**Newark Medical Associates System**

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This appears to be a detailed set of requirements for designing a database for Newark Medical Associates (MMA). The requirements cover various aspects including Clinic personnel, surgeries, patients, medications, illnesses, and more. To summarize and outline the major points:

**System Requirements Summary:**

* **Clinic Person:** Different roles including physicians, surgeons, nurses, and support staff.
  + - Capture information about clinic employees, including physicians, surgeons, and nurses.
    - Include details such as name, gender, address, telephone number, position, salary (for non-surgeons), specialty (for physicians), contract type and length (for surgeons), grade, and years of experience (for nurses).
    - Maintain a unique employment number for each employee.
    - Nurses should have a grade and years of experience.
* **Surgeries and Schedules:** Surgeons, surgery types, operation theatre details, nurse  
  assignments based on surgery types and skills.
  + - Record information about different surgery types performed at the clinic.
    - Store surgery codes, names, categories (hospitalization or outpatient), anatomical locations, and special needs.
    - Maintain a list of surgery skills required for each surgery type.
    - Surgeons have specific surgery skills, and their skills should be mapped to surgery types.
    - Keep track of surgery schedules, including the surgeon, patient, operation theatre, and surgery date.
    - Assign nurses to specific surgery types, ensuring that at least two nurses are available for each surgery type.
    - Manage the association of nurses with surgery types based on their skills.
  + **Surgery Categories:**
    - Categorize surgeries as either requiring hospitalization (category H) or as outpatient procedures (category O).
* **Patients**: Personal and medical data, illnesses, allergies, medications, admission information, and monitoring parameters like cholesterol levels and categorize heart disease risk.
  + - Record information about patients, including personal data (name, gender, date of birth, address, telephone) and medical data (blood type, cholesterol levels, blood sugar, allergies).
    - Each patient must have at least one illness.
    - Maintain a unique patient number (identifier).
  + **Illnesses and Medications:**
    - Track various illnesses and medications.
    - Store codes and descriptions for illnesses.
    - Manage medications, including name, quantity, unit cost, and interactions with other medications.
  + **Prescription:** Track medications, prescriptions by physicians to patients, and medication interactions.
    - Capture information about medications prescribed to patients by physicians.
    - Include details like dosage, frequency, and prescription date.
    - Ensure that no two physicians prescribe the same medication to the same patient.
  + **In-patient:**
* Manage admission date, nursing units, rooms, and beds for in-patients.
* **Ownership and Corporate Information**: Medical corporations with ownership interest, their headquarters, and percentage ownership in the clinic.

**Entity Relationship and Relational Design:**

ER Diagram illustrating entities, their attributes, and relationships.

* **Strong Entities:** Clinic Person, Physician, Surgeon, Nurse, Patient, Surgery Type, Illness, Allergy, Medication, Corporation.
* **Weak Entities:** Surgery Skill, Surgery Schedule, Nurse Assignment, In-Patient, Prescription, Medical data, Diagnosis, Consultation.
* **SurgerySkill:** Although it has a composite primary key formed by SkillID and SurgeryCode, it could potentially be considered weak, especially if SurgeryCode is not unique by itself across different surgeries.
* **Surgery Schedule**: It’s depend on surgerycode,surgeon\_id,patient\_number and Surgery Date is Primary Key.
* **In-Patient:** In-patient admission date is only primary key and depend on patient-number in patient.
* **Prescription:** This entity seems to be weak as it has foreign keys PatientNumber and MedicationID referencing the Patient and Medication entities. It does not have a primary key attribute uniquely identifying a prescription on its own.

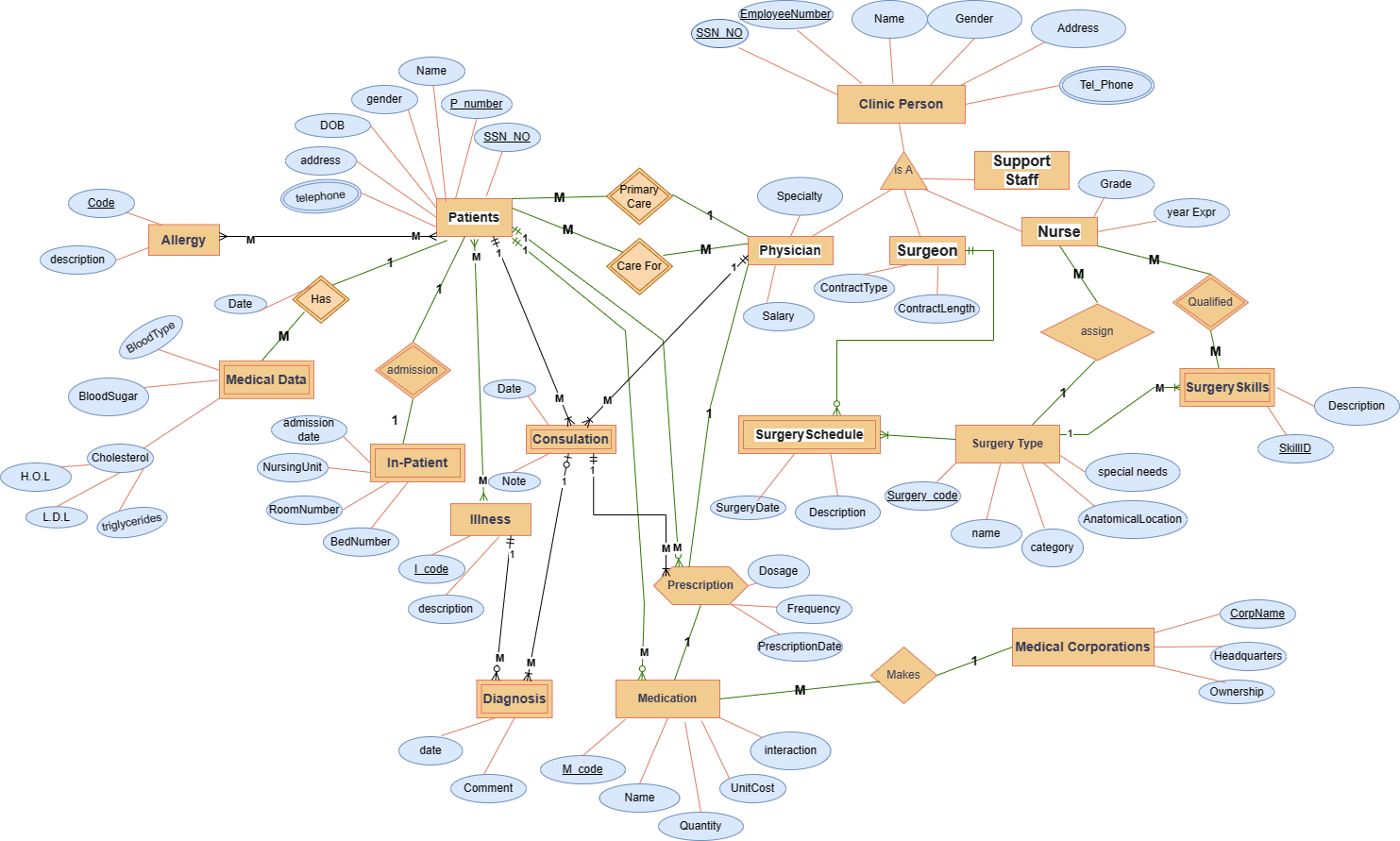
**Relationships:**

**1. ClinicPerson (Employee)- Physician Relationship:**

* + Relationship: One-to-One (each Physician has one ClinicPerson record.)

