

Test Case 1: View Medical Record

- Patients view their own medical record.
- Verify that the system displays the patient's medical record, including Patient ID, Name, Date of Birth, Gender, Contact Information, Blood Type, and Past Diagnoses and Treatments.

```
Welcome, Alice Brown!
=====
Patient Menu
=====
> 1. View Medical Record
> 2. Update Personal Information
> 3. View Available Appointment Slots
> 4. Schedule an Appointment
> 5. Reschedule an Appointment
> 6. Cancel an Appointment
> 7. View Scheduled Appointments
> 8. View Past Appointment Outcome Records
> 9. Logout
=====

Choose an option: 1
-----
Alice Brown [P1001]
-----
Date of Birth      : 14/5/80
Gender            : Female
Email Address     : alice@example.com
Phone Number      : 91231234
Blood Type        : A+

-----
Date             : 15/10/24
Doctor Name [ID] : John Smith [D001]
Appointment ID   : AP001
Type of Service   : Consultation
Diagnosis         : Headache
Treatment         : Painkiller
Case Notes        : No fever
```

Test Case 2: Update Personal Information

- Patient updates their email address and contact number.
- Verify that patient's contact information is updated successfully, and the changes are reflected in the medical record.

```
=====
Patient Menu
=====
> 1. View Medical Record
> 2. Update Personal Information
> 3. View Available Appointment Slots
> 4. Schedule an Appointment
> 5. Reschedule an Appointment
> 6. Cancel an Appointment
> 7. View Scheduled Appointments
> 8. View Past Appointment Outcome Records
> 9. Logout
=====

Choose an option: 2
-----
Alice Brown [P1001]
-----
Date of Birth      : 14/5/80
Gender            : Female
Email Address     : alice@example.com
Phone Number      : 91231234
Blood Type        : A+

-----
Update Personal Information
=====
> 1. Update Email Address
> 2. Update Phone Number
> 3. Update Password
> 4. Back to Main Menu
=====

Choose an option: 1
Enter new email address: alice@test.com
Email address updated successfully.

Choose an option: 2
Enter new phone number: 93211234
Phone number updated successfully.

Choose an option: 3
Enter new Password (must contain at least 8 characters, including uppercase, lowercase, digit, and special character): Pa$$w0rd123
Password updated successfully.
```

```
=====
Hospital Management System
=====

Enter UserID: P1001
Enter Password: Pa$$w0rd123

Welcome, Alice Brown!
=====
Patient Menu
=====
> 1. View Medical Record
> 2. Update Personal Information
> 3. View Available Appointment Slots
> 4. Schedule an Appointment
> 5. Reschedule an Appointment
> 6. Cancel an Appointment
> 7. View Scheduled Appointments
> 8. View Past Appointment Outcome Records
> 9. Logout
=====

Choose an option: 1
-----
Alice Brown [P1001]
-----
Date of Birth      : 14/5/80
Gender            : Female
Email Address     : alice@test.com
Phone Number      : 93211234
Blood Type        : A+
```

Test Case 3: View Available Appointment Slots

- Patient views available appointment slots with doctors.
- Verify that the system displays a list of available appointment slots, showing doctors' names, dates, and times.

```
===== Patient Menu =====
> 1. View Medical Record
> 2. Update Personal Information
> 3. View Available Appointment Slots
> 4. Schedule an Appointment
> 5. Reschedule an Appointment
> 6. Cancel an Appointment
> 7. View Scheduled Appointments
> 8. View Past Appointment Outcome Records
> 9. Logout
=====

Choose an option: 3

===== View Available Appointment Slots =====

John Smith [D001]
-----
 Available Date: 15/10/24
 Available Date: 16/10/24
 Available Date: 17/10/24
 Available Date: 18/10/24

Emily Clarke [D002]
-----
 Available Date: 15/10/24
 Available Date: 16/10/24
 Available Date: 17/10/24

Please select the Doctor ID and Date (Format: DXXX DD/MM/YY): D001 17/10/24

John Smith [D001]
-----
Available Time Slots for 17/10/24:
> 1. 1000 - 1100
```

Test Case 4: Schedule an Appointment

- Patient schedules a new appointment with a doctor.
- Verify that the appointment is scheduled successfully with status "confirmed". The selected time slot becomes unavailable to other patients. The system should prevent the patient from booking a time slot that is unavailable/already booked.

```
===== Patient Menu =====
> 1. View Medical Record
> 2. Update Personal Information
> 3. View Available Appointment Slots
> 4. Schedule an Appointment
> 5. Reschedule an Appointment
> 6. Cancel an Appointment
> 7. View Scheduled Appointments
> 8. View Past Appointment Outcome Records
> 9. Logout
=====

Choose an option: 4

John Smith [D001]
-----
 Available Date: 15/10/24
 Available Date: 16/10/24
 Available Date: 17/10/24
 Available Date: 18/10/24

Emily Clarke [D002]
-----
 Available Date: 15/10/24
 Available Date: 16/10/24
 Available Date: 17/10/24

Please select the Doctor ID and Date to schedule (Format: DXXX DD/MM/YY): D001 15/10/24

John Smith [D001]
-----
Available Time Slots for 15/10/24:
> 1. 0900 - 1000
> 2. 1300 - 1400
> 3. 1400 - 1500
> 4. 1500 - 1600
> 5. 1600 - 1700

Select a time slot number to schedule: 1
Appointment scheduled successfully.

===== Patient Menu =====
> 1. View Medical Record
> 2. Update Personal Information
> 3. View Available Appointment Slots
> 4. Schedule an Appointment
> 5. Reschedule an Appointment
> 6. Cancel an Appointment
> 7. View Scheduled Appointments
> 8. View Past Appointment Outcome Records
> 9. Logout
=====

Choose an option: 7

===== View Upcoming Appointments =====

Appointment ID      : AP010
Doctor             : John Smith [D001]
Date               : 16/10/24
Time Slot          : 1400 - 1500
Status              : Confirmed

Appointment ID      : AP011
Doctor             : John Smith [D001]
Date               : 15/10/24
Time Slot          : 0900 - 1000
Status              : Pending
```

