Problem:

To meet the stakeholder's requirements or a project to succeed we need to solve the problem. The gap between the current and desired states. We must define the problem and give the right solution. When there is a problem, they need a new system to achieve something better and different.

A few issues the eConsult system is causing-

1. The inefficiency of the eConsult system.
2. Patients should see the real-time of their requested doctor and how much time should they wait for the review.
3. Not every patient is given equal priority. Those who need immediate medical treatment should be the first priority.
4. They should have access to their medical history.
5. Users should have different time slots for doctor availability so; they can choose the best time for them. Not just these, they can avoid activating other services.
6. Strong security is required on this app to safety of patient data and medical histories for the eConsult system.
7. The eConsult system must be user-friendly.

We need to ensure patient satisfaction. By that patients can get better healthcare outcomes. The online platform is the crucial point that connects the patients and doctors. There is a range of features such as patient, GP practice, doctor, GP, request, and consultation.

This app highlights the technology and the gap between doctor and patient also improving the healthcare system.

b) Process:

There are two popular methodologies, we can use. like-

•Traditional Methodologies- Waterfall Model

•Modern Methodologies- Scrum

Definition and differences between these two methodologies:

•Waterfall Model- It is called the linear sequential model. Each part must be completed before the following part starts. In the last phase, if developers find any problem, we must solve it from the top. So, 60% of efforts are in the last phase.

Advantages	Disadvantages
• Stakeholder's requirements involvement at the beginning and end of the project.	° The waterfall model does not have flexibility. They took feedback late so; it is bad for users and doctors.
• To run this methodology, the users must give clear requirements. eConsult system requirements are well defined.	° The waterfall model is rigid. There is no feedback from one stage to another. To deliver an eConsult system on perfect time that's' not suitable.
	° There is no parallelism in the waterfall model.
	° Actual costs had to be calculated on the last. So, the budget is fixed that's why owner cannot go over on this budget.
	° There are no modifications on late. Users must give their opinions what they want on an eConsult system.

•Scrum- An agile methodology that follows an iterative and incremental approach to software development. It is lightweight, iterative, and incremental. Product development progress in a series of sprints. A sprint is a short, time-boxed period when a scrum team works to complete a set amount of work. Team members need commitment, courage, focus and respect. 15-minute daily scrum stand-up meetings. They reduce the development time by up to 40%. The entire team reviews the sprint results at the end of the sprint. Team members must put their commitment, courage, focus and respect.

| Advantages	Disadvantages
• The main advantage of agile methodologies like Scrum is flexibility and adaptability. Where eConsult users may need to evolve.	° If any team member leaves in the middle of the project, it will be a huge negative impact for the eConsult system to build up.
• Scrum methodology can change their requirement at any time. So, users can add their perspective and the owner. That is why they can improve their system.	° It is not perfect for the big team to build up like this big project.
• The scrum team is self-organizing, which means team members are involved in multiple tasks of the development process.	° Daily meetings will be frustrating for team members.
• scrum methodology is good to use because they can review the phase at the end of the sprint.so, everyone will know what is happening.	° All the team members must be committed to the project.
• On Scrum individual effort of each team member is visible during daily Scrum meetings.	
• Reduce the development time by up to 40%. Because scrum do their work by following their sprint. eConsult system can deliver on perfect time.	
• They spot problems and fix them it helps risk analysts. So, there will be no risk for an eConsult system to finish a sprint faster.	

In conclusion, Scrum Agile is a popular software development methodology that is popular for its flexibility and adaptability. Scrum Agile ensures that the software meets with the users and is high quality for users. Not just these, it is iterative and incremental. But also, Scrum will detect risk. So, there will be not a single minute delay on the specified deadline. That is why we are using Scrum.

c)Project: State the goal of the system, a list of resources, and a breakdown of the budget (providing the framework within which management can be performed)

• Project: Enhancing eConsult Mobile App
• Methodology: Scrum Methodology
• Budget Breakdown: Allocation for Development, Training, and Marketing
• Backlog: Gathering user software requirements by Mr. Felix and stakeholders, with an £800,000 project budget.
• Stakeholders: Mr. Felix, Mr. Morrison, and the developer team involved in the project.
• Planning: Estimating task durations and defining specific tasks.
• Backlog: Creating a task list for software implementation based on the sprint planning.
• Scrum Team: Daily 15-minute meetings for team members to highlight individual work and provide continuous feedback.
• Increment: Delivery of progress at the end of each sprint
• Review: Ensuring the completion of each sprint and addressing any outstanding issues.
• Product: Enhanced eConsult Mobile App
• Objective: Improving patient consultation services, prioritizing patient problems, and increasing patient satisfaction. Features: Location preferences, real-time request status tracking, access to medical history, and patient prioritization based on urgency.

The item, for this situation, is the upgraded eConsult portable application. It is what the group plans to convey after the 18-month project period. The improved application will permit patients to submit demands with area inclinations, look at the continuous status of their solicitations, access their clinical history, and be focused on because of desperation. This item lines up fully intent on giving better medical care administrations by utilizing innovation.

