Table of Contents (Phase 1)

1. Background
2. Purpose
3. Scope
4. Functional Requirements
    - 4.1 Patient
    - 4.2 Doctor
    - 4.3 Pharmacy
5. Non-Functional Requirements
6. Prototype
7. Data Requirements
8. Entity Definition Table
9. Relation Definition Table
10. Attribute Definition Table

1. Background

Our healthcare management system is crafted to optimize and enhance the medical experience for patients, doctors, pharmacies, labs, radiology departments, and billing services. This all-in-one platform offers streamlined appointment scheduling, easy access to medical records, efficient prescription management, and seamless billing and insurance processing. It also includes medication delivery services and home healthcare options, ensuring that patients receive their prescriptions conveniently at home, further improving the overall efficiency and accessibility of healthcare.

2. Purpose

The purpose of the WellnessWay application is to enhance the patient experience by providing a seamless, user-friendly application for accessing medical records, scheduling appointments, and managing prescriptions. It aims to streamline healthcare processes for providers by integrating appointment scheduling, billing, and clinical management into a single system. Additionally, the system facilitates efficient communication among patients, doctors, pharmacies, medical tests, and billing services, ensuring coordinated and effective care delivery. Finally, it increases accessibility through services like medication delivery and home healthcare services, making it easier for patients to receive the care they need conveniently.

3. Scope

The scope of our Healthcare Management System includes comprehensive functionalities designed to enhance the healthcare experience for patients, pharmacies, and billing services. Key features encompass patient management, online appointments, and delivery of the needed medicines to the home. Additionally, offers home healthcare services, ensuring patient satisfaction through convenient access to services and support, by creating a cohesive application. WellnessWay aims to foster collaboration among all stakeholders, ultimately improving the quality, efficiency, and accessibility of healthcare services while focusing solely on essential healthcare functions. An initial prototype of the system has been developed, outlining its scope and design.

4. Functional Requirements

4.1 Patient

- Patients must log in using authentication methods (e.g., PatientID and password).
- Patients choose the clinic type, and doctor name.
- Patients select a date, and time to schedule an online Appointment.
- Patients can pay for appointments and services through payment processors (e.g., cash, credit/debit card, Apple Pay) or it could be paid by insurance.
- Patients can view their medical tests such as lab results and radiology results.
- Patients can view their medical prescriptions that are issued by doctors.
- Patents can view their completed, canceled, and scheduled appointments, along with the doctor's name, time, and date.
- Patients can view and cancel the scheduled appointments.
- Patients can request delivery of their prescriptions to their house.
- Patients can track the status of their medication deliveries.
- Patients can request home health care services which are (physiotherapy, laboratory testing, and vaccination).
- Patients can view the costs of home health care services.
- Patients receive automated reminders via SMS for upcoming appointments.
- Patients can contact support by phone number.

4. Functional Requirements (Cont'd)

4.2 Doctor

- Doctors must log in using authentication methods (e.g., DoctorID and password).
- Doctors can view their schedule to check the appointment and the date assigned to that appointment.
- Doctors can view and cancel the appointments if it is needed.
- Doctors can view the patient's medical tests (e.g.lab results, radiology reports)
- Doctors can write a medical prescription for the patient.
- Doctors can conduct virtual consultations with patients through an integrated video conferencing feature.
- Doctors can generate prescriptions digitally and send them directly to pharmacies.
- Doctors can request lab and radiology tests.

4.3 Pharmacy

- Pharmacy receives patient's prescriptions from doctors.
- Pharmacy can review, validate, and process received prescriptions.
- Pharmacy can update medication delivery status.
- Pharmacies can schedule medication deliveries to patients' homes.
- Pharmacies can check insurance coverage for medications before processing prescriptions to handle billing and claims Processing.

5. Non-Functional Requirements

- **Availability**

  The system must be available 99.99% of the time, ensuring minimal downtime, especially during critical hours.

  Users should be notified ahead of time about any scheduled maintenance or updates, and efforts should be made to minimize downtime.

- **Performance**

  The system must handle a large volume of concurrent users (e.g., doctors, patients, pharmacies) without performance degradation.

  Responses to user requests (such as loading patient records or scheduling appointments) should take no longer than 4 seconds.

  The system should be optimized to handle high traffic during peak hours.

- **Scalability**

  The system should easily grow to handle more users, records, and new healthcare facilities without issues.

- **Security**

  The system must protect patient data with strong security measures, like encryption.

  Data encryption should be used for both stored data (at rest) and transmitted data (in transit).

5. Non-Functional Requirements (Cont'd)

- **Usability**

  Doctors and healthcare providers should be able to easily navigate through patient's medical records and appointment schedules.

  The system should be easy to use, with a simple and understandable interface.

- **Reliability**

  The system should ensure consistent operation without failures under normal conditions, offering accurate and reliable information for users.

  The system should work consistently without errors, ensuring data is always accurate and safe.

- **Data Backup and Recovery**

  Automated daily backups must be performed to ensure that patient and operational data can be recovered in case of system failures.

  The system should support fast data recovery options, ensuring minimal disruption in healthcare services in case of data loss.