Test Case 5: Reschedule an Appointment

- Patient reschedules an existing appointment to a new slot.
- Verify that the appointment is rescheduled successfully. The previous time slot becomes available, and the new slot is reserved.

```
===== Patient Menu =====
> 1. View Medical Record
> 2. Update Personal Information
> 3. View Available Appointment Slots
> 4. Schedule an Appointment
> 5. Reschedule an Appointment
> 6. Cancel an Appointment
> 7. View Scheduled Appointments
> 8. View Past Appointment Outcome Records
> 9. Logout
=====
Choose an option: 5
=====
View Upcoming Appointments
=====

Appointment ID : AP010
Doctor         : John Smith [D001]
Date           : 16/10/24
Time Slot      : 1400 - 1500
Status          : Confirmed

Appointment ID : AP011
Doctor         : John Smith [D001]
Date           : 18/10/24
Time Slot      : 0900 - 1000
Status          : Pending

Enter the Appointment ID you want to reschedule: AP011
Rescheduling appointment...
Available Doctors and Dates:
John Smith [D001]
 Available Date: 15/10/24
 Available Date: 16/10/24
 Available Date: 17/10/24
 Available Date: 18/10/24

Emily Clarke [D002]
 Available Date: 15/10/24
 Available Date: 16/10/24
 Available Date: 17/10/24

Please select the Doctor ID and Date to reschedule (Format: DXXX DD/MM/YY): D001 18/10/24

John Smith [D001]
Available Time Slots for 18/10/24:
> 1. 0900 - 1000
> 2. 1000 - 1100
> 3. 1100 - 1200
> 4. 1200 - 1300
> 5. 1300 - 1400
> 6. 1500 - 1600

Select a time slot number to reschedule: 1
Appointment ID AP011 has been successfully updated.

Appointment rescheduled successfully.
```

```
===== Patient Menu =====
> 1. View Medical Record
> 2. Update Personal Information
> 3. View Available Appointment Slots
> 4. Schedule an Appointment
> 5. Reschedule an Appointment
> 6. Cancel an Appointment
> 7. View Scheduled Appointments
> 8. View Past Appointment Outcome Records
> 9. Logout
=====
Choose an option: 7
=====
View Upcoming Appointments
=====

Appointment ID   : AP010
Doctor          : John Smith [D001]
Date            : 16/10/24
Time Slot       : 1400 - 1500
Status          : Confirmed

Appointment ID   : AP011
Doctor          : John Smith [D001]
Date            : 18/10/24
Time Slot       : 0900 - 1000
Status          : Pending
```

Test Case 6: Cancel an Appointment

- Patient cancels an existing appointment.
- Verify that the appointment is cancelled successfully, and the time slot becomes available for others.

```
===== Patient Menu =====
> 1. View Medical Record
> 2. Update Personal Information
> 3. View Available Appointment Slots
> 4. Schedule an Appointment
> 5. Reschedule an Appointment
> 6. Cancel an Appointment
> 7. View Scheduled Appointments
> 8. View Past Appointment Outcome Records
> 9. Logout
=====
Choose an option: 6
=====
View Upcoming Appointments
=====

Appointment ID : AP010
Doctor         : John Smith [D001]
Date           : 16/10/24
Time Slot      : 1400 - 1500
Status          : Confirmed

Appointment ID : AP011
Doctor         : John Smith [D001]
Date           : 18/10/24
Time Slot      : 0900 - 1000
Status          : Pending

Enter the Appointment ID you want to cancel: AP011
Appointment ID AP011 has been successfully cancelled.

Appointment cancelled successfully.
```

```
===== Patient Menu =====
> 1. View Medical Record
> 2. Update Personal Information
> 3. View Available Appointment Slots
> 4. Schedule an Appointment
> 5. Reschedule an Appointment
> 6. Cancel an Appointment
> 7. View Scheduled Appointments
> 8. View Past Appointment Outcome Records
> 9. Logout
=====
Choose an option: 8
=====
Upcoming Appointments
=====

Appointment ID   : AP010
Doctor          : John Smith [D001]
Date            : 16/10/24
Time Slot       : 1400 - 1500
Status          : Confirmed

===== Cancelled Appointments =====
Appointment ID   : AP006
Doctor          : John Smith [D001]
Date            : 17/10/24
Time Slot       : 1000 - 1100
Status          : Cancelled by Doctor

Appointment ID   : AP011
Doctor          : John Smith [D001]
Date            : 18/10/24
Time Slot       : 0900 - 1000
Status          : Cancelled by Patient
```

Test Case 7: View Scheduled Appointments

- Patient views their list of scheduled appointments.
- Verify that the system displays all upcoming appointments with details like doctor name, date, time, and status.

```
=====  
          Patient Menu  
=====  
→ 1. View Medical Record  
→ 2. Update Personal Information  
→ 3. View Available Appointment Slots  
→ 4. Schedule an Appointment  
→ 5. Reschedule an Appointment  
→ 6. Cancel an Appointment  
→ 7. View Scheduled Appointments  
→ 8. View Past Appointment Outcome Records  
→ 9. Logout  
=====  
  
Choose an option: 7  
=====  
          View Upcoming Appointments  
=====  
  
Appointment ID      : AP010  
Doctor             : John Smith [D001]  
Date               : 16/10/24  
Time Slot          : 1400 - 1500  
Status             : Confirmed
```

Test Case 8: View Past Appointment Outcome Records

- Patient views outcome records of past appointments.
- Verify that the system displays past appointment details, including services provided, prescribed medications, and consultation notes.

```
=====  
          Patient Menu  
=====  
→ 1. View Medical Record  
→ 2. Update Personal Information  
→ 3. View Available Appointment Slots  
→ 4. Schedule an Appointment  
→ 5. Reschedule an Appointment  
→ 6. Cancel an Appointment  
→ 7. View Scheduled Appointments  
→ 8. View Past Appointment Outcome Records  
→ 9. Logout  
=====  
  
Choose an option: 8  
=====  
          Upcoming Appointments  
=====  
Appointment ID      : AP010  
Doctor             : John Smith [D001]  
Date               : 16/10/24  
Time Slot          : 1400 - 1500  
Status             : Confirmed  
=====  
          Cancelled Appointments  
=====  
Appointment ID      : AP006  
Doctor             : John Smith [D001]  
Date               : 17/10/24  
Time Slot          : 1000 - 1100  
Status             : Cancelled by Doctor  
  
Appointment ID      : AP011  
Doctor             : John Smith [D001]  
Date               : 18/10/24  
Time Slot          : 0900 - 1000  
Status             : Cancelled by Patient  
=====  
          Completed Appointments  
=====  
Appointment ID      : AP001  
Doctor             : John Smith [D001]  
Date               : 15/10/24  
Time Slot          : 1000 - 1100  
Status             : Confirmed  
  
Diagnosis          : Headache  
Treatment          : Painkiller  
Prescription       : Ibuprofen  
Quantity           : 10  
Case Notes         : No fever  
Type of Service    : Consultation
```

Test Case 9: View Patient Medical Records

- Doctor views medical records of patients under their care.
- Verify that the patient's medical record is displayed, including all relevant medical history.

```
=====
          Doctor Menu
=====
→ 1. View Patient Medical Records
→ 2. Update Patient Medical Records
→ 3. View Personal Schedule
→ 4. Set Availability for Appointments
→ 5. Accept or Decline Appointment Requests
→ 6. View Upcoming Appointments
→ 7. Record Appointment Outcome
→ 8. Logout
=====

Choose an option: 1
=====
Alice Brown [P1001]
-----
Date of Birth      : 14/5/80
Gender            : Female
Email Address     : alice@test.com
Phone Number      : 93211234
Blood Type        : A+

-----
Date             : 15/10/24
Doctor Name [ID] : John Smith [D001]
Appointment ID   : AP001
Type of Service   : Consultation
Diagnosis         : Headache
Treatment         : Painkiller
Case Notes        : No fever

-----
Charlie White [P1003]
-----
Date of Birth      : 8/7/90
Gender            : Male
Email Address     : charlie.white@example.com
Phone Number      : 90242467
Blood Type        : O-

-----
Date             : 15/10/24
Doctor Name [ID] : John Smith [D001]
Appointment ID   : AP003
Type of Service   : X-ray
Diagnosis         : Lung Infection
Treatment         : Antibiotics
Case Notes        : To monitor

-----
James Cook [P1005]
-----
Date of Birth      : 4/12/95
Gender            : Male
Email Address     : james@example.com
Phone Number      : 96142612
Blood Type        : B-

-----
Date             : 16/10/24
Doctor Name [ID] : John Smith [D001]
Appointment ID   : AP005
Type of Service   : Consultation
Diagnosis         : Headache
Treatment         : Painkiller
Case Notes        : No Fever
```