Gnatt Chart
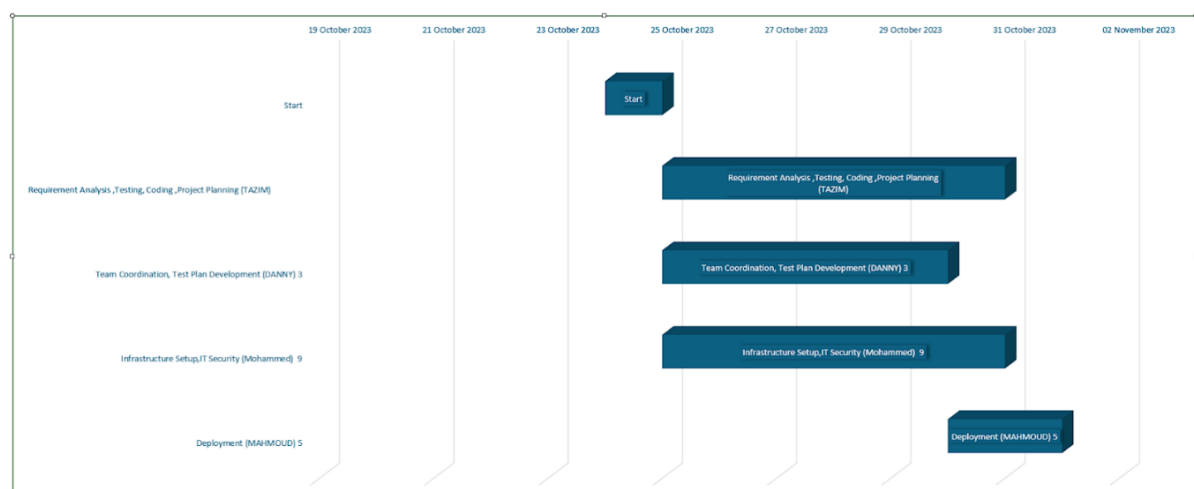
Budget Table

Positions	Budget (£800,000)
Software Developer (Mahmoud)	£400,000
Project Manager (Mohammed)	£200,000
Quality Insurer (Danny)	£100,000
Infrastructure and IT (Tanzim)	£100,000

d)Product:

1. Mobile App Extension:	**User-Friendly Design:** The application will have an easy-to-use design that makes it simple for patients to go through. Encouraging people from all technological backgrounds to access healthcare services is an aim that this design approach supports. **Cross-Device Accessibility:** The application will be created to work flawlessly across a range of gadgets, such as desktop computers, tablets, and smartphones. Convenience and usefulness are increased by accessibility, which guarantees that patients can use the platform from the device of their choice.
2. Training and Support:	**Staff Training:** • Comprehensive training for medical professionals, nurses, and administrators. • A focus on proficiently utilising apps and analysing patient data. • Assures personnel are prepared for a smooth integration of the app into medical procedures. **Patient Support:** • Easily accessible chat assistance, comprehensive FAQs, and specific phone numbers for patients. • Quick attention to patient concerns, guaranteeing a seamless user experience. • Offers support as needed, encouraging self-assurance and patient empowerment.

3. Features	**Patient Preferences:** Patients have control over their contact with healthcare providers by choosing the doctor they see fit, the time of their visit, and the style of consultation (in-person or online).
	Real-Time Status Updates: These updates give patients peace of mind and increase process transparency by giving them real-time information on how their consultation is going.
	Access to Medical History: During consultations, patients can share and access their complete medical history, allowing clinicians to base their decisions on thorough patient data.
	Priority Queueing System: Makes use of a priority system to guarantee that urgent cases are attended to as soon as possible, optimise the use of medical resources, and enhance overall healthcare results.

E) People:

Participants	Roles

Participants	Roles
General Director, Mr. Felix:	• Led to the improvement of the patient consultation service through the current application extension. • Gives top priority to determining patient issues and confirming medical conditions. • Advocates for higher patient satisfaction and reduced appointment costs.
Sales Director, Mr. Morrison:	• Expresses concerns about in-person interactions and immediate assistance. • Values individualised communication and individualized touch with clients. • Raises issues with staff training and the switch to a computerised system.
Sales Representatives:	• Prefer phone conversations and emphasize a warm, customised approach.

	• Hesitant to switch to computerised systems out of concern for job instability.
Mohamed:	• Oversaw the analysis process and recognised the flaws in the current app. • Worked together to collect user requirements with stakeholders.
Tanzim:	• Controlled the project's budget and schedule while allocating duties and resources. • Made sure it was in line with stakeholder expectations and coursework requirements.
Dani:	• Oversaw the development team and wrote and improved the source code for the application. • Added real-time functionality to guarantee seamless user interactions.
Mahmoud:	• Centred on the stage of design. • Oversaw app design and makes sure interfaces are user-friendly

These prime movers play crucial roles in shaping the direction and priorities of the software project. Understanding their perspectives and concerns is essential for successful project planning and execution.

Functional and Non-Functional requirements:

Functional Requirements- It means the behaviour of a system, where a function is described as the feature should be.

| Time:	Enhance the user experience by improving delays and inefficiency.
Status:	The eConsult system has a feature that patients can see the status of a doctor and the information should be given to them in too timely.
Priority:	The eConsult system has a priority queuing system so, that in case of an emergency, patients can have the priority for medical treatment.
History:	The eConsult system has a feature like patients can see their medical history.
Various Time Periods:	Provide patients with different time slots for consultation and doctor's availability.
Improvement Chart:	Patient can see the improvement chart for their improvement of the treatment.
Discussion for Users:	The eConsult should has their own consultation option for users.
Disease List:	The eConsult system should have all the health disease like A to Z.
Reviews:	The eConsult system should have option for users to give reviews and ratings for doctors.