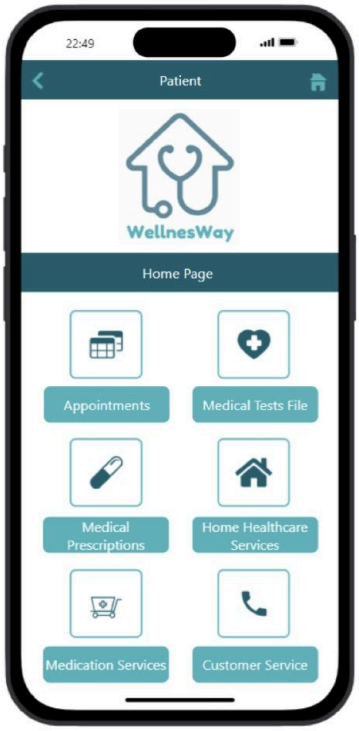
- **Support and Training**

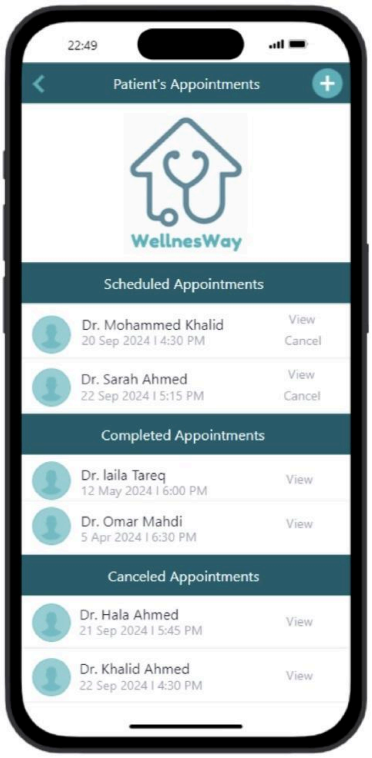
  The system should offer 24/7 technical support to resolve user issues in a timely manner.

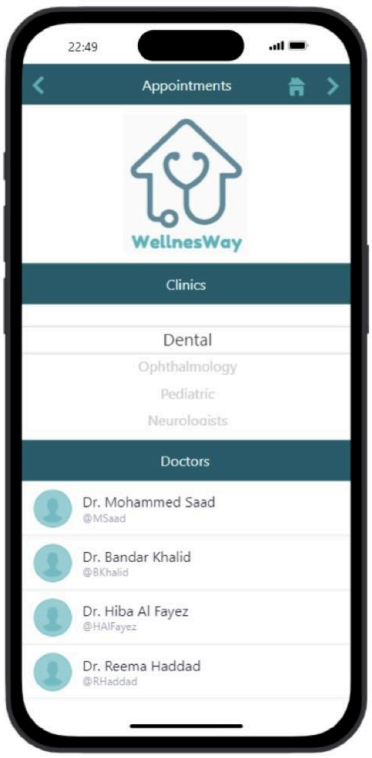
6. Prototype

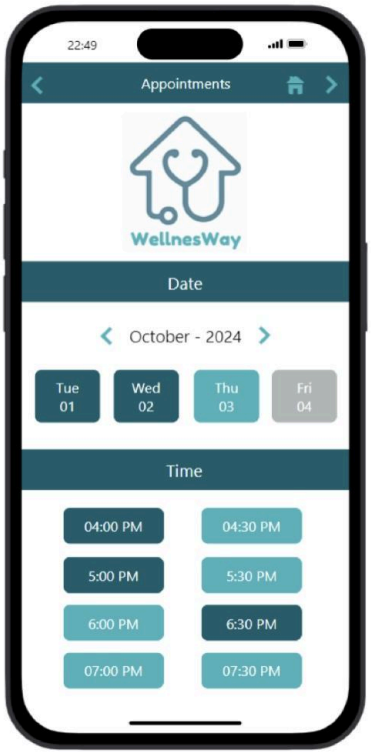

22:49
WellnesWay
Sign in
By proceeding you also agree to the Terms of Service and Privacy Policy
English
عربي

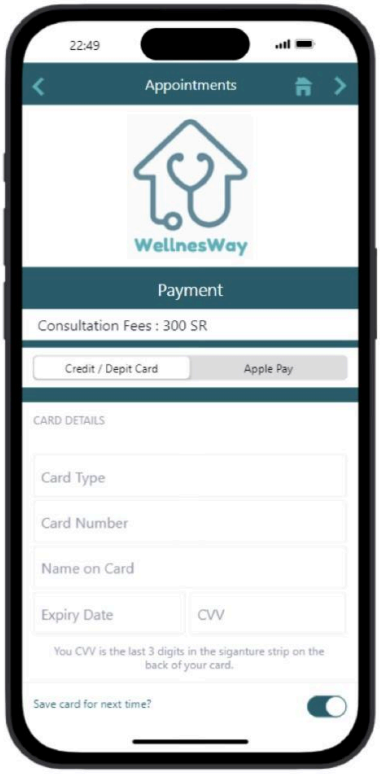

22:49
WellnesWay
Doctor
Patient
ID Number *
Password*
Forgot your password?
Sign in