Test Case 10: Update Patient Medical Records

- Doctor adds a new diagnosis and treatment plan to a patient's medical record.
- Verify that the medical record is updated successfully, reflecting the new information.

```
=====
Doctor Menu
=====
> 1. View Patient Medical Records
> 2. Update Patient Medical Records
> 3. View Personal Schedule
> 4. Set Availability for Appointments
> 5. Accept or Decline Appointment Requests
> 6. View Upcoming Appointments
> 7. Record Appointment Outcome
> 8. Logout
=====
```

Choose an option: 2

Alice Brown [P1001]

```
Date of Birth : 14/5/80
Gender : Female
Email Address : alice@test.com
Phone Number : 93211234
Blood Type : A+
```

```
Date : 15/10/24
Doctor Name [ID] : John Smith [D001]
Appointment ID : AP001
Type of Service : Consultation
Diagnosis : Headache
Treatment : Painkiller
Case Notes : No fever
```

Charlie White [P1003]

```
Date of Birth : 8/7/90
Gender : Male
Email Address : charlie.white@example.com
Phone Number : 90242467
Blood Type : O-
```

```
Date : 15/10/24
Doctor Name [ID] : John Smith [D001]
Appointment ID : AP003
Type of Service : X-ray
Diagnosis : Lung Infection
Treatment : Antibiotics
Case Notes : To monitor
```

James Cook [P1005]

```
Date of Birth : 4/12/95
Gender : Male
Email Address : james@example.com
Phone Number : 96142612
Blood Type : B-
```

```
Date : 16/10/24
Doctor Name [ID] : John Smith [D001]
Appointment ID : AP005
Type of Service : Consultation
Diagnosis : Headache
Treatment : Painkiller
Case Notes : No Fever

Please insert the Patient ID to update the medical information: P1005
Date : 16/10/24
Doctor Name [ID] : D001 [D001]
Appointment ID : AP005
Type of Service : Consultation
Diagnosis : Headache
Treatment : Painkiller
Case Notes : No Fever
```

Enter Appointment ID to update: AP005

Enter Appointment ID to update: AP005
1. Update Type of Service
2. Update Diagnosis
3. Update Treatment
4. Update Case Notes

Choose an option: 1

Available Type of Services:

- Consultation
- X-ray
- Blood Test

Enter Type of Service: Blood Test

Medical record updated successfully.

Choose an option: 2

Enter new Diagnosis: Weekly Checkup
Medical record updated successfully.

Choose an option: 3

Enter new Treatment: Painkiller
Medical record updated successfully.

Choose an option: 4

Enter new Case Notes: No abnormality
Medical record updated successfully.

```
=====
Doctor Menu
=====
```

```
> 1. View Patient Medical Records
> 2. Update Patient Medical Records
> 3. View Personal Schedule
> 4. Set Availability for Appointments
> 5. Accept or Decline Appointment Requests
> 6. View Upcoming Appointments
> 7. Record Appointment Outcome
> 8. Logout
=====
```

Choose an option: 1

Alice Brown [P1001]

```
Date of Birth : 14/5/80
Gender : Female
Email Address : alice@test.com
Phone Number : 93211234
Blood Type : A+
```

```
Date : 15/10/24
Doctor Name [ID] : John Smith [D001]
Appointment ID : AP001
Type of Service : Consultation
Diagnosis : Headache
Treatment : Painkiller
Case Notes : No fever
```

Charlie White [P1003]

```
Date of Birth : 8/7/90
Gender : Male
Email Address : charlie.white@example.com
Phone Number : 90242467
Blood Type : O-
```

```
Date : 15/10/24
Doctor Name [ID] : John Smith [D001]
Appointment ID : AP003
Type of Service : X-ray
Diagnosis : Lung Infection
Treatment : Antibiotics
Case Notes : To monitor
```

James Cook [P1005]

```
Date of Birth : 4/12/95
Gender : Male
Email Address : james@example.com
Phone Number : 96142612
Blood Type : B-
```

```
Date : 16/10/24
Doctor Name [ID] : John Smith [D001]
Appointment ID : AP005
Type of Service : Blood Test
Diagnosis : Weekly Checkup
Treatment : Painkiller
Case Notes : No abnormality
```

Test Case 11: View Personal Schedule

- Doctor views their personal appointment schedule.
- Verify that the system displays the doctor's upcoming appointments and availability slots.

```
===== Doctor Menu =====
=====
> 1. View Patient Medical Records
> 2. Update Patient Medical Records
> 3. View Personal Schedule
> 4. Set Availability for Appointments
> 5. Accept or Decline Appointment Requests
> 6. View Upcoming Appointments
> 7. Record Appointment Outcome
> 8. Logout
=====

Choose an option: 3

John Smith [D001] Availability
=====
Date: 15/10/24
0900 - 1000
1300 - 1400
1400 - 1500
1500 - 1600
1600 - 1700

Date: 16/10/24
1000 - 1100
1100 - 1200
1300 - 1400
1500 - 1600
1600 - 1700

Date: 17/10/24
1000 - 1100

Date: 18/10/24
0900 - 1000
1000 - 1100
1100 - 1200
1200 - 1300
1300 - 1400
1500 - 1600
```

Test Case 12: Set Availability for Appointments

- Doctor sets or updates their availability for patient appointments.
- Verify that the doctor's availability is updated, and patients can see the new slots when scheduling appointments.

```
===== Doctor Menu =====
=====
> 1. View Patient Medical Records
> 2. Update Patient Medical Records
> 3. View Personal Schedule
> 4. Set Availability for Appointments
> 5. Accept or Decline Appointment Requests
> 6. View Upcoming Appointments
> 7. Record Appointment Outcome
> 8. Logout
=====

Choose an option: 4
Enter the date of availability (dd/MM/yy): 05/11/24
Enter the time range (e.g., 1100 - 1800): 1000 - 1300
Availability set successfully for 05/11/24.
```

```
===== Doctor Menu =====
=====
> 1. View Patient Medical Records
> 2. Update Patient Medical Records
> 3. View Personal Schedule
> 4. Set Availability for Appointments
> 5. Accept or Decline Appointment Requests
> 6. View Upcoming Appointments
> 7. Record Appointment Outcome
> 8. Logout
=====

Choose an option: 3
=====
John Smith [D001] Availability
=====
Date: 15/10/24
0900 - 1000
1300 - 1400
1400 - 1500
1500 - 1600
1600 - 1700

Date: 16/10/24
1000 - 1100
1100 - 1200
1300 - 1400
1500 - 1600
1600 - 1700

Date: 17/10/24
1000 - 1100

Date: 18/10/24
0900 - 1000
1000 - 1100
1100 - 1200
1200 - 1300
1300 - 1400
1500 - 1600

Date: 05/11/24
1000 - 1100
1100 - 1200
1200 - 1300
```

Test Case 13: Accept or Decline Appointment Requests

- Doctor accepts or declines an appointment request from a patient.
- Verify that the appointment status changes to "confirmed" when accepted or "cancelled" when declined , and the patient is able to see the updated status of the appointment.