Non-Functional Requirements- A system where a function should be performed.

|	
Security:	Strong security for patient information and medical records. But also, confidential medical records.
User Satisfaction:	The eConsult system is user-friendly it is easy to use. So, users will be satisfied by using this platform.
Performance:	Ensure that increased users will not affect the performance.
Reassurance:	Ensure the user's trust by giving them the best security for their details.
Authentication:	Verifying the regulation of the eConsult system by trusting them.
Cost:	eConsult system should have his own maintenance cost.

Entity Relationship Diagram:

The Entity Relationship Diagram (ERD) for the proposed improved system includes the following entities:
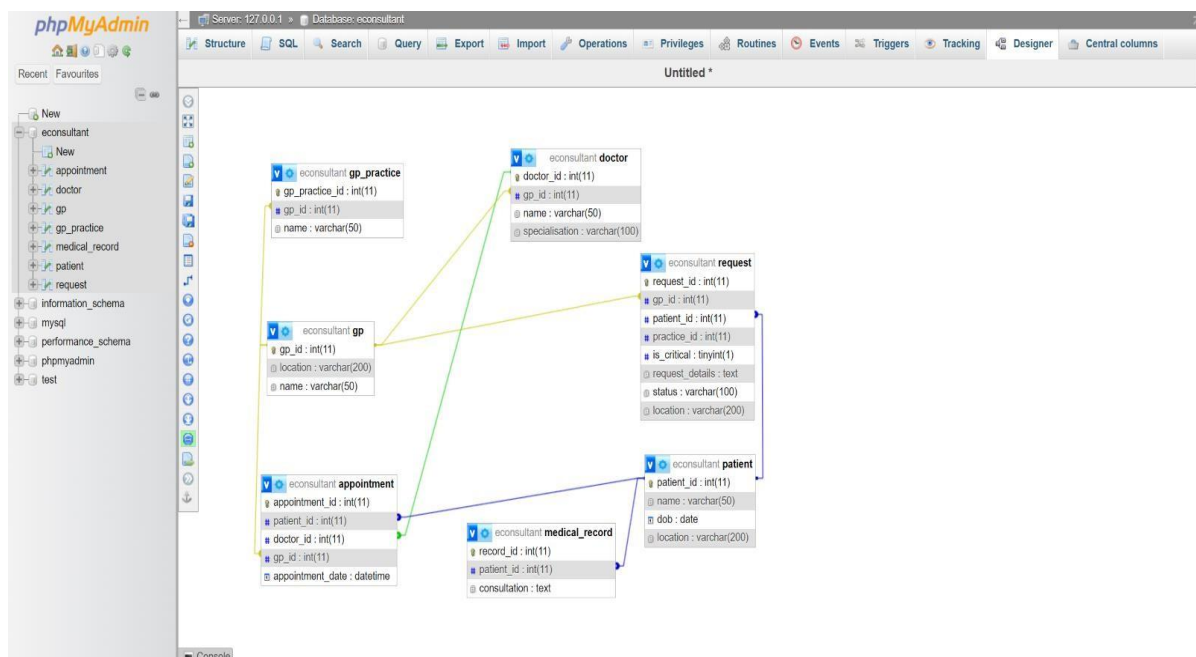
Patient, GP Practice, Doctor, GP, Request, Medical Record, Appointment
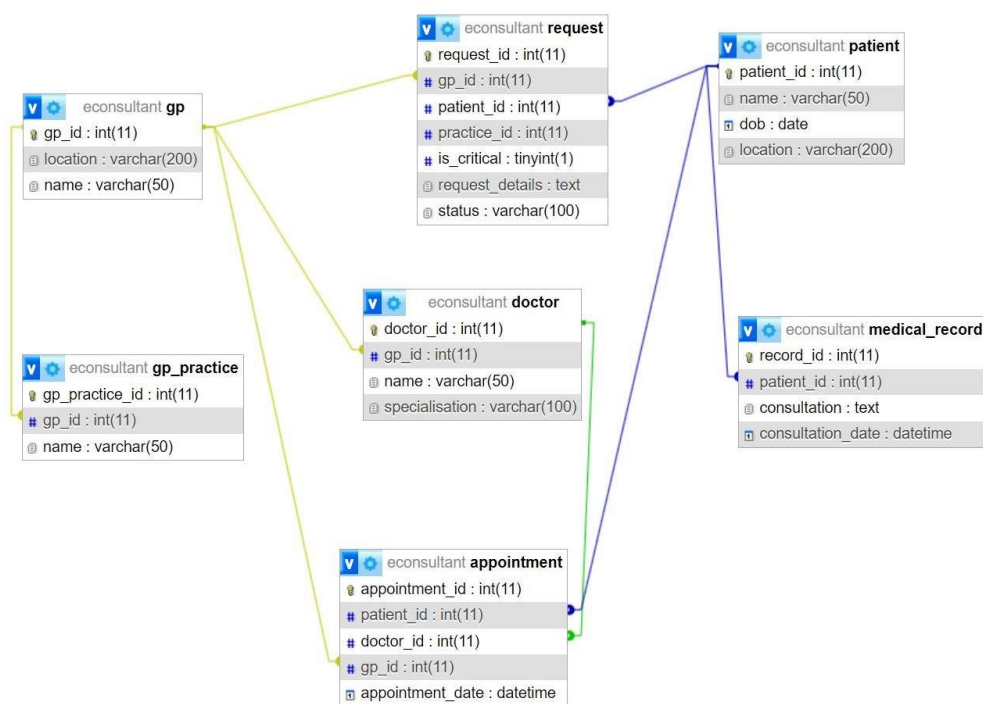
Data Flow Diagram(context diagram):
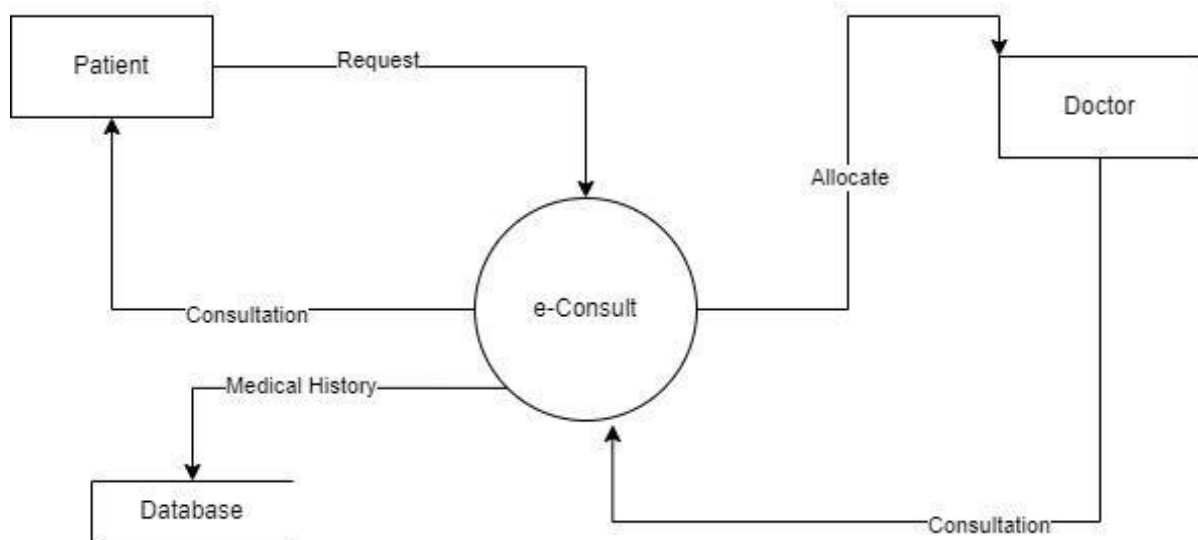
SQL Database:

SQL Queries:

Setting up initial data

```
1  insert into patient (name, dob)
2  Values ('Mahmoud Alkawareet', '2003-02-15')
3
4  UPDATE patient
5  set location = '17 mapeshill place, London, nw25la'
6  WHERE patient_id = 1
7
8  DELETE from patient
9  where patient_id = 1
10
11 INSERT into gp (location, name)
12 VALUES ('51 Staverton Rd, London NW2 5HA', 'Staverton Surgery')
13
14 INSERT into doctor (gp_id, name, specialisation)
15 VALUES (1, 'Mohammad', 'heart')
16
17 INSERT into gp_practice (gp_id, name)
18 VALUES (1, 'Omar')
19
20 INSERT into request (gp_id, patient_id, practice_id, is_critical, request_details, status, location)
21 VALUES (1, 2, 1, false, 'I have a headace', 'In progress', '17 mapeshill place, London, nw25la')
22
23 INSERT into appointment (patient_id, doctor_id, gp_id, appointment_date)
24 VALUES (2, 1, 1, '2023-12-05 14:30:00')
25
```

1- Add patient to the system
   Patient table before adding patient:

			patient_id	name	dob	location
☐	✏ Edit	⌗ Copy	⊝ Delete	2 Mahmoud Alkawareet	2003-02-15	17 mapeshill place, London, nw25la

☐ Check all   With selected: ✏ Edit   ⌗ Copy   ⊝ Delete   ⊞ Export

SQL Query:

✔ 1 row inserted.
Inserted row id: 4 (Query took 0.0007 seconds.)

```
INSERT into patient (name, dob, location) VALUES ('Mohammad', '2003-02-23', 'London');
```

Patient table after adding patient:

			patient_id	name	dob	location
☐	✏ Edit	⌗ Copy	⊝ Delete	2 Mahmoud Alkawareet	2003-02-15	17 mapeshill place, London, nw25la
☐	✏ Edit	⌗ Copy	⊝ Delete	4 Mohammad	2003-02-23	London

☐ Check all   With selected: ✏ Edit   ⌗ Copy   ⊝ Delete   ⊞ Export

2- Update patient details
SQL Query to update location of patient 4:

```
1 UPDATE patient
2 SET location = 'GreenWhich'
3 WHERE patient_id = 4
```