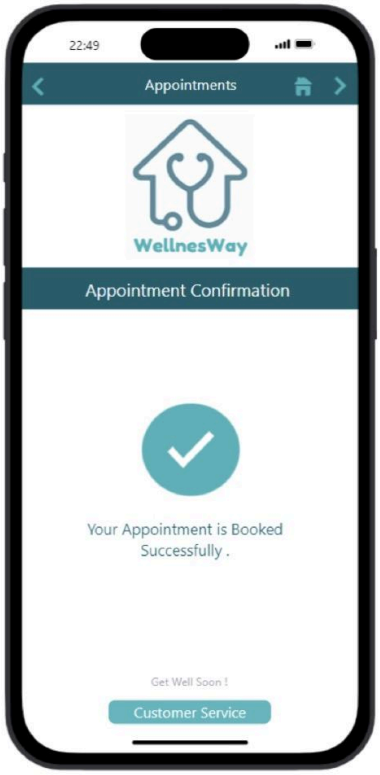

22:49
Patient
WellnesWay
Home Page
Appointments
Medical Tests File
Medical Prescriptions
Home Healthcare Services
Medication Services
Customer Service

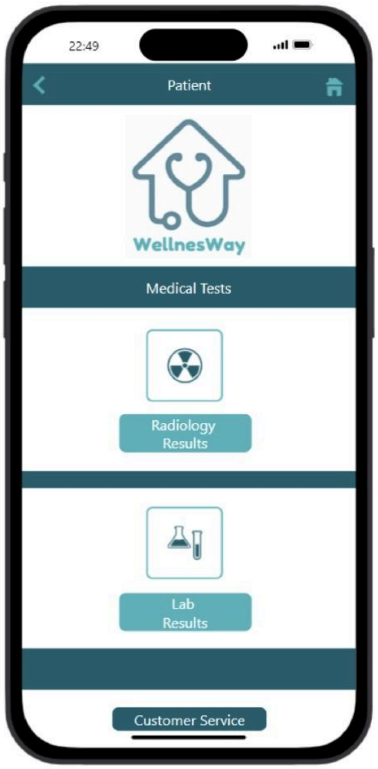

22:49
Patient's Appointments
WellnesWay
Scheduled Appointments
Dr. Mohammed Khalid
20 Sep 2024 | 4:30 PM
View
Cancel
Dr. Sarah Ahmed
22 Sep 2024 | 5:15 PM
View
Cancel
Completed Appointments
Dr. laila Tareq
12 May 2024 | 6:00 PM
View
Dr. Omar Mahdi
5 Apr 2024 | 6:30 PM
View
Canceled Appointments
Dr. Hala Ahmed
21 Sep 2024 | 5:45 PM
View
Dr. Khalid Ahmed
22 Sep 2024 | 4:30 PM
View

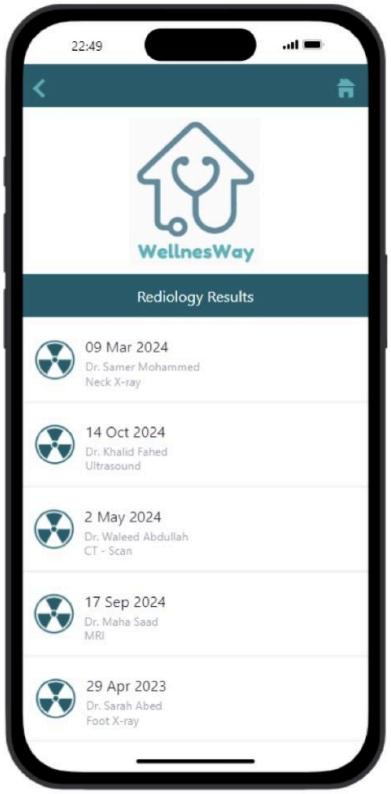

22:49
Appointments
WellnesWay
Clinics
Dental
Ophthalmology
Pediatric
Neurologists
Doctors
Dr. Mohammed Saad
@MSaad
Dr. Bandar Khalid
@BKhalid
Dr. Hiba Al Fayez
@HAlFayez
Dr. Reema Haddad
@RHaddad

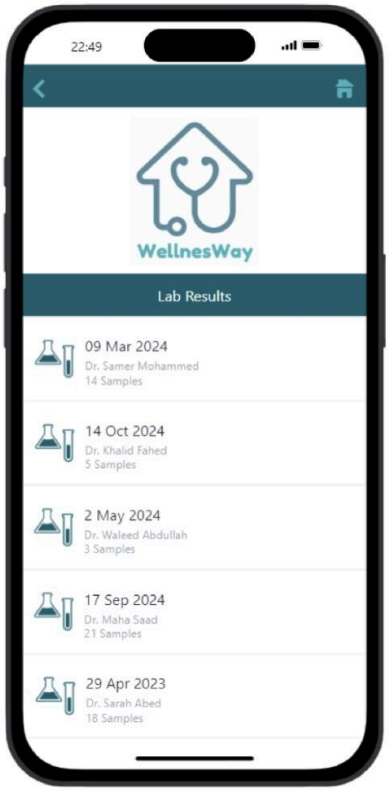

22:49
Appointments
WellnesWay
Date
October - 2024
Tue 01
Wed 02
Thu 03
Fri 04
Time
04:00 PM
04:30 PM
5:00 PM
5:30 PM
6:00 PM
6:30 PM
07:00 PM
07:30 PM