<pre>Welcome, Dr. John Smith! ===== Doctor Menu ===== → 1. View Patient Medical Records → 2. Update Patient Medical Records → 3. View Personal Schedule → 4. Set Availability for Appointments → 5. Accept or Decline Appointment Requests → 6. View Upcoming Appointments → 7. Record Appointment Outcome → 8. Logout ===== Choose an option: 5 ===== Pending Appointment Slots ===== Patient ID : P1001 Appointment ID : AP012 Date : 05/11/24 Time Slot : 1000 - 1100 Select Appointment ID to approve/decline: AP012 Do you want to approve this appointment? (y/n): y Appointment confirmed successfully.</pre>	<pre>===== Doctor Menu ===== → 1. View Patient Medical Records → 2. Update Patient Medical Records → 3. View Personal Schedule → 4. Set Availability for Appointments → 5. Accept or Decline Appointment Requests → 6. View Upcoming Appointments → 7. Record Appointment Outcome → 8. Logout ===== Choose an option: 6 ===== Upcoming Appointment Slot ===== Appointment ID: AP010 ----- Alice Brown [P1001] Date : 16/10/24 Time : 1400 - 1500 ----- Appointment ID: AP012 ----- Alice Brown [P1001] Date : 05/11/24 Time : 1000 - 1100</pre>
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Test Case 14: View Upcoming Appointments

- Doctor views all upcoming confirmed appointments.
- Verify that the system displays a list of all upcoming appointments with patient details and appointment times.

<pre>===== Doctor Menu ===== → 1. View Patient Medical Records → 2. Update Patient Medical Records → 3. View Personal Schedule → 4. Set Availability for Appointments → 5. Accept or Decline Appointment Requests → 6. View Upcoming Appointments → 7. Record Appointment Outcome → 8. Logout ===== Choose an option: 6 ===== Upcoming Appointment Slot ===== Appointment ID: AP010 ----- Alice Brown [P1001] Date : 16/10/24 Time : 1400 - 1500 ----- Appointment ID: AP012 ----- Alice Brown [P1001] Date : 05/11/24 Time : 1000 - 1100</pre>	
--	--

Test Case 15: Record Appointment Outcome

- Doctor records the outcome of a completed appointment.
- Verify that the appointment outcome is recorded, and relevant updates are visible to the patient under "View Past Appointment Outcome Records".

```
===== Doctor Menu =====
> 1. View Patient Medical Records
> 2. Update Patient Medical Records
> 3. View Personal Schedule
> 4. Set Availability for Appointments
> 5. Accept or Decline Appointment Requests
> 6. View Upcoming Appointments
> 7. Record Appointment Outcome
> 8. Logout
=====
Choose an option: 7
=====
Upcoming Appointment Slot
=====
Appointment ID: AP010
=====
Alice Brown [P1001]
Date : 16/10/24
Time : 1400 - 1500
=====
Appointment ID: AP012
=====
Alice Brown [P1001]
Date : 05/11/24
Time : 1000 - 1100
Select an Appointment ID: AP012
=====
Appointment ID: AP012
=====
Alice Brown [P1001]
Date : 05/11/24
Time : 1000 - 1100
Are you sure you want to edit this? (Yes / No): Yes
Enter Diagnosis: Headache
Enter Treatment: Painkiller
Available Medicines:
- Paracetamol
- Ibuprofen
- Amoxicillin
- Melatonin
Enter Prescription (choose from the list): Paracetamol
Enter Quantity: 10
Enter Case Notes: High Fever
Available Type of Services:
- Consultation
- X-ray
- Blood Test
Enter Type of Service: Consultation
Diagnosis details recorded successfully.
Appointment outcome updated to 'Completed'.
```

```
===== Doctor Menu =====
> 1. View Patient Medical Records
> 2. Update Patient Medical Records
> 3. View Personal Schedule
> 4. Set Availability for Appointments
> 5. Accept or Decline Appointment Requests
> 6. View Upcoming Appointments
> 7. Record Appointment Outcome
> 8. Logout
=====
Choose an option: 1
=====
Alice Brown [P1001]
=====
Date of Birth      : 14/5/80
Gender            : Female
Email Address     : alice@test.com
Phone Number      : 93211234
Blood Type        : A+
=====
Date             : 15/10/24
Doctor Name [ID] : John Smith [D001]
Appointment ID   : AP001
Type of Service   : Consultation
Diagnosis         : Headache
Treatment         : Painkiller
Case Notes        : No fever
=====
Date             : 05/11/24
Doctor Name [ID] : John Smith [D001]
Appointment ID   : AP012
Type of Service   : Consultation
Diagnosis         : Headache
Treatment         : Painkiller
Case Notes        : High Fever
=====
Charlie White [P1003]
=====
Date of Birth      : 8/7/90
Gender            : Male
Email Address     : charlie.white@example.com
Phone Number      : 90242467
Blood Type        : O-
=====
Date             : 15/10/24
Doctor Name [ID] : John Smith [D001]
Appointment ID   : AP003
Type of Service   : X-ray
Diagnosis         : Lung Infection
Treatment         : Antibiotics
Case Notes        : To monitor
=====
James Cook [P1005]
=====
Date of Birth      : 4/12/95
Gender            : Male
Email Address     : james@example.com
Phone Number      : 96142612
Blood Type        : B-
=====
Date             : 16/10/24
Doctor Name [ID] : John Smith [D001]
Appointment ID   : AP005
Type of Service   : Blood Test
Diagnosis         : Weekly Checkup
Treatment         : Painkiller
Case Notes        : No abnormality
```

Test Case 16: View Appointment Outcome Record

- Pharmacist views appointment outcome records to process prescriptions.
- Verify that the system displays the appointment outcome details, including prescribed medications.

```
[!] WARNING: Low Stock Medications:  
[!] Melatonin is currently running low, please refill!  
=====  
Pharmacist Menu  
=====  
→ 1. View Appointment Outcome Record  
→ 2. Update Prescription Status  
→ 3. View Medication Inventory  
→ 4. Submit Replenishment Request  
→ 5. Logout  
=====  
Choose an option: 1  
=====  
Completed Appointments  
=====  
Appointment ID : AP001  
=====  
Patient : Alice Brown [P1001]  
Doctor : John Smith [D001]  
Date : 15/10/24  
Type of Service : Consultation  
Diagnosis : Headache  
Treatment : Painkiller  
Prescription : Ibuprofen  
Quantity : 10  
Case Notes : No fever  
Status : Dispensed  
=====  
Appointment ID : AP002  
=====  
Patient : Bob Stone [P1002]  
Doctor : Emily Clarke [D002]  
Date : 15/10/24  
Type of Service : X-ray  
Diagnosis : Lung Infection  
Treatment : Antibiotics  
Prescription : Amoxicillin  
Quantity : 10  
Case Notes : To monitor  
Status : Dispensed  
=====  
Appointment ID : AP003  
=====  
Patient : Charlie White [P1003]  
Doctor : John Smith [D001]  
Date : 15/10/24  
Type of Service : X-ray  
Diagnosis : Lung Infection  
Treatment : Antibiotics  
Prescription : Amoxicillin  
Quantity : 10  
Case Notes : To monitor  
Status : Dispensed  
=====  
Appointment ID : AP004  
=====  
Patient : Sam Pound [P1004]  
Doctor : Emily Clarke [D002]  
Date : 16/10/24  
Type of Service : Consultation  
Diagnosis : Fever  
Treatment : Painkiller  
Prescription : Paracetamol  
Quantity : 10  
Case Notes : 39 degrees  
Status : Dispensed  
=====  
Appointment ID : AP005  
=====  
Patient : James Cook [P1005]  
Doctor : John Smith [D001]  
Date : 16/10/24  
Type of Service : Blood Test  
Diagnosis : Weekly Checkup  
Treatment : Painkiller  
Prescription : Melatonin  
Quantity : 10  
Case Notes : No abnormality  
Status : Dispensed
```