Patient 4 details after updating location:

				patient_id	name	dob	location
☐	Edit	Copy	Delete	2	Mahmoud Alkawareet	2003-02-15	17 mapeshill place, London, nw25la
☐	Edit	Copy	Delete	4	Mohammad	2003-02-23	GreenWhich

↑ ☐ Check all   With selected: Edit   Copy   Delete   Export

3- Delete patient details:
SQL Query to delete patient details

```
1 DELETE from patient
2 WHERE patient_id = 4
```

Patient table after deleting patient details:

				patient_id	name	dob	location
☐	Edit	Copy	Delete	2	Mahmoud Alkawareet	2003-02-15	17 mapeshill place, London, nw25la

↑ ☐ Check all   With selected: Edit   Copy   Delete   Export

4- Add an appointment

				appointment_id	patient_id	doctor_id	gp_id	appointment_date
☐	Edit	Copy	Delete	2	2	1	1	2023-12-05 14:30:00

↑ ☐ Check all   With selected: Edit   Copy   Delete   Export

SQL Query to add an appointment

```
1 INSERT INTO appointment (patient_id, doctor_id, gp_id, appointment_date)
2 VALUES (2, 1 ,1 ,'2023-12-06 02:20:00')
```

Appointment table after adding an appointment:

	appointment_id	patient_id	doctor_id	gp_id	appointment_date
☐ 🖉 Edit ⧉ Copy ⊖ Delete	2	2	1	1	2023-12-05 14:30:00
☐ 🖉 Edit ⧉ Copy ⊖ Delete	3	2	1	1	2023-12-06 02:20:00

↑ ☐ Check all   With selected: 🖉 Edit   ⧉ Copy   ⊖ Delete   📄 Export

5- appointment status

```
SELECT status FROM request WHERE request_id = 1;
```

☐ Profiling [Edit inline] [Edit] [Explain SQL] [Create PHP code] [Refresh]

☐ Show all | Number of rows: 25 ⌄   Filter rows: Search this table

Extra options

	status
☐ 🖉 Edit ⧉ Copy ⊖ Delete	In progress

6- History of all appointments of a patient

```
SELECT patient_id, name, appointment_date from appointment join gp on appointment.gp_id = gp.gp_id WHERE patient_id = 2;
```

☐ Profiling [Edit inline] [Edit] [Explain SQL] [Create PHP code] [Refresh]

☐ Show all | Number of rows: 25 ⌄   Filter rows: Search this table   Sort by key: None ⌄

Extra options

patient_id	name	appointment_date
2	Staverton Surgery	2023-12-05 14:30:00
2	Staverton Surgery	2023-12-06 02:20:00

Use Case Diagram: A representation of a user's probable interactions with a system.

Actors:
• Patient
• Doctor
• Administrator

Use cases:

1. Submit eConsult request: Request for an eConsult's on online by patient.
2. Review eConsult request: eConsult request is reviewing by administrator.
3. Access medical records: medical history is accessible and reviewable by doctor

Interaction of UML Diagram:
° Requests for e-Consults are submitted by patients to engage with the system.

° Administrator reviews and schedules appointments through the system.
° Doctors use the patient medical record access feature to communicate with the system.

Use Case Diagram:
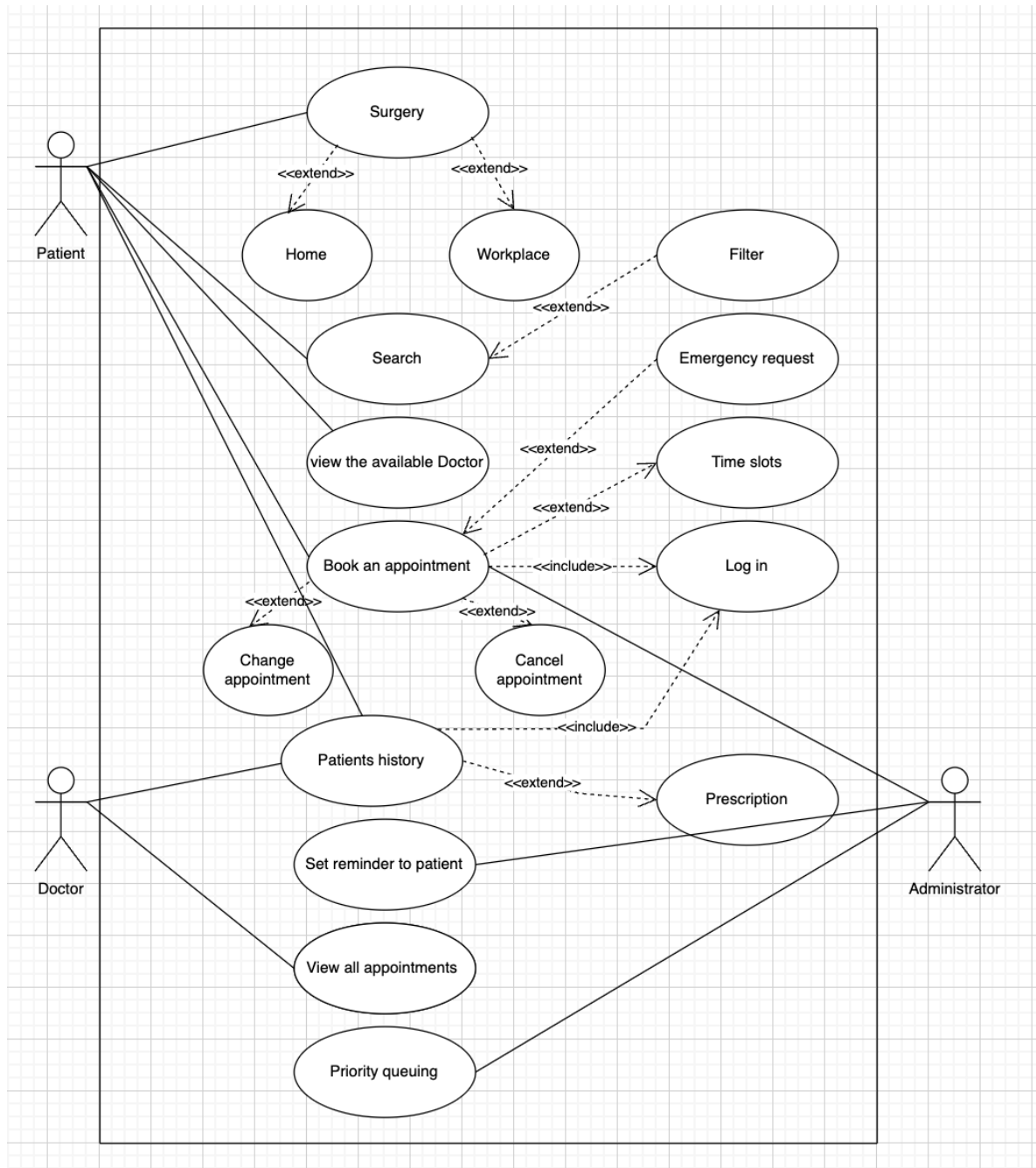
Sequence Diagram:

Actor: User
Preconditions: User has submitted a Consultation request.
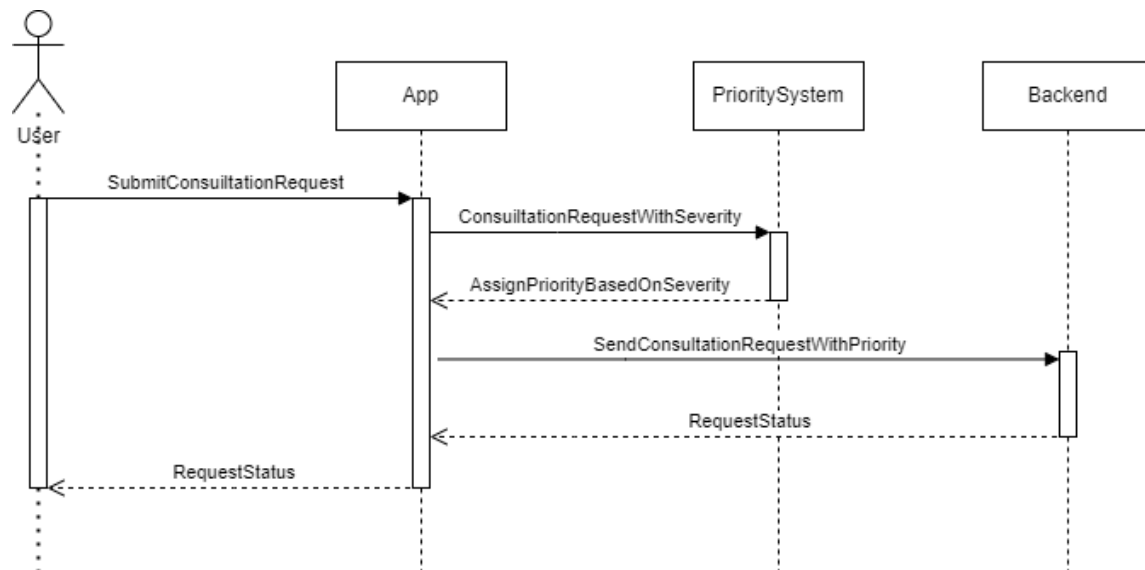
Actor: User
Preconditions: User has submitted for their medical history.

Actor: User
Preconditions: User wanted to confirm their location.

Design UML Class Diagram:

User
- -userId: String
- +name: String
- +contactInfo: String
- +updateContactInfo(newContactInfo: str): None

Appointment
- -appointmentId: String
- +date: DateTime
- +status: String
- +cancel(): None