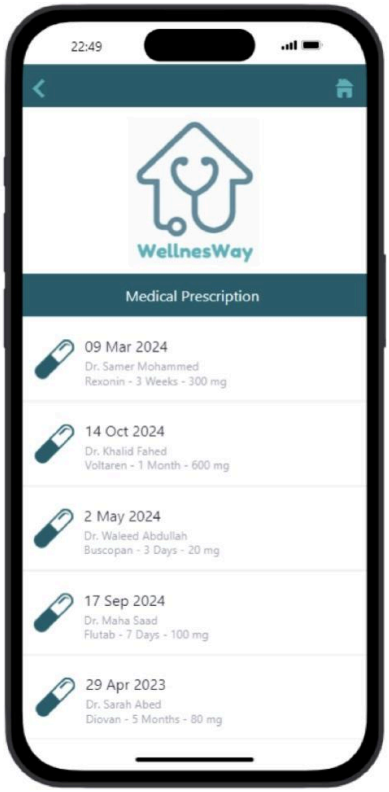

22:49
Appointments
WellnesWay
Payment
Consultation Fees : 300 SR
Credit / Depit Card
Apple Pay
CARD DETAILS
Card Type
Card Number
Name on Card
Expiry Date
CVV
You CVV is the last 3 digits in the siganture strip on the back of your card.
Save card for next time?

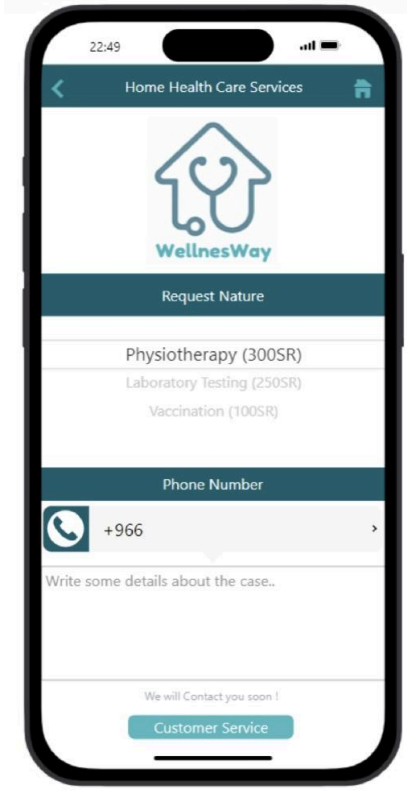

22:49
Appointments
WellnesWay
Appointment Confirmation
Your Appointment is Booked Successfully .
Get Well Soon !
Customer Service

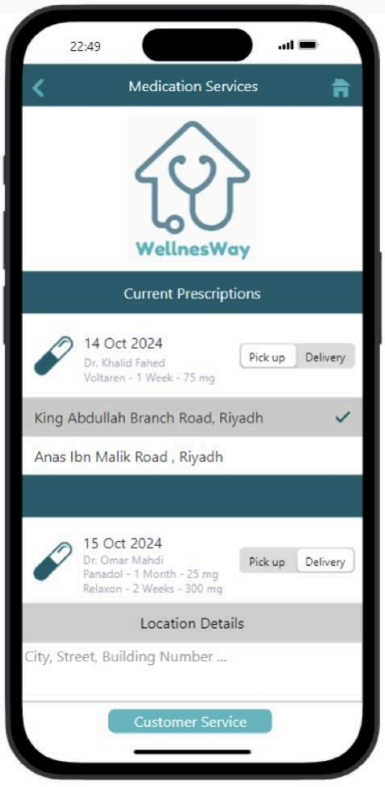

22:49
Patient
WellnesWay
Medical Tests
Radiology Results
Lab Results
Customer Service

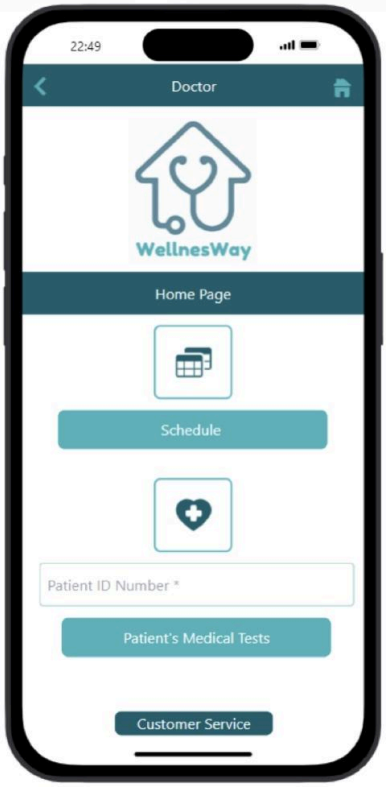

22:49
WellnesWay
Rediology Results
09 Mar 2024
Dr. Samer Mohammed
Neck X-ray
14 Oct 2024
Dr. Khalid Fahed
Ultrasound
2 May 2024
Dr. Waleed Abdullah
CT - Scan
17 Sep 2024
Dr. Maha Saad
MRI
29 Apr 2023
Dr. Sarah Abed
Foot X-ray