Test Case 17: Update Prescription Status

- Pharmacist updates the status of a prescription to "dispensed."
- Verify that the prescription status is updated, and the change is reflected in the patient's records.

```
[!] WARNING: Low Stock Medications:  
[!] Melatonin is currently running low, please refill!  
=====  
Pharmacist Menu  
=====  
→ 1. View Appointment Outcome Record  
→ 2. Update Prescription Status  
→ 3. View Medication Inventory  
→ 4. Submit Replenishment Request  
→ 5. Logout  
=====  
Choose an option: 2  
=====  
Pending Prescriptions  
=====  
Appointment ID : AP012  
  
Patient : Alice Brown [P1001]  
Doctor : John Smith [D001]  
Type of Service : Consultation  
Diagnosis : Headache  
Treatment : Painkiller  
Prescription : Ibuprofen  
Quantity : 10  
Case Notes : No fever  
  
Enter the Appointment ID to dispense: AP012  
  
Do you want to dispense this medication? (Yes/No): Yes  
  
Medication dispensed successfully.
```

```
=====  
Pharmacist Menu  
=====  
→ 1. View Appointment Outcome Record  
→ 2. Update Prescription Status  
→ 3. View Medication Inventory  
→ 4. Submit Replenishment Request  
→ 5. Logout  
=====  
Choose an option: 1  
=====  
Completed Appointments  
=====  
Appointment ID : AP001  
  
Patient : Alice Brown [P1001]  
Doctor : John Smith [D001]  
Date : 15/10/24  
Type of Service : Consultation  
Diagnosis : Headache  
Treatment : Painkiller  
Prescription : Ibuprofen  
Quantity : 10  
Case Notes : No fever  
Status : Dispensed  
  
Appointment ID : AP002  
  
Patient : Bob Stone [P1002]  
Doctor : Emily Clarke [D002]  
Date : 15/10/24  
Type of Service : X-ray  
Diagnosis : Lung Infection  
Treatment : Antibiotics  
Prescription : Amoxicillin  
Quantity : 10  
Case Notes : To monitor  
Status : Dispensed  
  
Appointment ID : AP003  
  
Patient : Charlie White [P1003]  
Doctor : John Smith [D001]  
Date : 15/10/24  
Type of Service : X-ray  
Diagnosis : Lung Infection  
Treatment : Antibiotics  
Prescription : Amoxicillin  
Quantity : 10  
Case Notes : To monitor  
Status : Dispensed  
  
Appointment ID : AP004  
  
Patient : Sam Pound [P1004]  
Doctor : Emily Clarke [D002]  
Date : 16/10/24  
Type of Service : Consultation  
Diagnosis : Fever  
Treatment : Painkiller  
Prescription : Paracetamol  
Quantity : 10  
Case Notes : 39 degrees  
Status : Dispensed  
  
Appointment ID : AP005  
  
Patient : James Cook [P1005]  
Doctor : John Smith [D001]  
Date : 16/10/24  
Type of Service : Blood Test  
Diagnosis : Weekly Checkup  
Treatment : Painkiller  
Prescription : Melatonin  
Quantity : 10  
Case Notes : No abnormality  
Status : Dispensed  
  
Appointment ID : AP012  
  
Patient : Alice Brown [P1001]  
Doctor : John Smith [D001]  
Date : 05/11/24  
Type of Service : Consultation  
Diagnosis : Headache  
Treatment : Painkiller  
Prescription : Paracetamol  
Quantity : 10  
Case Notes : High Fever  
Status : Dispensed
```

Test Case 18: View Medication Inventory

- Pharmacist views the current medication inventory.
- Verify that the system displays a list of medications, including stock levels.

```
[!] WARNING: Low Stock Medications:  
[!] Melatonin is currently running low, please refill!  
=====  
          Pharmacist Menu  
=====  
→ 1. View Appointment Outcome Record  
→ 2. Update Prescription Status  
→ 3. View Medication Inventory  
→ 4. Submit Replenishment Request  
→ 5. Logout  
=====  
Choose an option: 3  
[!] WARNING: Low Stock Medications:  
[!] Melatonin is currently running low, please refill!  
=====  
          Medicine Stock  
=====  


| Medicine    | Current Stock |
|-------------|---------------|
| Paracetamol | 90            |
| Ibuprofen   | 50            |
| Amoxicillin | 75            |
| Melatonin   | 30            |


```

Test Case 19: Submit Replenishment Request

- Pharmacist submits a replenishment request for low-stock medications.
- Verify that the replenishment request is submitted successfully, pending approval from the administrator.

```
[!] WARNING: Low Stock Medications:  
[!] Melatonin is currently running low, please refill!  
=====  
          Pharmacist Menu  
=====  
→ 1. View Appointment Outcome Record  
→ 2. Update Prescription Status  
→ 3. View Medication Inventory  
→ 4. Submit Replenishment Request  
→ 5. Logout  
=====  
Choose an option: 4  
[!] WARNING: Low Stock Medications:  
[!] Melatonin is currently running low, please refill!  
=====  
          Medicine Stock  
=====  


| Medicine    | Current Stock |
|-------------|---------------|
| Paracetamol | 90            |
| Ibuprofen   | 50            |
| Amoxicillin | 75            |
| Melatonin   | 30            |

  
Available Medicines:  
- Paracetamol  
- Ibuprofen  
- Amoxicillin  
- Melatonin  
  
Enter the Medicine Name: Melatonin  
Enter the quantity to request: 100  
Replenishment request for Melatonin has been recorded successfully.
```

Test Case 20: View and Manage Hospital Staff

- Administrators can view the list of hospital staff and add, update or remove staff members.
- Verify that the displayed list of staff is updated with any changes.

```
[!] WARNING: Low Stock Medications:  
[!] Melatonin is currently running low, please refill!  
=====  
Administrator Menu  
=====  
→ 1. View and Manage Hospital Staff  
→ 2. View Appointments details  
→ 3. View and Manage Medication Inventory  
→ 4. Approve Replenishment Requests  
→ 5. View Login Logs File  
→ 6. Logout  
=====  
Choose an option: 1  
=====  
Manage Hospital Staff  
=====  
→ 1. View Hospital Staff  
→ 2. Add Hospital Staff  
→ 3. Update Hospital Staff  
→ 4. Delete Hospital Staff  
→ 5. Return to Main Menu  
=====  
Choose an option: 1  
=====  
Doctor  
=====  
John Smith [D001]  
Gender: Male  
Age: 45  
Email: john@example.com  
Contact: 91111111  
  
Emily Clarke [D002]  
Gender: Female  
Age: 38  
Email: emily@example.com  
Contact: 91111112  
  
Pharmacist  
=====  
Mark Lee [P001]  
Gender: Male  
Age: 29  
Email: mark@example.com  
Contact: 91111113  
  
Sue Sharp [P002]  
Gender: Female  
Age: 22  
Email: sue@example.com  
Contact: 91111114  
  
Administrator  
=====  
Sarah Lee [A001]  
Gender: Female  
Age: 40  
Email: sarah@example.com  
Contact: 91111115
```