1. **ClinicPerson (Employee)- Surgeon Relationship:**
   * Relationship: One-to-One (Assuming each ClinicPerson with an EmployeeNumber is a Surgeon, and each Surgeon has one ClinicPerson record.)
2. **ClinicPerson(Employee) - Nurse Relationship:**
   * Relationship: One-to-One (Assuming each ClinicPerson with an EmployeeNumber is a Nurse, and each Nurse has one ClinicPerson record.)
3. **SurgeryType - SurgerySkill Relationship:**
   * Relationship: One-to-Many (Assuming each SurgeryType may have multiple SurgerySkills, but each SurgerySkill belongs to one SurgeryType.)
4. **SurgeryType - SurgerySchedule Relationship:**
   * Relationship: One-to-Many (Assuming each SurgeryType may have multiple SurgerySchedules, but each SurgerySchedule belongs to one SurgeryType.)
5. **Nurse – SurgerySkill Relationship:**
   * Relationship: Many-to-Many (Assuming each nurse may have multiple surgery skill, and each Surgeryskill belongs to Multiple Nurse.)
6. **Nurse -SurgeryType Relationship:**
   * Relationship: Many-to-one (Assuming each nurse may have one surgery Type, but each SurgeryType belongs to Multiple Nurse.)
7. **Patient – Medical Data Relationship:**
   * Relationship: One-to-Many (Assuming each Patient may have multiple Medical Data, but each Medical Data belongs to one Patient.)
8. **Patient - Allergy Relationship:**
   * Relationship: Many-to-Many (Assuming each Patient may have multiple Allergy, and each Allergy belongs to Multiple Patient.)
9. **Patient - Prescription Relationship:**
   * Relationship: One-to-Many (Assuming each Patient may have multiple Prescriptions, but each Prescription belongs to one Patient.)
10. **Patient - Illness Relationship:**
    * Relationship: many-to-Many (Assuming each Patient may have multiple Illnesses, but each Illness belongs to many Patients.)
11. **Patient - Medication Relationship:**
    * Relationship: One-to-Many (Assuming each Patient may have multiple Medications, but each Medication belongs to one Patient.)
12. **Patient - Physician Relationship:**
    * Relationship: Many-to-one (Assuming each Patient may have Primary Care one Physician) and Many-to-Many ( each Patient may have to many Care for Physician.)**.**
13. **Patient - Consultation Relationship:**
    * Relationship: One-to-Many (Assuming each Patient may have multiple consultation, but each consultation belongs to one Patient.)
14. Consultation relationship with one-to many Diagnosis and Prescription and Many-to-one relationship with Physician.
15. **Diagnosis- Illness Relationship:**
    * Relationship: Many-to-one (Assuming each Diagnosis may have one Illness, but each Illness belongs to Multiple Diagnosis.)

**E-R Diagram:**It is very important to identify entities and their relationships because choosing appropriate entities and relationships ensures the database structure facilitates efficient data retrieval.   
  
In addition to that, a proper and accurate attribute for each entity and the related data type play a crucial part on designing. That helps with data consistency, optimizing storage space and performance enhancement.



**Relational Schema Mapping:**

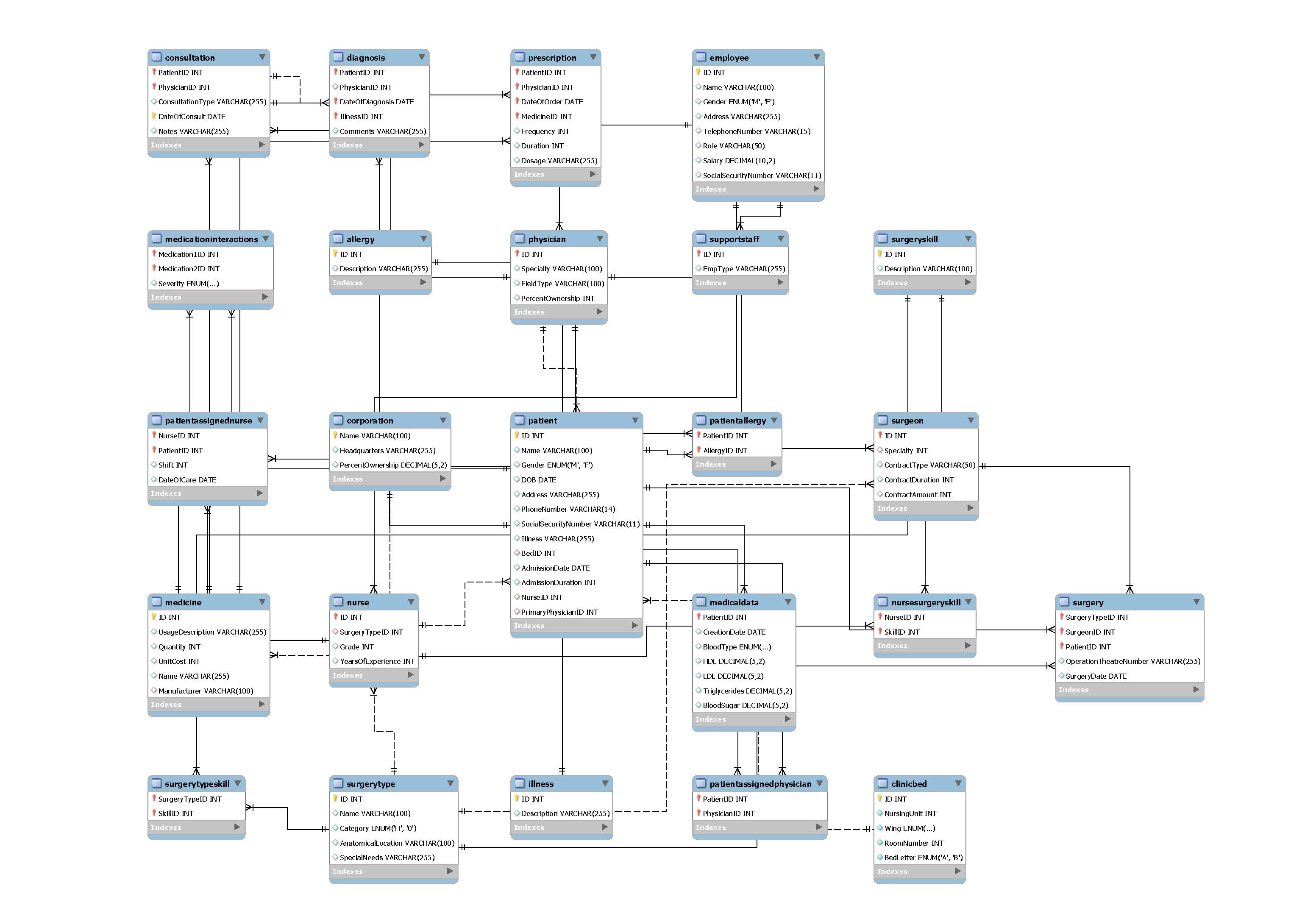
* Relational Schema mapping entities to tables with primary and foreign keys and their relationships. It is very important to identify entities and their relationships because properly create tables based on the ER diagram ensures add to defined relationships like one-to-one, one-to-many, many-to-many, many-to-one.

In addition to that, implementing primary keys and foreign keys and constraints are play a crucial part on designing. Primary keys define uniqueness while foreign keys maintain referential integrity. That helps with data consistency and performance enhancement.

**Final Set of Relation are:**

* **ClinicPerson (Employee)**(EmployeeNumber PK, Name, Gender, Address, TelephoneNumber, SSN)
* **Surgeon** (EmployeeNumber PK FK, ContractType, ContractLength)
* **Physician** (EmployeeNumber PK FK, Salary, Specialty)
* **Nurse** (EmployeeNumber PK FK, Grade, YearsExperience)
* **SupportStaff** (EmployeeNumber PK FK,Type)
* **SurgeryType** (SurgeryCode PK, SurgeryName, Category, AnatomicalLocation, SpecialNeeds)
* **SurgerySchedule(Surgery)** (SurgeryDate PK, OperationTheatre, EmployeeNumber FK, PatientNumber FK, SurgeryCode FK)
* **SurgerySkill** (SkillID PK, SurgeryCode FK, Description)
* **Patient** (PatientNumber PK, Name, Gender, DateOfBirth, Address, Telephone,SSN)
* **Medical Data**(Patientnumber PK FK, Date,BloodType,HDL,LDL,Triglycerides,BloodSugar)
* **Allergy** (Id PK, Description)
* **Illness** (IllnessCode PK, Description)
* **Medication** (MedicationID PK, Name, Quantity, Unit Cost, interaction)
* **Prescription** (Dosage, Frequency, PrescriptionDate, Patient Number, MedicationID)
* **Consultation** (Patientnumber PK FK, PhysicianNumber PK FK,Date,Note)
* **InPatient(Clinic Bed)** (PatientNumber PK FK, AdmissionDate PK, NursingUnit, RoomNumber, BedNumber)
* **Diagnosis** (PatientNumber PK FK, PhysicianNumber PK FK,Date PK, IllnessCode PK FK,comment)
* **MedicalCorporation**(CorpName PK, Headquarters, Ownership)