Doctor
- -doctorId: String
- +name:name
- +contactInfo: String
- +specialization: String
- +viewAvailability(): List[DateTime]
- -scheduleAppointment(patient: Patient, date: DateTime): None
- +check_priority(): String
- -prescribeMedication(patient: Patient, medication: str): None
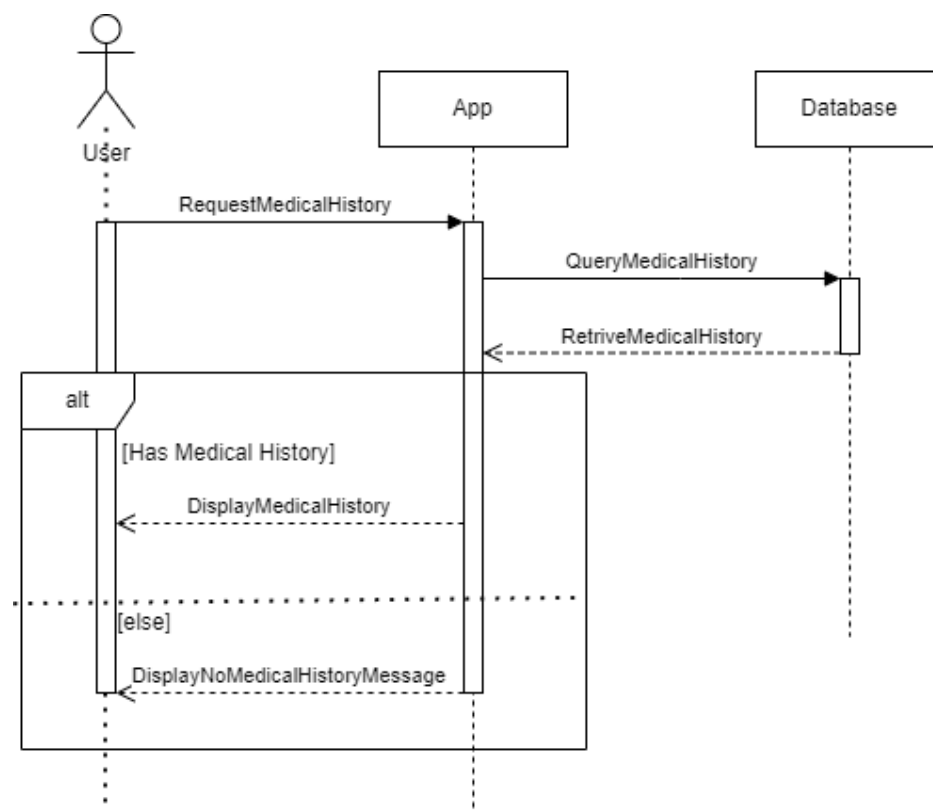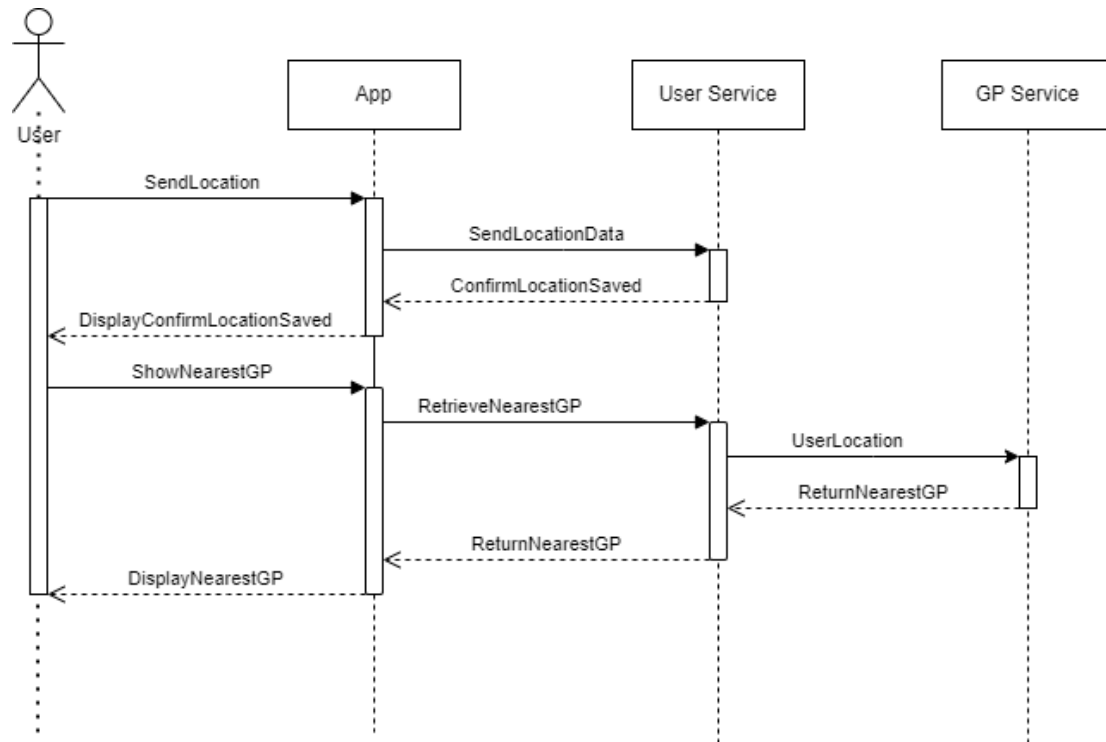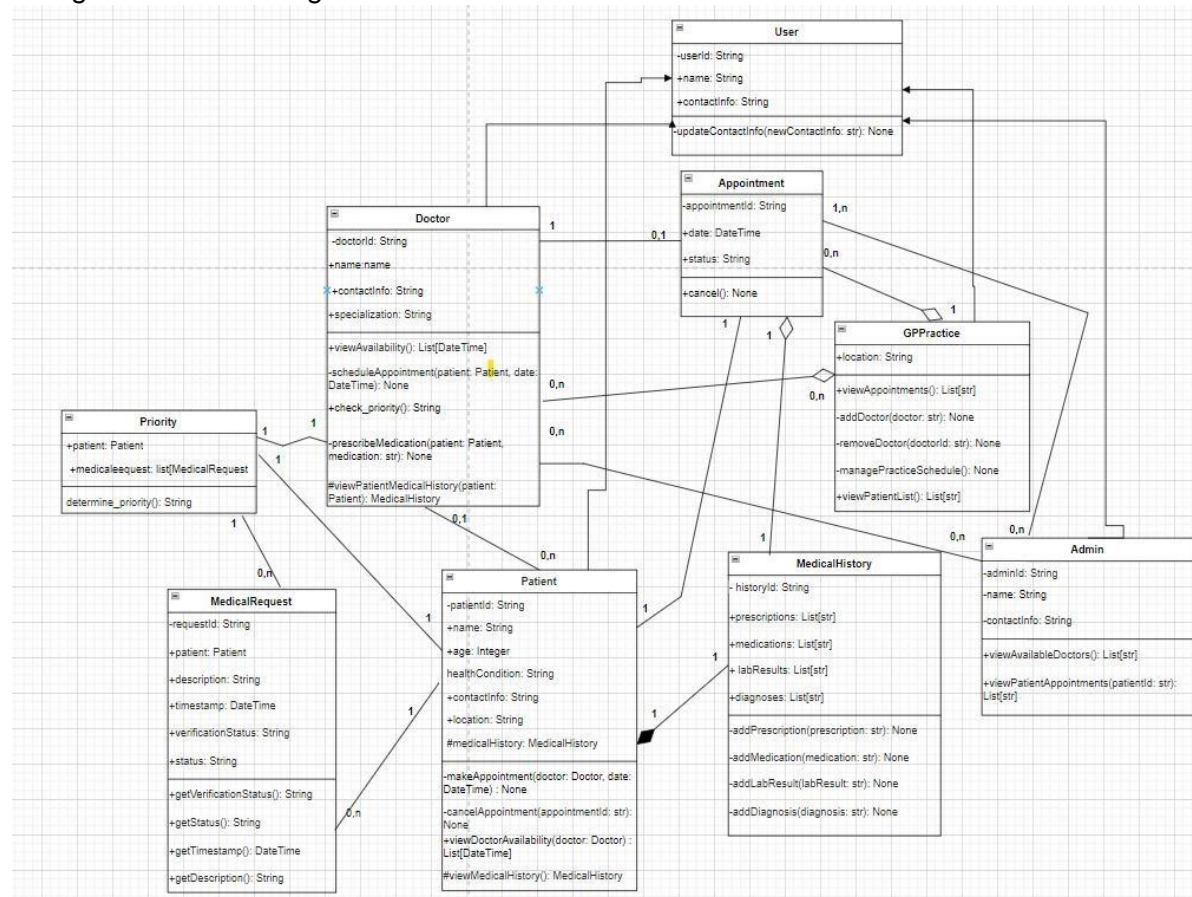- #viewPatientMedicalHistory(patient: Patient): MedicalHistory