Manage Hospital Staff

- 1. View Hospital Staff
 - 2. Add Hospital Staff
 - 3. Update Hospital Staff
 - 4. Delete Hospital Staff
 - 5. Return to Main Menu
-

Choose an option: 2

Add New Hospital Staff

Full Name: Jonah Choon
Role (Administrator, Pharmacist, Doctor): Administrator
Gender (Male/Female): Male
Age: 25
Email Address: jonah@email.com
Contact Number: 94231234

Confirmation:

Staff ID: A002
Name: Jonah Choon
Role: Administrator
Gender: Male
Age: 25
Email: jonah@email.com
Contact: 94231234

Is this information correct? (Y/N): Y

New staff member added successfully!

Hospital Management System

Enter UserID: A002
Enter Password: password
This is your first login. You are required to change your password.
Enter new Password (must contain at least 8 characters, including uppercase, lowercase, digit, and special character): Pa\$\$w0rd123

Password successfully changed.
Press ENTER to continue...

Welcome, Jonah Choon!

[!] WARNING: Low Stock Medications:
[!] Melatonin is currently running low, please refill!

Administrator Menu

- 1. View and Manage Hospital Staff
 - 2. View Appointments details
 - 3. View and Manage Medication Inventory
 - 4. Approve Replenishment Requests
 - 5. View Login Logs File
 - 6. Logout
-

Choose an option: |

Choose an option: 3

Update Staff Information

- 1. Update Staff Email Address
 - 2. Update Staff Contact Number
 - 3. Update Password
 - 4. Return to Main Menu
-

Choose an option: 1

Doctor

John Smith [D001]
Gender: Male
Age: 45
Email: john@example.com
Contact: 91111111

Emily Clarke [D002]
Gender: Female
Age: 38
Email: emily@example.com
Contact: 91111112

Pharmacist

Mark Lee [P001]
Gender: Male
Age: 29
Email: mark@example.com
Contact: 91111113

Sue Sharp [P002]
Gender: Female
Age: 22
Email: sue@example.com
Contact: 91111114

Administrator

Sarah Lee [A001]
Gender: Female
Age: 40
Email: sarah@example.com
Contact: 91111115

Jonah Choon [A002]
Gender: Male
Age: 25
Email: jonah@email.com
Contact: 94231234

Enter the Staff ID to update email: A002
Enter new Email Address: jonah@gmail.com
Email updated successfully for Staff ID: A002

Enter the Staff ID to update contact: A002
Enter new Contact Number: 91231234
Contact updated successfully for Staff ID: A002

Enter the Staff ID to update password: A002
Enter new Password (must contain at least 8 characters, including uppercase, lowercase, digit, and special character): Pa\$\$w0rd123
Password updated successfully for Staff ID: A002

Manage Hospital Staff

- 1. View Hospital Staff
 - 2. Add Hospital Staff
 - 3. Update Hospital Staff
 - 4. Delete Hospital Staff
 - 5. Return to Main Menu
-

Choose an option: 1

Doctor

John Smith [D001]
Gender: Male
Age: 45
Email: john@example.com
Contact: 91111111

Emily Clarke [D002]
Gender: Female
Age: 38
Email: emily@example.com
Contact: 91111112

Pharmacist

Mark Lee [P001]
Gender: Male
Age: 29
Email: mark@example.com
Contact: 91111113

Sue Sharp [P002]
Gender: Female
Age: 22
Email: sue@example.com
Contact: 91111114

Administrator

Sarah Lee [A001]
Gender: Female
Age: 40
Email: sarah@example.com
Contact: 91111115

Jonah Choon [A002]
Gender: Male
Age: 25
Email: jonah@gmail.com
Contact: 91231234

Hospital Management System

Enter UserID: A002
Enter Password: Pa\$\$w0rd123

Welcome, Jonah Choon!

[!] WARNING: Low Stock Medications:
[!] Melatonin is currently running low, please refill!

Administrator Menu

- 1. View and Manage Hospital Staff
 - 2. View Appointments details
 - 3. View and Manage Medication Inventory
 - 4. Approve Replenishment Requests
 - 5. View Login Logs File
 - 6. Logout
-

Choose an option: |

Enter the Staff ID to deactivate: A002
Are you sure you want to deactivate Staff ID A002? (Y/N): Y
Enter your administrator ID for confirmation: A001
Enter your administrator password for confirmation: Pa\$\$w0rd
Staff ID A002 has been deactivated successfully.

Hospital Management System
=====
Enter UserID: A002
Enter Password: Pa\$\$w0rd123
Account is deactivated. Please contact the administrator.

Test Case 21: View Appointments Details

- Administrator views all appointments.
- Verify that the system displays a list of appointments including details like Patient ID, Doctor ID, status, and date/time.

```
[!] WARNING: Low Stock Medications:  
[!] Melatonin is currently running low, please refill!  
=====  
Administrator Menu  
=====  
→ 1. View and Manage Hospital Staff  
→ 2. View Appointments details  
→ 3. View and Manage Medication Inventory  
→ 4. Approve Replenishment Requests  
→ 5. View Login Logs File  
→ 6. Logout  
=====  
Choose an option: 2  
Upcoming Appointments  
=====  
Appointment ID : AP009  
Patient : Bob Stone [P1002]  
Doctor : Emily Clarke [D002]  
Date : 19/10/24  
Time Slot : 0900 - 1000  
Status : Pending  
  
Appointment ID : AP010  
Patient : Alice Brown [P1001]  
Doctor : John Smith [D001]  
Date : 16/10/24  
Time Slot : 1400 - 1500  
Status : Confirmed  
  
=====  
Cancelled Appointments  
=====  
Appointment ID : AP006  
Patient : Alice Brown [P1001]  
Doctor : John Smith [D001]  
Date : 17/10/24  
Time Slot : 1000 - 1100  
Status : Cancelled by Doctor  
  
Appointment ID : AP007  
Patient : Charlie White [P1003]  
Doctor : Emily Clarke [D002]  
Date : 17/10/24  
Time Slot : 0900 - 1000  
Status : Cancelled by Patient  
  
Appointment ID : AP011  
Patient : Alice Brown [P1001]  
Doctor : John Smith [D001]  
Date : 18/10/24  
Time Slot : 0900 - 1000  
Status : Cancelled by Patient  
  
=====  
Completed Appointments  
=====  
Appointment ID : AP001  
Patient : Alice Brown [P1001]  
Doctor : John Smith [D001]  
Date : 15/10/24  
Time Slot : 1000 - 1100  
Status : Confirmed  
  
Diagnosis : Headache  
Treatment : Painkiller  
Prescription : Ibuprofen  
Quantity : 10  
Case Notes : No fever  
Type of Service : Consultation  
  
=====  
Appointment ID : AP002  
Patient : Bob Stone [P1002]  
Doctor : Emily Clarke [D002]  
Date : 15/10/24  
Time Slot : 1100 - 1200  
Status : Confirmed  
  
Diagnosis : Lung Infection  
Treatment : Antibiotics  
Prescription : Amoxicillin  
Quantity : 10  
Case Notes : To monitor  
Type of Service : X-ray  
  
=====  
Appointment ID : AP003  
Patient : Charlie White [P1003]  
Doctor : John Smith [D001]  
Date : 15/10/24  
Time Slot : 1100 - 1200  
Status : Confirmed  
  
Diagnosis : Lung Infection  
Treatment : Antibiotics  
Prescription : Amoxicillin  
Quantity : 10  
Case Notes : To monitor  
Type of Service : X-ray
```