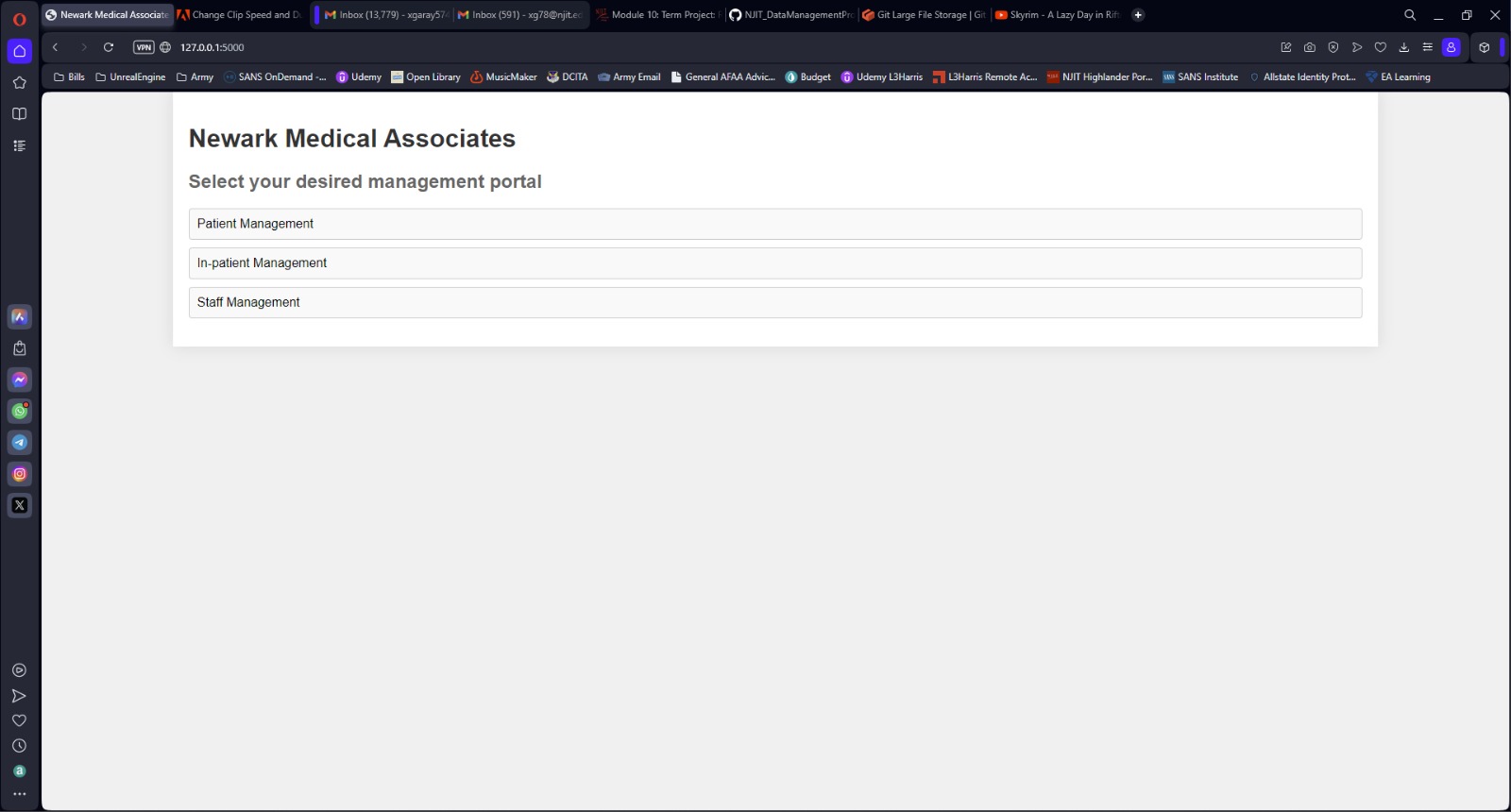
**logical database design:**



**Application Program Design:**

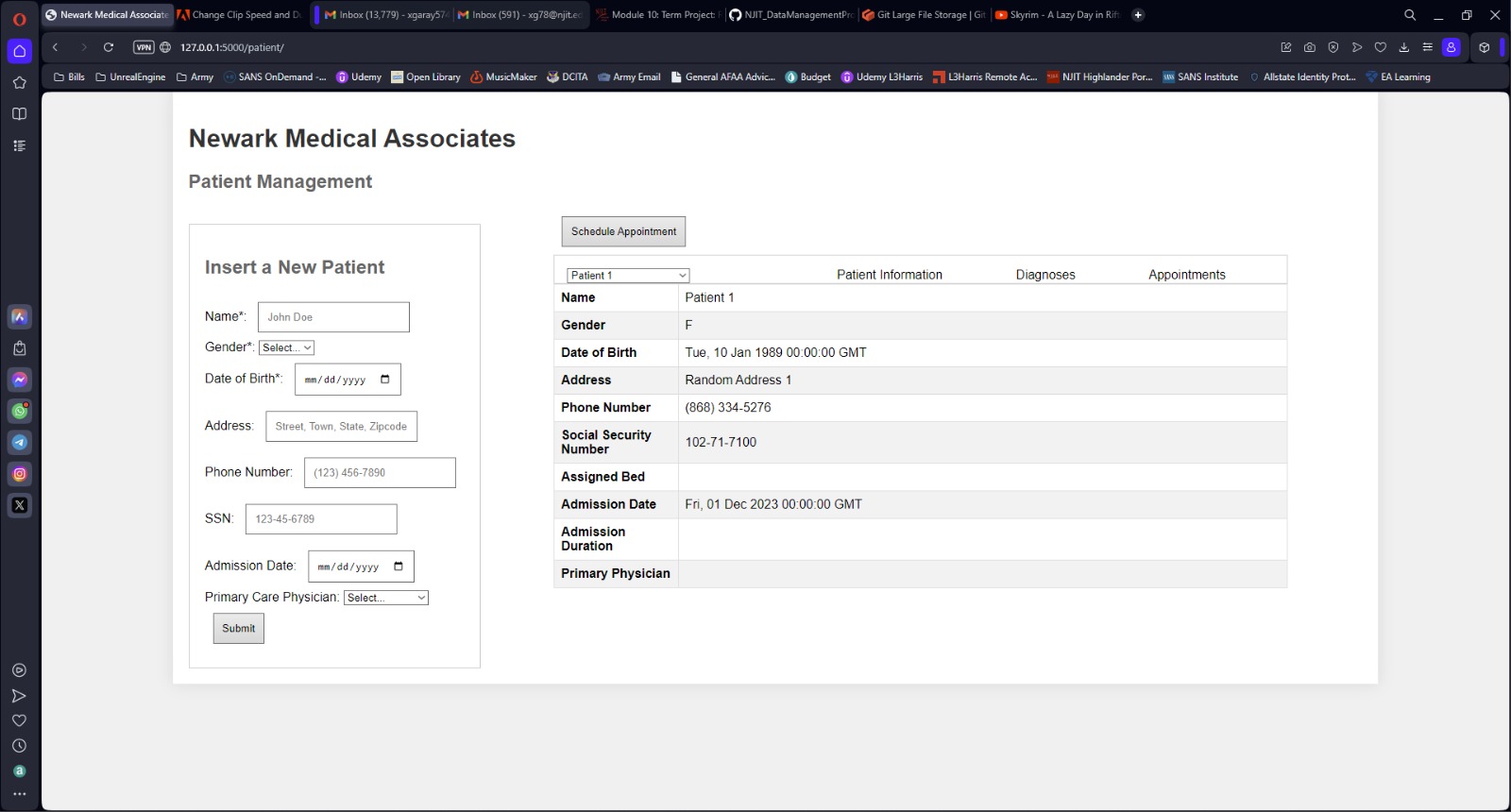
This page shows basic managing function in our web application.

