1. Tests

The following is the login page of the HMS. Upon a user's first login, they are prompted to change their password.

1.1 Patient Actions

1.1.1   View Medical Records

After login in, patients can view their particulars and record through selecting the first option in the menu.

1.1.2   Update Personal Information

Patients can also change their contact information through the second selection in the menu. They are able to alter their email address and contact number.

```
===============================================        ===============================================
Hello Alice Brown, welcome to the patient menu         Hello Alice Brown, welcome to the patient menu
1. View Medical Records                                1. View Medical Records
2. Update Personal Information                         2. Update Personal Information
3. View Available Appointment Slots                    3. View Available Appointment Slots
4. Schedule Appointment                                4. Schedule Appointment
5. Reschedule Appointment                              5. Reschedule Appointment
6. Cancel Appointment                                  6. Cancel Appointment
7. View Scheduled Appointments                         7. View Scheduled Appointments
8. View Past Appointment Records                       8. View Past Appointment Records
9. Change Password                                     9. Change Password
10. Logout                                             10. Logout
===============================================        ===============================================
Enter your choice: 2                                   Enter your choice: 2
Choose particular to change:                           Choose particular to change:
1. Email                                               1. Email
2. Contact number                                      2. Contact number
Enter selection:                                       Enter selection:
1                                                      2
Enter new email:                                       Enter new contact number:
Mail@mail.com                                          831279
Email edited                                           Contact number edited
```

The change is also reflected if patient choose to view their records.

```
Enter your choice: 1
Name            : Alice Brown
DOB             : 14 May 1980
Email           : Mail@mail.com
Contact no.     : 831279
Blood type      : A+
Previous appointment outcomes:
~ No appointment outcomes found!
```

1.1.3 View Available Appointment

Patients can view the available appointment slot of their preferred doctor through the third menu. Upon selecting the doctor, available slots in the next 7 days are shown.

```
===============================================
Hello Alice Brown, welcome to the patient menu
1. View Medical Records
2. Update Personal Information             Available slots:
3. View Available Appointment Slots        Mon, 18 Nov 2024:
4. Schedule Appointment                    1. 09:00
5. Reschedule Appointment                  2. 10:00
6. Cancel Appointment                      3. 11:00
7. View Scheduled Appointments             4. 12:00
8. View Past Appointment Records           5. 13:00
9. Change Password                         6. 14:00
10. Logout                                 7. 15:00
===============================================    Tue, 19 Nov 2024:
Enter your choice: 3                       8. 09:00
Select Doctor:                             9. 10:00
1. dr. John Smith                          10. 11:00
2. dr. Emily Clarke                        11. 12:00
3. dr. James Bond                          12. 13:00
Select doctor:                             13. 14:00
1                                          14. 15:00
```

1.1.4 Schedule an Appointment

Through the fourth menu, they are able to schedule an appointment by selecting their preferred doctor, date, and time. After this, the timeslot is marked as unavailable. Patients are also unable to book an appointment on an unavailable time slot.

```
================================================
Hello Alice Brown, welcome to the patient menu
1. View Medical Records
2. Update Personal Information
3. View Available Appointment Slots
4. Schedule Appointment
5. Reschedule Appointment
6. Cancel Appointment
7. View Scheduled Appointments
8. View Past Appointment Records
9. Change Password
10. Logout
================================================
Enter your choice: 4
1. dr. John Smith
2. dr. Emily Clarke
3. dr. James Bond
Select doctor:
1
1. Mon, 18 Nov 2024
2. Tue, 19 Nov 2024
3. Wed, 20 Nov 2024
4. Thu, 21 Nov 2024
5. Fri, 22 Nov 2024
6. Sat, 23 Nov 2024
7. Sun, 24 Nov 2024
8. Back
Choose date:
1
```

```
Mon, 18 Nov 2024
1. 09:00 : Available
2. 10:00 : Available
3. 11:00 : Available
4. 12:00 : Available
5. 13:00 : Available
6. 14:00 : Available
7. 15:00 : Available
8. Back
Choose time:
2
Appointment successfully booked with dr. John Smith at Mon, 18 Nov 2024, 10:00
```

```
Mon, 18 Nov 2024
1. 09:00 : Available
2. 10:00 : Unavailable
3. 11:00 : Available
4. 12:00 : Available
5. 13:00 : Available
6. 14:00 : Available
7. 15:00 : Available
8. Back
Choose time:
2
Slot is unavailable!
```