Test Case 22: View and Manage Medication Inventory

- Administrator updates the stock level of a medication.
- Verify that the medication's stock level is updated in the inventory.

```
=====
Administrator Menu
=====
> 1. View and Manage Hospital Staff
> 2. View Appointments details
> 3. View and Manage Medication Inventory
> 4. Approve Replenishment Requests
> 5. View Login Logs File
> 6. Logout
=====

Choose an option: 3
No medications are running low at the moment.

=====
Medicine Stock
=====
Medicine          Current Stock
-----
Paracetamol      90
Ibuprofen        50
Amoxicillin      75
Melatonin        130
-----

Paracetamol
-----
Request Date    : 1/1/24
Request Quantity : 100
Request Staff ID : P002
Status           : Approved
Approved By     : A001

-----
Melatonin
-----
Request Date    : 1/1/24
Request Quantity : 30
Request Staff ID : P002
Status           : Approved
Approved By     : A001

Request Date    : 31/10/24
Request Quantity : 100
Request Staff ID : P001
Status           : Approved
Approved By     : A002

-----
Ibuprofen
-----
Request Date    : 1/1/24
Request Quantity : 50
Request Staff ID : P002
Status           : Approved
Approved By     : A001

-----
Amoxicillin
-----
Request Date    : 1/1/24
Request Quantity : 75
Request Staff ID : P002
Status           : Approved
Approved By     : A001
```

Test Case 23: Approve Replenishment Requests

- Administrator approves a replenishment request from a pharmacist.
- Verify that the request status changes to "approved," and the medication inventory is updated accordingly.

```
[!] WARNING: Low Stock Medications:
[!] Melatonin is currently running low, please refill!
=====
Administrator Menu
=====
> 1. View and Manage Hospital Staff
> 2. View Appointments details
> 3. View and Manage Medication Inventory
> 4. Approve Replenishment Requests
> 5. View Login Logs File
> 6. Logout
=====

Choose an option: 4
[!] WARNING: Low Stock Medications:
[!] Melatonin is currently running low, please refill!
=====
Medicine Stock
=====
Medicine          Current Stock
-----
Paracetamol      90
Ibuprofen        50
Amoxicillin      75
Melatonin        30
-----

Pending Replenishment Requests
=====
1. Melatonin
Request Date    : 31/10/24
Request Quantity : 100
Request Staff ID : P001

Enter the number of the request to approve: 1
Updated stock for Melatonin. New stock: 130
```

Test Case 25: First-Time Login and Password Change

- User logs in with default password and changes it.
- Verify that the password change is successful, and the user can log in with the new password.

```
===== Hospital Management System =====

Enter UserID: P1002
Enter Password: password
This is your first login. You are required to change your password.
Enter New Password (must contain at least 8 characters, including uppercase, lowercase, digit, and special character): Pa$$w0rd

Password successfully changed.
Press ENTER to continue...

Welcome, Bob Stone!

Patient Menu
=====
> 1. View Medical Record
> 2. Update Personal Information
> 3. View Available Appointment Slots
> 4. Schedule an Appointment
> 5. Reschedule an Appointment
> 6. Cancel an Appointment
> 7. View Scheduled Appointments
> 8. View Past Appointment Outcome Records
> 9. Logout
=====

Choose an option: |
```

Test Case 26: Login with Incorrect Credentials

- User attempts to log in with an incorrect password.
- Verify that the system displays an error message indicating invalid credentials, and login is denied.

```
===== Hospital Management System =====

Enter UserID: P1001
Enter Password: asd
Login failed. Invalid UserID or Password.
```

Additional Function 1: Regex on Update Personal Information

- Updated email address must be in the following format "XXX@XXX.XXX"
- Updated phone number must have 8 digits and must start with "8" or "9"
- Ability to update password, new password must fulfil the following password policy:
 - 1 Uppercase letter
 - 1 Lowercase letter
 - 1 Digit
 - 1 Special character
 - At least 8 characters long

```
Choose an option: 2
Alice Brown [P1001]
Date of Birth : 14/5/80
Gender : Female
Email Address : alice@test.com
Phone Number : 93211234
Blood Type : A+
=====

Update Personal Information
> 1. Update Email Address
> 2. Update Phone Number
> 3. Update Password
> 4. Back to Main Menu
=====

Choose an option: 1
Enter new email address: a
Invalid email format. Try again.

Alice Brown [P1001]
Date of Birth : 14/5/80
Gender : Female
Email Address : alice@test.com
Phone Number : 93211234
Blood Type : A+
=====

Update Personal Information
> 1. Update Email Address
> 2. Update Phone Number
> 3. Update Password
> 4. Back to Main Menu
=====

Choose an option: 2
Enter new phone number: a
Invalid phone number format. It should be 8 digits and start with 8 or 9.

Alice Brown [P1001]
Date of Birth : 14/5/80
Gender : Female
Email Address : alice@test.com
Phone Number : 93211234
Blood Type : A+
=====

Update Personal Information
=====

Choose an option: 3
Enter new Password (must contain at least 8 characters, including uppercase, lowercase, digit, and special character): a
Password must contain at least 1 uppercase letter, 1 lowercase letter, 1 digit, 1 special character, and be at least 8 characters long.
```

Additional Function 2: Regex on Update Patient Medical Records

- In the update of diagnosis and treatment plan, no digit input is allowed
- Type of Service must be chosen from the list

```
Enter Appointment ID to update: AP005
1. Update Type of Service
2. Update Diagnosis
3. Update Treatment
4. Update Case Notes

Choose an option: 1
Available Type of Services:
- Consultation
- X-ray
Blood Test

Enter Type of Service: a
Invalid Type of Service. Please choose from the available options.

Choose an option: 2
Enter new Diagnosis: 1
Invalid input for Diagnosis. Only letters and spaces are allowed.

Choose an option: 3
Enter new Treatment: 1
Invalid input for Treatment. Only letters and spaces are allowed.
```

Additional Function 3: Error Handling in Submit Replenishment Request

- Implemented Error Handling, User can only input positive integer

```
=====
          Pharmacist Menu
=====
→ 1. View Appointment Outcome Record
→ 2. Update Prescription Status
→ 3. View Medication Inventory
→ 4. Submit Replenishment Request
→ 5. Logout
=====

Choose an option: 4
No medications are running low at the moment.

=====
          Medicine Stock
=====
Medicine           Current Stock
-----
Paracetamol        90
Ibuprofen         50
Amoxicillin       75
Melatonin         130

Available Medicines:
- Paracetamol
- Ibuprofen
- Amoxicillin
- Melatonin

Enter the Medicine Name: Paracetamol
Enter the quantity to request: -10
Quantity must be greater than zero.
No medications are running low at the moment.
```