**Home Page:**

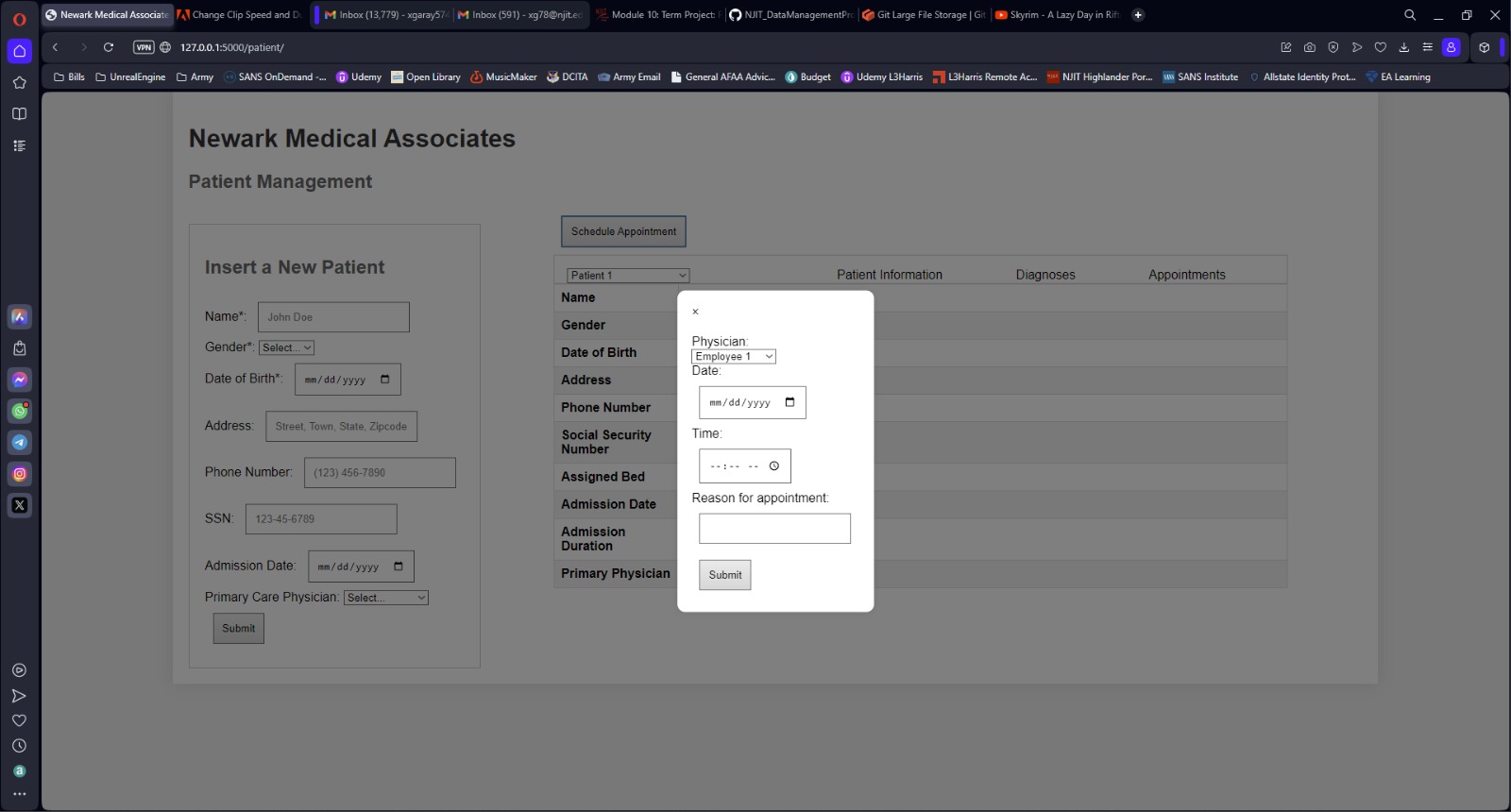
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**Patient Management Module:**

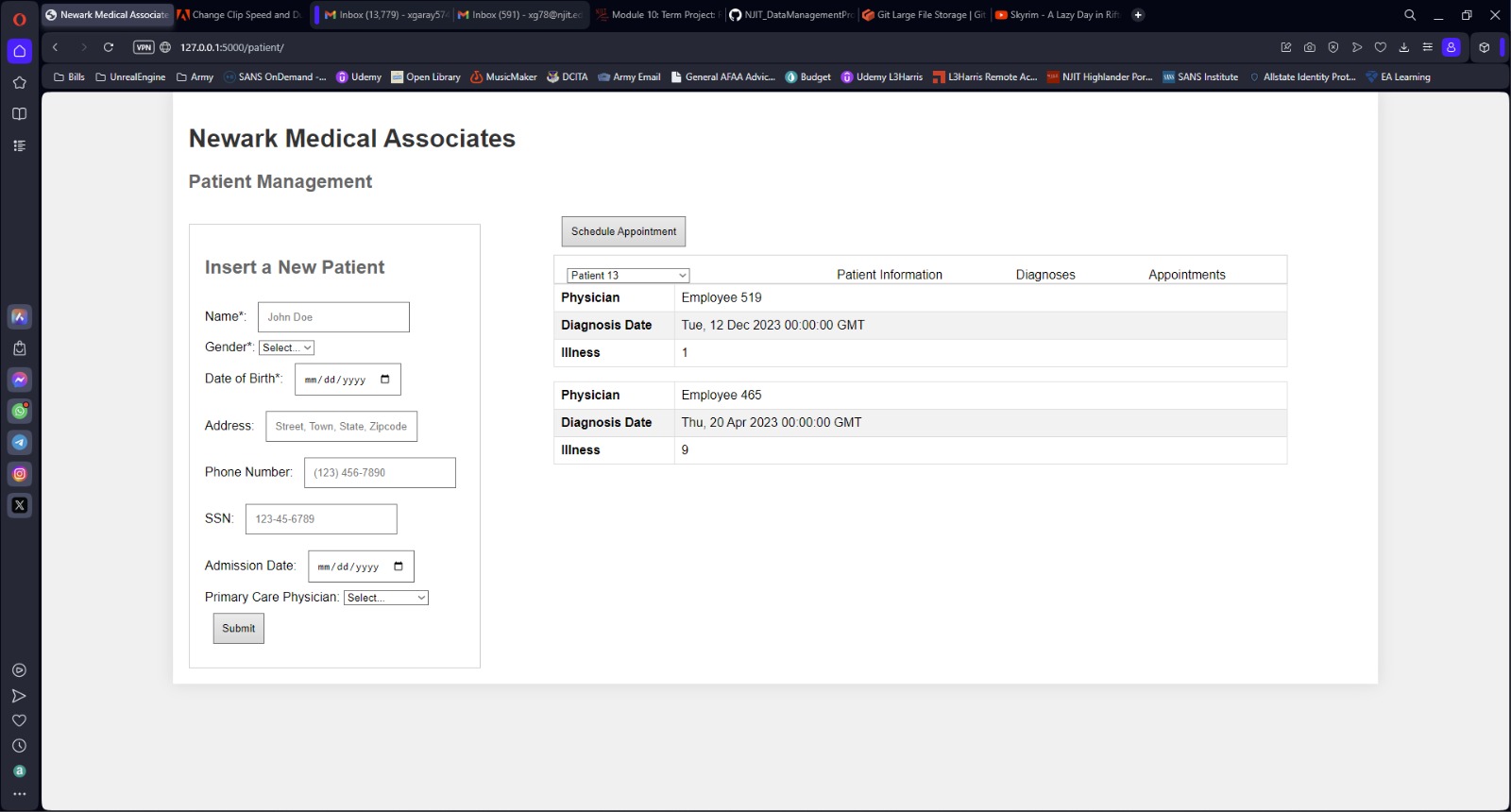
You can insert new patient and view patient information, Diagnoses, Appointments.