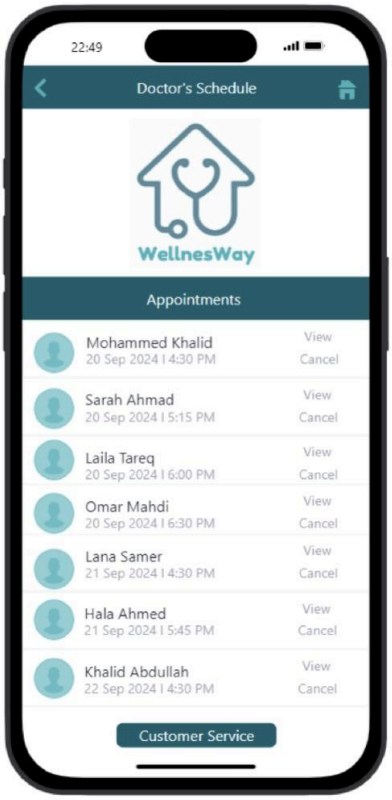

22:49
WellnesWay
Lab Results
09 Mar 2024
Dr. Samer Mohammed
14 Samples
14 Oct 2024
Dr. Khalid Fahed
5 Samples
2 May 2024
Dr. Waleed Abdullah
3 Samples
17 Sep 2024
Dr. Maha Saad
21 Samples
29 Apr 2023
Dr. Sarah Abed
18 Samples

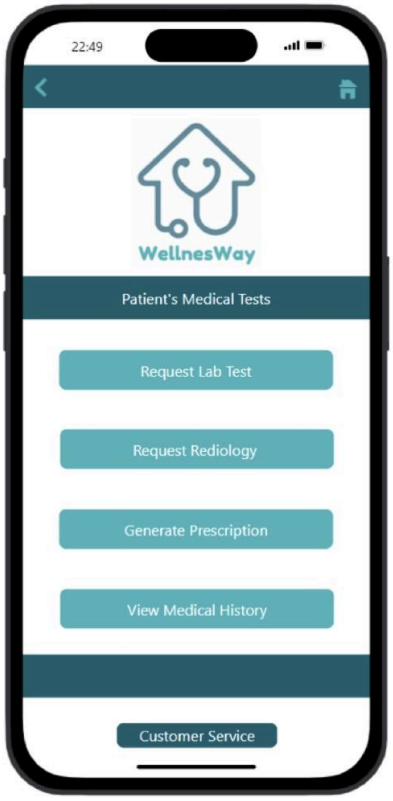

22:49
WellnesWay
Medical Prescription
09 Mar 2024
Dr. Samer Mohammed
Rexonin - 3 Weeks - 300 mg
14 Oct 2024
Dr. Khalid Fahed
Voltaren - 1 Month - 600 mg
2 May 2024
Dr. Waleed Abdullah
Buscopan - 3 Days - 20 mg
17 Sep 2024
Dr. Maha Saad
Flutab - 7 Days - 100 mg
29 Apr 2023
Dr. Sarah Abed
Diovan - 5 Months - 80 mg

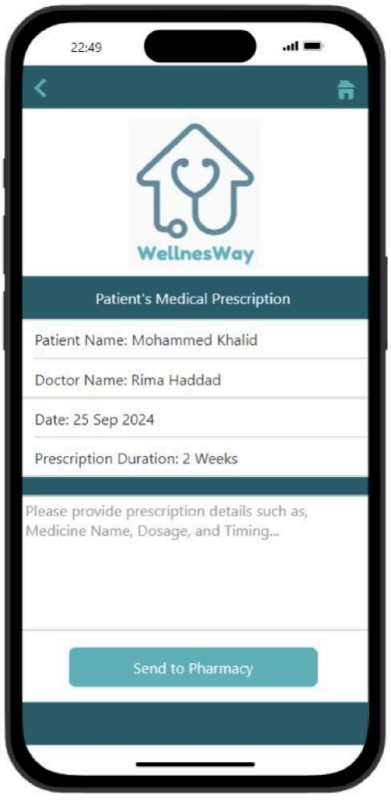

22:49
Home Health Care Services
WellnesWay
Request Nature
Physiotherapy (300SR)
Laboratory Testing (250SR)
Vaccination (100SR)
Phone Number
+966
Write some details about the case..
We will Contact you soon !
Customer Service