GPPractice
- +location: String
- +viewAppointments(): List[str]
- +addDoctor(doctor: str): None
- -removeDoctor(doctorId: str): None
- -managePracticeSchedule(): None
- +viewPatientList(): List[str]

Priority
- +patient: Patient
- +medicaleequest: list[MedicalRequest]
- determine_priority(): String

MedicalRequest
- -requestId: String
- +patient: Patient
- +description: String
- +timestamp: DateTime
- +verificationStatus: String
- +status: String
- +getVerificationStatus(): String
- +getStatus(): String
- +getTimestamp(): DateTime
- +getDescription(): String

Patient
- -patientId: String
- +name: String
- +age: Integer
- healthCondition: String
- +contactInfo: String
- +location: String
- #medicalHistory: MedicalHistory
- -makeAppointment(doctor: Doctor, date: DateTime) : None
- -cancelAppointment(appointmentId: str): None
- +viewDoctorAvailability(doctor: Doctor) : List[DateTime]
- #viewMedicalHistory(): MedicalHistory

MedicalHistory
- -historyId: String
- +prescriptions: List[str]
- +medications: List[str]
- +labResults: List[str]
- +diagnoses: List[str]
- -addPrescription(prescription: str): None
- -addMedication(medication: str): None
- -addLabResult(labResult: str): None
- -addDiagnosis(diagnosis: str): None

Admin
- -adminId: String
- -name: String
- -contactInfo: String
- +viewAvailableDoctors(): List[str]
- +viewPatientAppointments(patientId: str): List[str]

	A	B	C	D	E	F	Comments
the 5 Ps							
• Problem:	B						Done it as like coursework says and how our personal tutor taught us.
• Process	A						It was perfect as coursework and also satisfying for this work.
• Project		B					It was good.

	A	B	C	D	E	F	Comments
• Product		A					Followed the coursework perfectly.
• People		A					It was fairly good.

functional and non-functional requirements:	B					Satisfied with this work and done as coursework mentioned it to do it.
Structured design, • Entity Relationship Diagram	A					It is the best one.
• Data Flow Diagrams.	A					It's pretty good.
• SQL queries	A					I had fun finishing this one.

UML Design					
Use Case Diagram -	A				It is perfect.
Design Class diagrams		B			It's good too.
Sequence Diagrams			C		It is good enough to follow the diagram.