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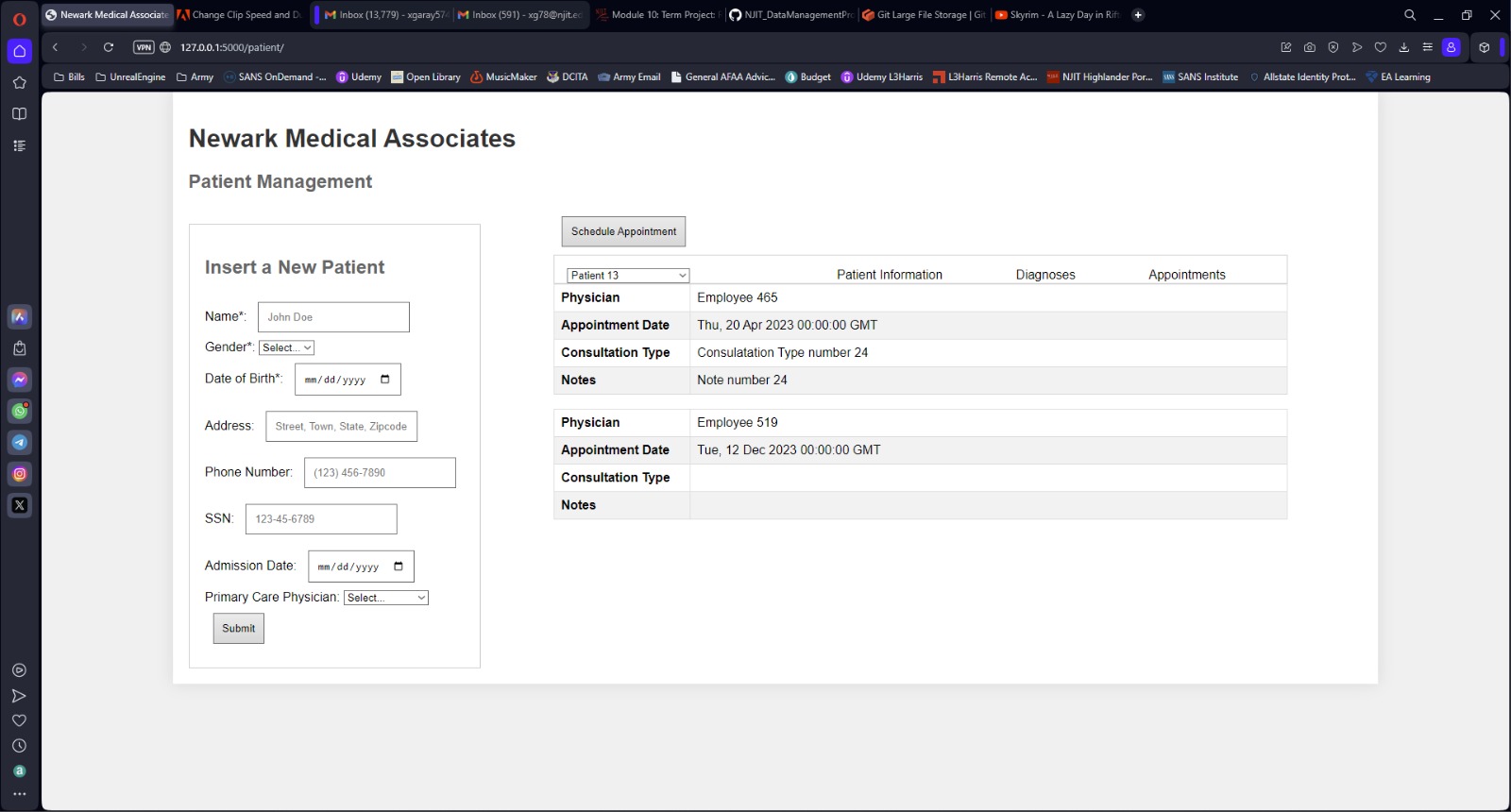
**Add Schedule Appointments:**

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**Select patient and shows patient diagnoses details.**

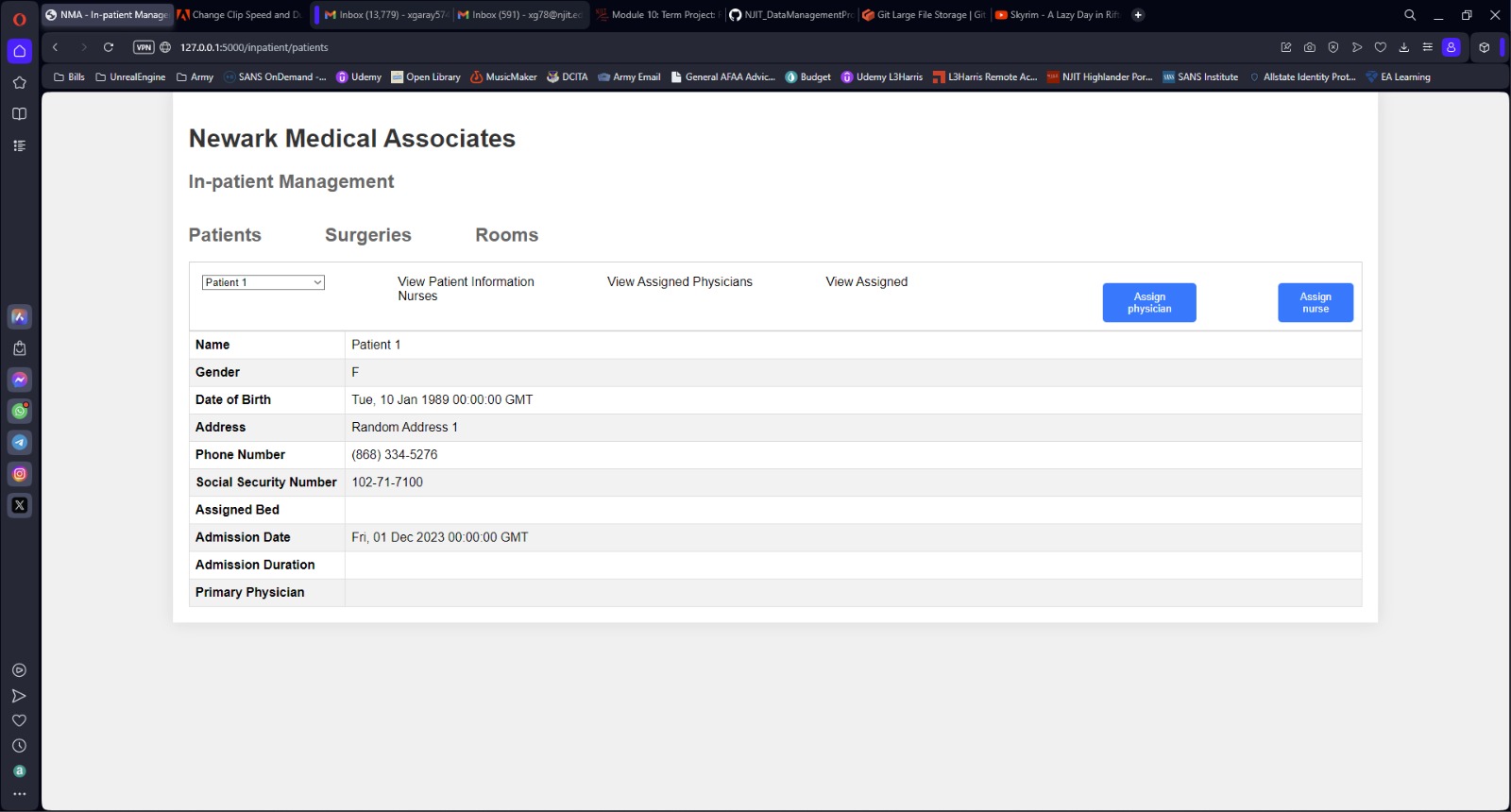
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**Select patient and shows patient Appointment details.**