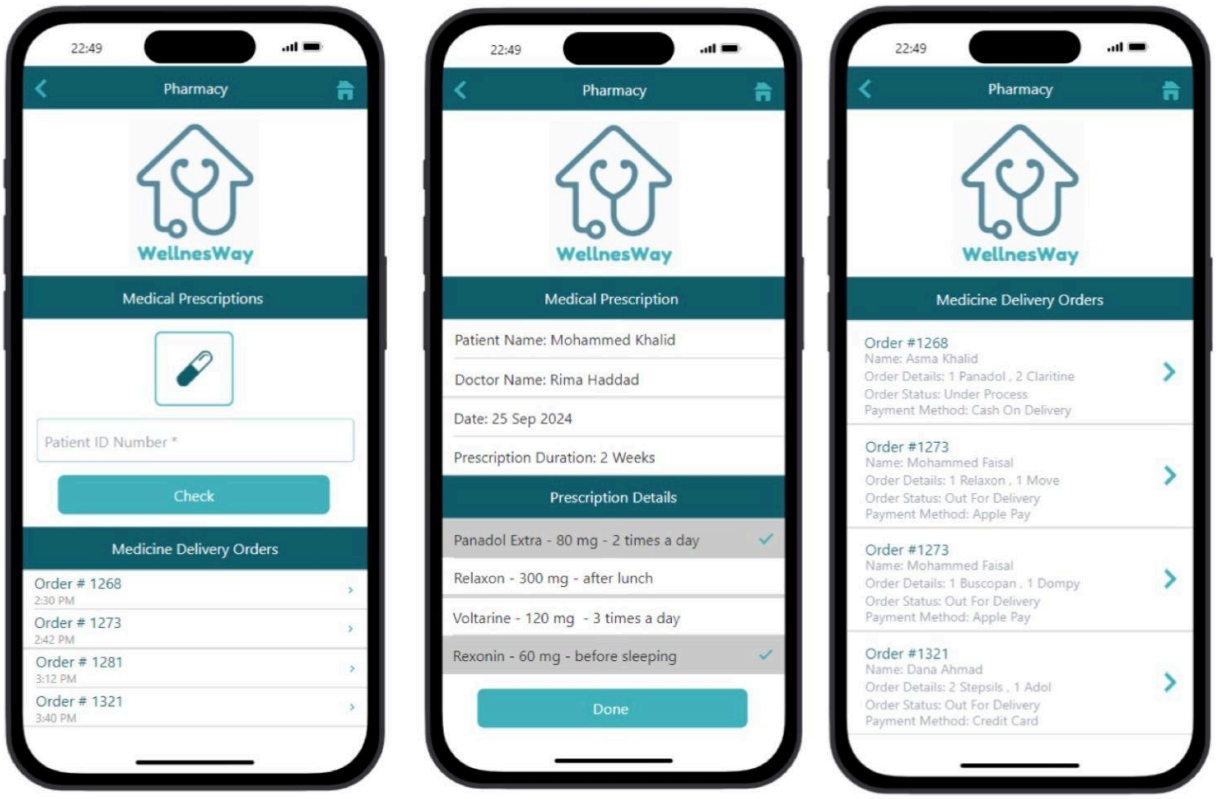

22:49
Medication Services
WellnesWay
Current Prescriptions
14 Oct 2024
Dr. Khalid Fahed
Voltaren - 1 Week - 75 mg
Pick up
Delivery
King Abdullah Branch Road, Riyadh
Anas Ibn Malik Road , Riyadh
15 Oct 2024
Dr. Omar Mahdi
Panadol - 1 Month - 25 mg
Relaxon - 2 Weeks - 300 mg
Pick up
Delivery
Location Details
City, Street, Building Number ...
Customer Service


22:49
Doctor
WellnesWay
Home Page
Schedule
Patient ID Number *
Patient's Medical Tests
Customer Service


22:49
Doctor's Schedule
WellnesWay
Appointments
Mohammed Khalid
20 Sep 2024 | 4:30 PM
Sarah Ahmad
20 Sep 2024 | 5:15 PM
Laila Tareq
20 Sep 2024 | 6:00 PM
Omar Mahdi
20 Sep 2024 | 6:30 PM
Lana Samer
21 Sep 2024 | 4:30 PM
Hala Ahmed
21 Sep 2024 | 5:45 PM
Khalid Abdullah
22 Sep 2024 | 4:30 PM
View
Cancel
Customer Service


22:49
WellnesWay
Patient's Medical Tests
Request Lab Test
Request Rediology
Generate Prescription
View Medical History
Customer Service


22:49
WellnesWay
Patient's Medical Prescription
Patient Name: Mohammed Khalid
Doctor Name: Rima Haddad
Date: 25 Sep 2024
Prescription Duration: 2 Weeks
Please provide prescription details such as, Medicine Name, Dosage, and Timing...
Send to Pharmacy


22:49
Pharmacy
WellnesWay
Medical Prescriptions
Patient ID Number *
Check
Medicine Delivery Orders
Order # 1268
2:30 PM
Order # 1273
2:42 PM
Order # 1281
3:12 PM
Order # 1321
3:40 PM
22:49
Pharmacy
WellnesWay
Medical Prescription
Patient Name: Mohammed Khalid
Doctor Name: Rima Haddad
Date: 25 Sep 2024
Prescription Duration: 2 Weeks
Prescription Details
Panadol Extra - 80 mg - 2 times a day
Relaxon - 300 mg - after lunch
Voltarine - 120 mg - 3 times a day
Rexonin - 60 mg - before sleeping
Done
22:49
Pharmacy
WellnesWay
Medicine Delivery Orders
Order #1268
Name: Asma Khalid
Order Details: 1 Panadol , 2 Claritine
Order Status: Under Process
Payment Method: Cash On Delivery
Order #1273
Name: Mohammed Faisal
Order Details: 1 Relaxon , 1 Move
Order Status: Out For Delivery
Payment Method: Apple Pay
Order #1273
Name: Mohammed Faisal
Order Details: 1 Buscopan , 1 Dompy
Order Status: Out For Delivery
Payment Method: Apple Pay
Order #1321
Name: Dana Ahmad
Order Details: 2 Stepsils , 1 Adol
Order Status: Out For Delivery
Payment Method: Credit Card

7. Data Requirements

1. Users can be patients or doctors. Each user has a User_ID, ssn, Name(first name, last name), and phone number.
2. Each Patient additionally must have a date of Birth, and address (City, Street, BuildingNum).
3. Some Patients have one Medical Insurance. Medical Insurance is only for one patient
4. Medical Insurance is described by InsuranceNum, Insurance type, coverage limits, start date, and expiration date.
5. All Doctors may have one or more specializations.
6. Each Patient consults one or more Doctors, and all Doctors are consulted by at least one Patient. This is considered as a high-level entity (Aggregation) known as Pat_Doc_consul.
7. A Pat_doc_consul results in one or many appointments. One appointment is for one pat_doc_consul (i,e, patient consulting a doctor on a particular day).
8. Every Appointment has an Appointment_ID, date(Day, Month, Year), time, cost, status E.g.(scheduled, completed, canceled), and TotalAmountOfTests that is calculated.
9. The MedicalTest has a MedicalTest_ID, TestName, date(Day, Month, Year), cost, lab (buildingNum, FloorNum, RoomNum), Fasting(Y\N).
10. An Appointment can order many MedicalTests. Medical Tests are ordered in many appointments.
11. Each Medical test consists of many TestDetails.
12. Test_Details has the itemName, value, and trueRatio (Min, Max).
    Test_Details can not exist without a Medical Test.

