attribute is accessible from any other class.

* (Private): The method or attribute is accessible only within the class it is declared.

# (Protected): The method or attribute is accessible within the class and by derived class instances (not used in this diagram).

Relationships

Each class can have associations (dependencies) with others, which would typically be represented in a visual UML diagram. For example:

Doctor has a one-to-many relationship with Appointment and Prescription.

Patient has a one-to-many relationship with MedicalRecord, Appointment, and Prescription.

Lab Technician is associated with LabTest.

Pharmacist is associated with Medication.