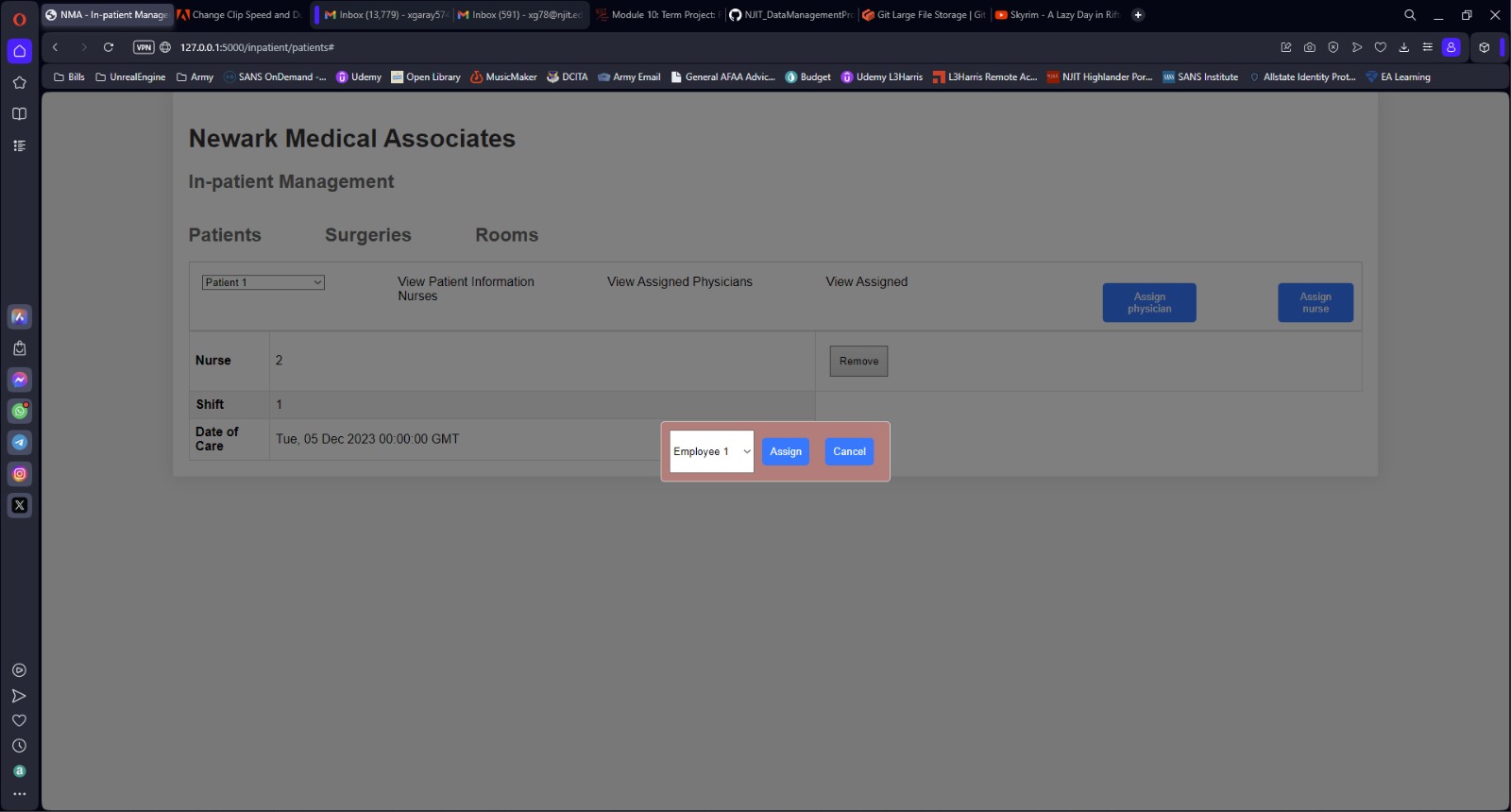
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**Second Module: In-Patient Management**

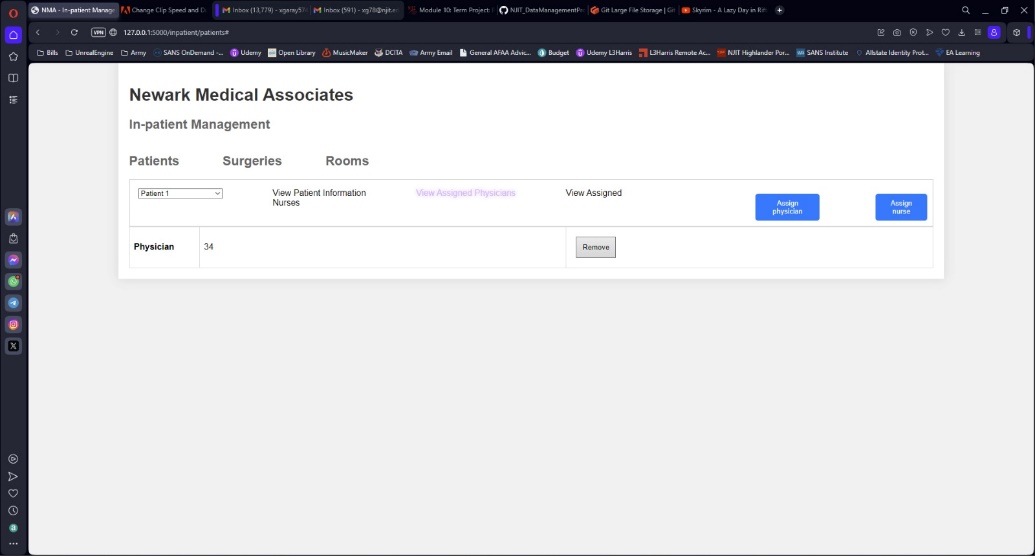
**View patient information:**

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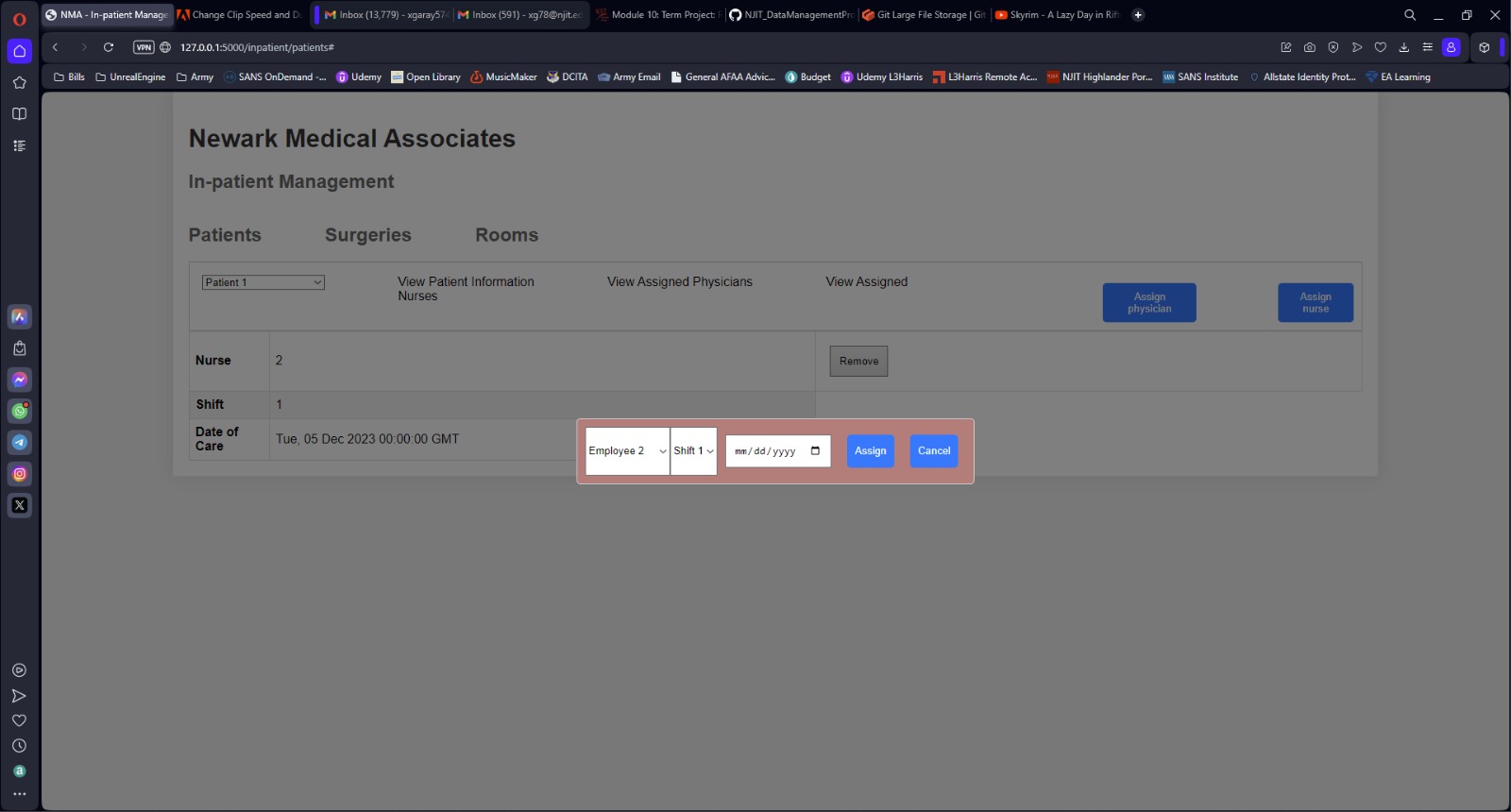
**You can click button on assign physician and select physician.**