13. One appointment can lead to one Prescription. Each Prescription is for one appointment.

14. All Medical Prescriptions must have prescription_ID, DateIssued (Day, Month, Year), and duration (NumOfDays, DailyPortion).

15. One Prescription contains one or many Medicines. Medicine is contained in many Prescriptions. The dosage is also stored for each medicine mentioned in the prescription.

16. The Medicine includes MedicineID, MedicineName, and ExpirationDate.

17. All prescriptions are sent to the pharmacy, and the Pharmacy delivers prescriptions to many patients. One patient can receive many Prescriptions that are sent by the pharmacy.

18. The date of delivery and delivery address are also stored when the Pharmacy delivers the Prescription.

19. The Pharmacy has a pharmacyID, PharmacyName, PhoneNumber, and Location consisting of (street name, city, and building number).

20. One Appointment requires one Payment and one payment is required for one appointment.

21. Payment is described by PaymentNo, PaymentDate, and PaymentAmount.

22. PaidByInsurance has MedicalApproval(Y\N).

23. Patients can request many Home Services which include serviceID, RequestNature, and cost. Home Services are requested by many patients.

24. A Home service that is requested by a patient has a date of Request, date of service, and time.

8. Entity Definition Table

Entity	Description	Key Attribute	Attributes
User	This is a Super entity that represents users of the WellnessWay application. It can be categorized into different roles (like Patient and doctor).	User_ID	• ssn • Name(First, Last) • PhoneNumber
Patient	This is a Sub entity of WellnessWay_user that represents patients who will be utilizing the WellnessWay application	User_ID	• DateOfBirth • Address(City, Street, BuildingNum)
Doctor	This is a Sub entity of WellnessWay_user that captures information about healthcare providers using the application	User_ID	• Specializations
Consultation	This is considered as a high level entity (Aggregation) that includes patient entity and doctor entity.	Consult_ID Surrogate Key	
Appointment	This entity captures all appointment details for patient consultations.	Appointment_ID	• Date (Day, Month, Year) • Time • cost • Status e.g.(Scheduled, Completed, Canceled) • TotalAmountOfTests (Calculated)

Pharmacy	This entity represents the pharmacy associated with the Wellness Way healthcare system.	Pharmacy_ID	• PharmacyName • PhoneNumber • Location (street name, city, and building number)
Medical Test	This is an entity that contains different records of the patient's medical tests such as results.	MedicalTest_ID	• TestName • Date (Day, Month, Year) • Cost • Lab (buildingNum, FloorNum, RoomNum) • Fasting(Y\N)
Test details	This a weak entity of Medical Test entity that includes detailed information regarding the tests	TestDetails_ID	• Item Name • Value • TrueRatio (Min,Max)
Medical Prescription	This entity details prescriptions issued to patients, facilitating medication management.	PrescriptionID	• DateIssued (Day, Month, Year) • Duration (NumOfDays, DailyPortion)
Medicine	This entity details medications available for prescription, including attributes such as name, dosage, form, expiration date	MedicineID	• MedicineName • ExpirationDate

Home Healthcare Services	This entity records requests for healthcare services delivered to the home, facilitating efficient management and coordination of home healthcare for patients.	ServiceID	• RequestNature • Cost
Medical Insurance	This entity provides essential information regarding the insurance coverage of patients which is critical for processing claims and ensuring patients receive covered services.	InsuranceNum	• InsuranceType • CoverageLimit • startDate • ExpirationDate
Payment	This entity records the total amount, the ID, and who paid that total. The type of payment (cash, credit/debit card, Apple Pay)	PaymentNo	• PaymentDate • PaymentAmount
PaidByInsurane	This entity is a sub entity of Payment entity. It shows payment that the insurance paid and its condition is the approval of insurance. (yes or no)	PaymentNo	• MedicalApproval (Y\N)

9. Relation Definition Table

Relationship	Type	Entities	Description	Relational Attributes
Have	Binary 1:1 PP:TP	Patient Medical_Insurance	One Patient may have one Medical Insurance. One medical Insurance belongs to one patient.	
Consults	Binary M:N TP:TP	Patient Doctor	One Patient can consult many Doctors. A doctor can be consulted by at least one Patient	
Result_in	Binary between aggregated entity and strong entity 1:M TP:TP	Consultation Appointment	The patient that consults a Doctor can result in many appointments. One appointment is a result of one patient consulting a doctor.	