Additional Function 4: Extra Security Step in View and Manage Hospital Staff

- When deleting a hospital staff, Administrator must enter ID and Password again for confirmation to avoid accidental deletion

```
Enter the Staff ID to deactivate: A002
Are you sure you want to deactivate Staff ID A002? (Y/N): Y
Enter your administrator ID for confirmation: a
Enter your administrator password for confirmation: a
Login failed. Invalid UserID or Password.
Incorrect password. Deactivation aborted.
```

Additional Function 5: Warning System in View and Manage Medication Inventory

- Implemented a warning when medicine stock is low.
- The warning value is saved directly in “column C” of Medicine_Stock.csv (E.g. Melatonin alert value is 30)

```
[!] WARNING: Low Stock Medications:  
[!] Melatonin is currently running low, please refill!  
=====Administrator Menu=====  
=> 1. View and Manage Hospital Staff  
=> 2. View Appointments details  
=> 3. View and Manage Medication Inventory  
=> 4. Approve Replenishment Requests  
=> 5. View Login Logs File  
=> 6. Logout  
=====
```

Additional Function 6: Logging System in View and Manage Medication Inventory

- Implemented logging to keep track of Request Date, Medicine, Quantity, Staff ID (Requestor & Approver) and Status

```
=====Administrator Menu=====  
=> 1. View and Manage Hospital Staff  
=> 2. View Appointments details  
=> 3. View and Manage Medication Inventory  
=> 4. Approve Replenishment Requests  
=> 5. View Login Logs File  
=> 6. Logout  
=====  
Choose an option: 3  
No medications are running low at the moment.  
=====Medicine Stock=====  
Medicine Current Stock  
Paracetamol 98  
Ibuprofen 58  
Amoxicillin 75  
Melatonin 130  
=====  
Paracetamol  
Request Date : 1/1/24  
Request Quantity : 100  
Request Staff ID : P002  
Status : Approved  
Approved By : A001  
=====  
Melatonin  
Request Date : 1/1/24  
Request Quantity : 30  
Request Staff ID : P002  
Status : Approved  
Approved By : A001  
Request Date : 31/10/24  
Request Quantity : 100  
Request Staff ID : P001  
Status : Approved  
Approved By : A002  
=====  
Ibuprofen  
Request Date : 1/1/24  
Request Quantity : 50  
Request Staff ID : P002  
Status : Approved  
Approved By : A001  
=====  
Amoxicillin  
Request Date : 1/1/24  
Request Quantity : 75  
Request Staff ID : P002  
Status : Approved  
Approved By : A001  
=====
```

Additional Function 7: Login User Password Storing

- For security, passwords are not stored in plain-text, they are hashed with MD5 in Master_LoginData.csv

User ID	Password	Role	First Login	public static String hashPassword(String password) { try { MessageDigest md = MessageDigest.getInstance("MD5"); md.update(password.getBytes()); byte[] digest = md.digest(); StringBuilder sb = new StringBuilder(); for (byte b : digest) { sb.append(String.format("%02x", b)); } return sb.toString(); } catch (NoSuchAlgorithmException e) { throw new RuntimeException(e); } }
P1001	f3c15bfc7bd77df65e79248f57c47cc	Patient	FALSE	
P1002	3cc31cd246149aec68079241e71e98f6	Patient	FALSE	
P1003	5f4dcc3b5aa765d61d8327deb882cf99	Patient	TRUE	
P1004	5f4dcc3b5aa765d61d8327deb882cf99	Patient	TRUE	
P1005	5f4dcc3b5aa765d61d8327deb882cf99	Patient	TRUE	
D001	3cc31cd246149aec68079241e71e98f6	Doctor	FALSE	
D002	5f4dcc3b5aa765d61d8327deb882cf99	Doctor	TRUE	
P001	3cc31cd246149aec68079241e71e98f6	Pharmacist	FALSE	
P002	5f4dcc3b5aa765d61d8327deb882cf99	Pharmacist	TRUE	
A001	3cc31cd246149aec68079241e71e98f6	Administrato	FALSE	
A002	3cc31cd246149aec68079241e71e98f6	Administrato	FALSE	

Additional Function 8: Regex on New Password Login

- New password must fulfil the following password policy of:

- 1 Uppercase letter
- 1 Lowercase letter
- 1 Digit
- 1 Special character
- At least 8 characters long

```
=====
 Hospital Management System
=====

Enter UserID: P1003
Enter Password: password
This is your first login. You are required to change your password.
Enter new Password (must contain at least 8 characters, including uppercase, lowercase, digit, and special character): asd
Password does not meet complexity requirements.
Enter new Password (must contain at least 8 characters, including uppercase, lowercase, digit, and special character): 
```

Additional Function 9: Administrator View Login Logs

- Allow Administrator to review successful and failed user login attempts on HMS
- Types of Status
 - Success
 - Failure (User Not Found)
 - Failure (Incorrect Password)
 - Failure (Account Deactivated)

```
=====
 Administrator Menu
=====
 → 1. View and Manage Hospital Staff
 → 2. View Appointments details
 → 3. View and Manage Medication Inventory
 → 4. Approve Replenishment Requests
 → 5. View Login Logs File
 → 6. Logout
=====

Choose an option: 5


| Timestamp    | User ID | Role          | Activity | Status                        |
|--------------|---------|---------------|----------|-------------------------------|
| 6/11/24 0:02 | A001    | Administrator | LOGOUT   | Success                       |
| 6/11/24 0:02 | A002    | Administrator | LOGIN    | Failure (Account Deactivated) |
| 6/11/24 0:09 | A002    | Administrator | LOGIN    | Success                       |
| 6/11/24 0:30 | A002    | Administrator | LOGOUT   | Success                       |
| 6/11/24 0:30 | P1002   | Patient       | LOGIN    | Success                       |
| 6/11/24 0:31 | P1002   | Patient       | LOGOUT   | Success                       |
| 6/11/24 0:31 | P1001   | Patient       | LOGIN    | Failure (Incorrect Password)  |
| 6/11/24 0:33 | P1001   | Patient       | LOGIN    | Failure (Incorrect Password)  |
| 6/11/24 0:33 | P1001   | Patient       | LOGOUT   | Success                       |
| 6/11/24 0:34 | P1001   | Patient       | LOGIN    | Success                       |
| 6/11/24 0:37 | P1001   | Patient       | LOGOUT   | Success                       |
| 6/11/24 0:38 | D001    | Doctor        | LOGIN    | Success                       |
| 6/11/24 0:40 | D001    | Doctor        | LOGOUT   | Success                       |
| 6/11/24 0:40 | P001    | Pharmacist    | LOGIN    | Success                       |
| 6/11/24 0:41 | P001    | Pharmacist    | LOGOUT   | Success                       |
| 6/11/24 0:41 | A001    | Administrator | LOGIN    | Success                       |
| 6/11/24 0:41 | a       | Unknown       | LOGIN    | Failure (User Not Found)      |
| 6/11/24 0:48 | A001    | Administrator | LOGOUT   | Success                       |
| 6/11/24 0:48 | P1003   | Patient       | LOGIN    | Success                       |
| 6/11/24 0:48 | P1003   | Patient       | LOGOUT   | Success                       |
| 6/11/24 0:48 | A001    | Administrator | LOGIN    | Success                       |


```