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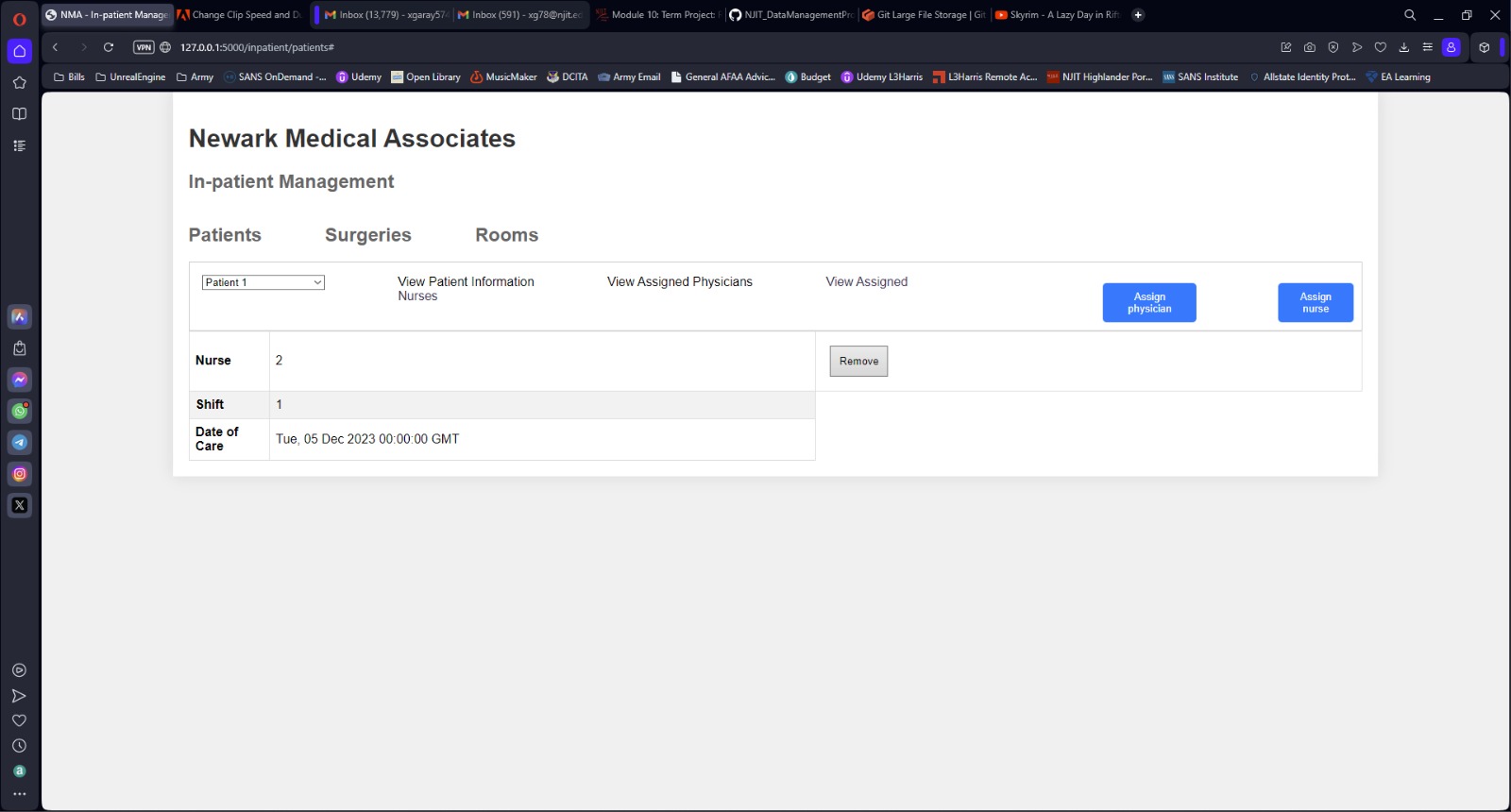
**View Assigned Physician information:**

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**You can click button on assign Nurse and select Nurse.**

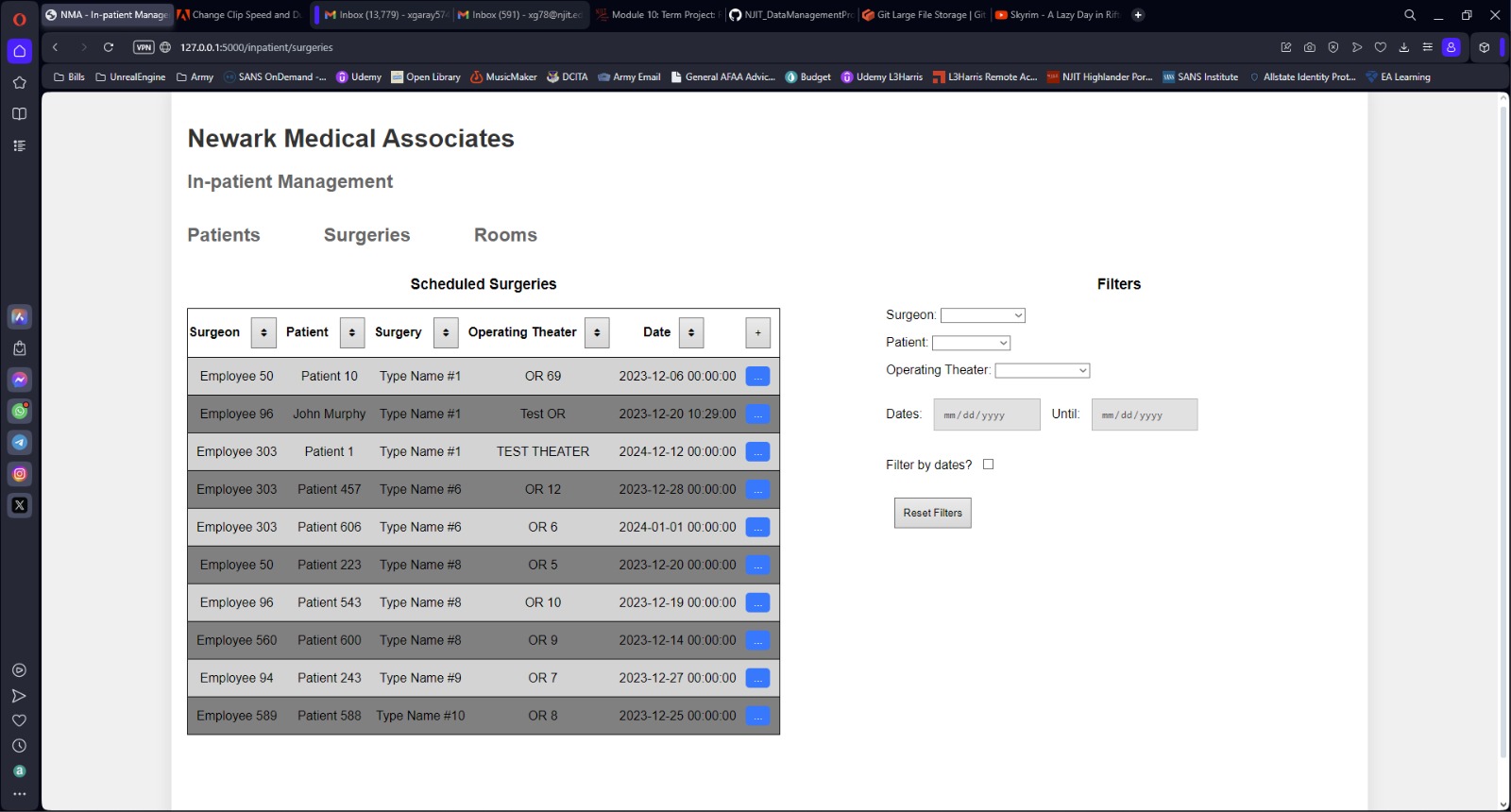
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**View Assigned Nurse information:**