Order	Binary N: M PP: TP	Appointment Medical_Test	An Appointment can order many Medical tests. A medical test is ordered by many appointments.	
Consist_of	Binary between strong and weak N:1 TP:TP	Madecal_Test Test_Details	Each Medical test consists of many Test_Details. Each Detail is a part of one Medical Test	
Leads_to	Binary 1:1 PP:TP	Appointment Prescription	One Appointment can lead to one Prescription. One Prescription is led by one Appointment.	
Contains	Binary M:N TP:TP	Prescription Medicine	One Prescription contains many Medicines. Medicine is contained in many Prescriptions.	dosage
Delivery	Ternary M:1:N TP:PP:TP	Pharmacy Patient Prescription	A Pharmacy delivers prescriptions to many patients. One patient can receive many Prescriptions that are sent by the pharmacy.	deliveryAddress ,dateOfDelivery

Require	Binary 1:1 TP:TP	Appointment Payment	One Appointment requires One Payment. One Payment is necessary for One Appointment	
Can_request	Binary N:M PP:TP	Patient Home_Servie	Patients can request many Home Services. Home Service can be requested by many patients.	dateOfRequest, dateOfService, time.

10. Attributes Definition Table :

Entity Name	Attributes	Type	Description
User	1. User_ID 2. ssn 3. Name 4. PhoneNumber	1. Simple key attribute 2. Simple attribute 3. Composite attribute(Fname ,Lname) 4. Simple attribute	1. Describes the unique ID of the user 2. Contains the social security number of the user 3. Describes the full name of the user 4. Contains the user's phone number
Patient	1. DateOfBirth 2. Address	1. Simple attribute 2. Composite attribute (year, month, day)	1. Contains the patient's date of birth 2. Includes the address of the patient
Doctor	1. Specializations	1. Multi-Valued attribute	1. It defines a doctor's advanced expertise in a specific medical field..

Appointment	1. Appointment_ID 2. Date 3. Time 4. Cost 5. Status 6. TotalAmountOfTests	1. simple key attribute 2. composite (year, month, day) 3. Simple attribute 4. Simple attribute 5. Simple attribute 6. Calculated attribute	1. Describe the unique ID of the appointment 2. Describe the date when the appointment was issued. 3. Describe the time of the appointment. 4. Contains the cost of the appointment 5. Describes the different status of the appointment 6. Shows the total amount of tests that were ordered for the appointment
Pharmacy	1. Pharmacy ID 2. PharmacyName 3. PhoneNum 4. Location	1. Simple key attribute 2. Simple attribute 3. Simple attribute 4. composite attribute	1. Describes the unique ID of the pharmacy 2. Contains the name of the pharmacy 3. Contains the pharmacy phone number 4. Describes the location of the pharmacy (street name, city, and building number).

Medical Test	1. MedicalTest_ID 2. TestName 3. Date 4. Cost 5. Lab 6. Fasting (Y\N)	1. Simple key attribute 2. Simple attribute 3. Composite (year, month, day) 4. Simple attribute 5. Composite attribute (buildingNum, FloorNum, RoomNum) 6. Simple Boolean attribute	1. Describes the unique ID of the test 2. Contains the name of the test. 3. Contains the date when the test was issued. 4. Describes the fees paid for the tests. 5. Describes the lab location where the patient will do the test. 6. Describes whether the test requires fasting or not.
Test Details	1. TestDetails_ID 2. Item name 3. Value 4. True Ratio	1. Partial Key 2. Simple attribute 3. Simple attribute 4. Composite attribute (Min, Max)	1. Describes the unique ID of the test details 2. Describes the name of the test to be done. 3. Describes the result value of the test. 4. Describe the value of the test in the normal state.

Medical prescription	1. Prescription_ID 2. DateIssued 3. Duration	1. Simple key attribute 2. Composite attribute (day, month, year) 3. Composite attribute (NumOfDays DailyPortion).	1. Describes the unique ID of the prescription by a set of numbers. 2. Describes the date that the prescription was written. 3. Describes the duration of time that the patient needs to take the medicines.
Medicine	1. MedicineID 2. MedicineName 3. Expiration Date	1. Simple key attribute 2. Simple attribute 3. Simple attribute	4. Describe the unique ID of the medicine. 5. Describes the name of the medicine issued. 6. Contains the expiry date of the medicine.
Home Healthcare Services	1. ServiceID 2. RequestNature 3. Cost	1. Simple key attribute 2. Simple attribute 3. Simple attribute	1. Describes the unique ID of the service requested. 2. Describes the nature or name of the service. 3. Describes the fees that need to be paid for the service.

Medical Insurance	1. InsuranceNum 2. InsuranceType 3. CoverageLimit 4. StartDate 5. ExpirationDate	1. Simple key attribute 2. Simple attribute 3. Simple attribute 4. Simple attribute 5. Simple attribute	1. Describes the unique ID of the medical insurance. 2. Describes the level of insurance that the patient has. 3. Describes the limitations of payments that the insurance can pay. 4. Contains the data on when the insurance started. 5. Contains the expiry date of the insurance.
Payment	1. PaymentNo 2. PaymentDate 3. PaymentAmount	1. Simple key attribute 2. Simple attribute 3. Simple attribute	1. Describe the unique ID of the payment. 2. Includes the date when the payment was issued. 3. Contains the total fees paid.
PaidByInsurance	1. PaymentNo 2. MedicalApproval (Y\N)	1. Simple key attribute 2. Simple boolean attribute	1. Describes the unique ID of the payment. 2. Describes whether the insurance company approved to pay the fees