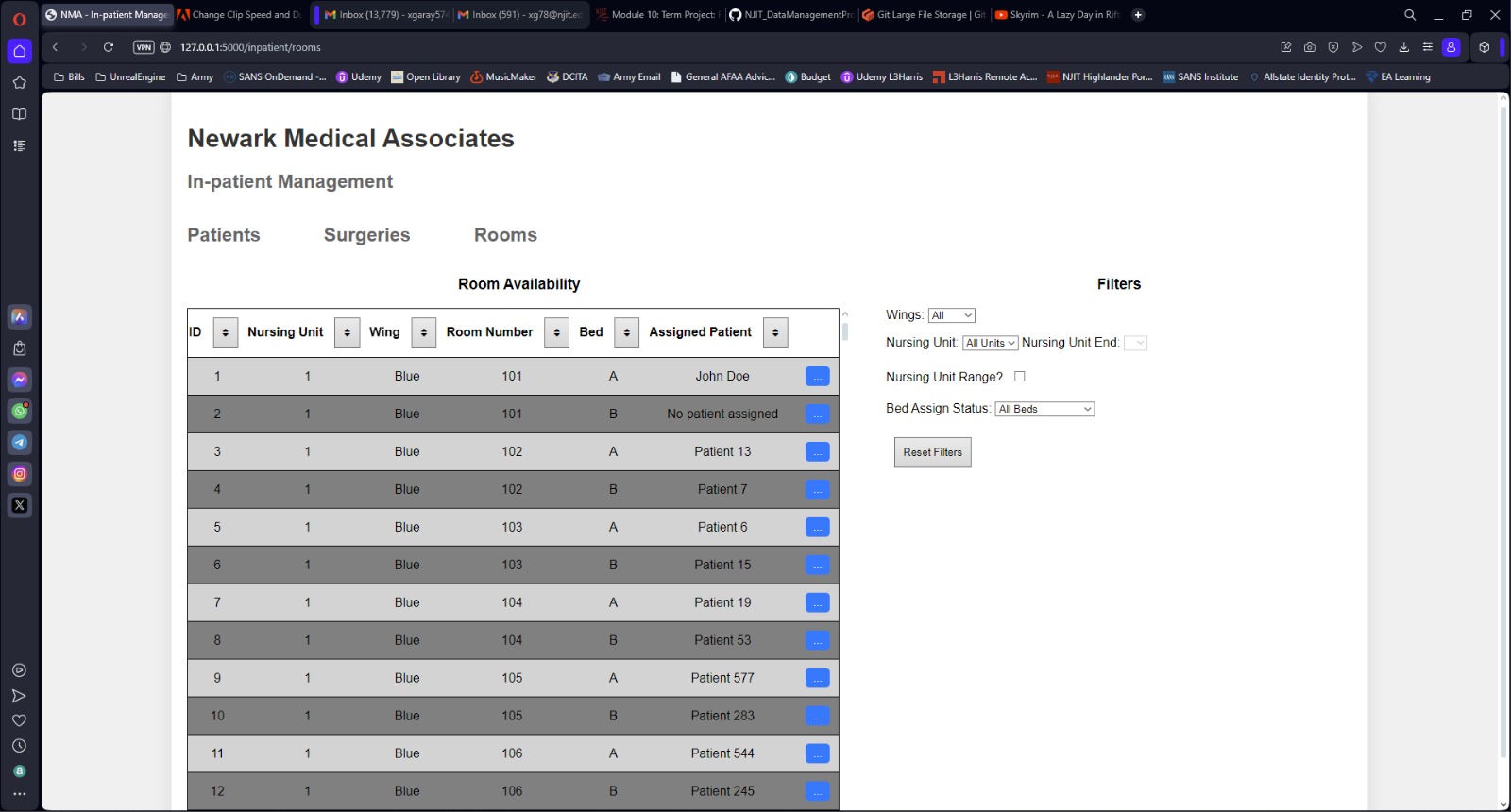
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**View all the different type of surgeries Scheduled list and you can filter data.**

**You can add surgeries click on + symbol.**

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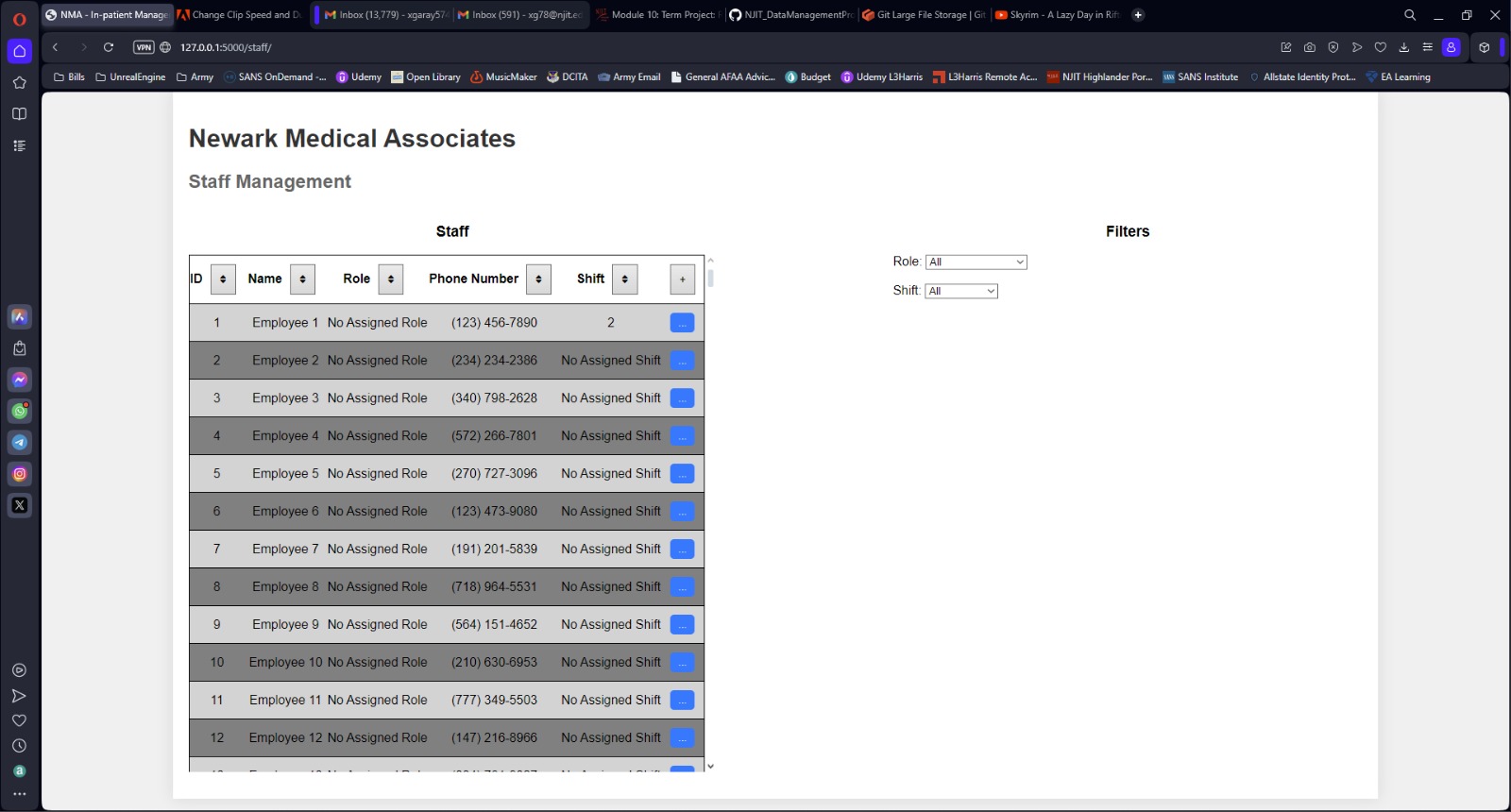
**View of different type Room Availability list and you can filter data.**

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**Third Module: Staff Management**

**View Staff information and select role and shift you can filter staff data.**

**You can Add staff details click on + symbol.**

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**Appendix, a list of the relational instances you have used to populate your database.**