1.1.5 Reschedule an Appointment

Appointments can be rescheduled through the 5th menu. Patients are required to choose the appointment they would like to reschedule and select a new doctor, time, and date for the appointment.

```
================================================
Hello Alice Brown, welcome to the patient menu
1. View Medical Records
2. Update Personal Information
3. View Available Appointment Slots
4. Schedule Appointment
5. Reschedule Appointment
6. Cancel Appointment
7. View Scheduled Appointments
8. View Past Appointment Records
9. Change Password
10. Logout
================================================
Enter your choice: 5
Appt1731920307595: (Doctor: dr. John Smith )Wed, 20 Nov 2024 11:00| Status: Pending
Enter full appointment ID to reschedule:
Appt1731920307595
Rescheduling appointment......
Appointment with dr. John Smith at Wed, 20 Nov 2024 11:00 successfully cancelled.
================================================
Availability updated. Appointment removed in schedule.
```
```
Availability of slot: Available
1. dr. John Smith
2. dr. Emily Clarke
Select doctor to reschedule to:
1
1. Mon, 18 Nov 2024
2. Tue, 19 Nov 2024
3. Wed, 20 Nov 2024
4. Thu, 21 Nov 2024
5. Fri, 22 Nov 2024
6. Sat, 23 Nov 2024
7. Sun, 24 Nov 2024
8. Back
Choose date:
4
Thu, 21 Nov 2024
1. 09:00 : Available
2. 10:00 : Available
3. 11:00 : Available
4. 12:00 : Available
5. 13:00 : Available
6. 14:00 : Available
7. 15:00 : Available
8. Back
Choose time:
1
Appointment successfully booked with dr. John Smith at Thu, 21 Nov 2024, 09:00
Availability updated. Appointment added in schedule.
```

The changes are reflected in the availability schedule.

```
Wed, 20 Nov 2024              Thu, 21 Nov 2024
1. 09:00 : Available          1. 09:00 : Unavailable
2. 10:00 : Available          2. 10:00 : Available
3. 11:00 : Available          3. 11:00 : Available
4. 12:00 : Available          4. 12:00 : Available
5. 13:00 : Available          5. 13:00 : Available
6. 14:00 : Available          6. 14:00 : Available
7. 15:00 : Available          7. 15:00 : Available
8. Back                       8. Back
```

1.1.6   Cancel an Appointment

Menu six allows patients to cancel appointments. Upon selecting it, a list of their appointments will be displayed and patients can choose appointment to cancel by entering the appointment ID.

```
=============================================
Hello Alice Brown, welcome to the patient menu
1. View Medical Records
2. Update Personal Information
3. View Available Appointment Slots
4. Schedule Appointment
5. Reschedule Appointment
6. Cancel Appointment
7. View Scheduled Appointments
8. View Past Appointment Records
9. Change Password
10. Logout
=============================================
Enter your choice: 6
Appt1731920400963: (Doctor: dr. John Smith )Thu, 21 Nov 2024 09:00| Status: Pending
Enter full appointment ID to cancel:
Appt1731920400963
Cancelling appointment......
Appointment with dr. John Smith at Thu, 21 Nov 2024 09:00 successfully cancelled.
=============================================
Availability updated. Appointment removed in schedule.
```

The timeslot is now available for appointments.

```
Thu, 21 Nov 2024
1. 09:00 : Available
2. 10:00 : Available
3. 11:00 : Available
4. 12:00 : Available
5. 13:00 : Available
6. 14:00 : Available
7. 15:00 : Available
8. Back
```

1.1.7   View Scheduled Appointments

Scheduled appointments can be seen through the seventh menu, doctor's name, date, and time of appointment is shown as below:

```
=============================================
Hello Alice Brown, welcome to the patient menu
1. View Medical Records
2. Update Personal Information
3. View Available Appointment Slots
4. Schedule Appointment
5. Reschedule Appointment
6. Cancel Appointment
7. View Scheduled Appointments
8. View Past Appointment Records
9. Change Password
10. Logout
=============================================
Enter your choice: 7
Showing upcoming appointment status:
=============================================
Appt1731920400963: (Doctor: dr. John Smith )Thu, 21 Nov 2024 09:00| Status: Pending
```

1.1.8 View Past Appointment Outcome Records

Past appointment records can be seen from the 8th menu option.

```
=============================================
Hello Alice Brown, welcome to the patient menu
1. View Medical Records
2. Update Personal Information
3. View Available Appointment Slots
4. Schedule Appointment
5. Reschedule Appointment
6. Cancel Appointment
7. View Scheduled Appointments
8. View Past Appointment Records
9. Change Password
10. Logout
=============================================
Enter your choice: 8
Past appointments and statuses:
=============================================
Appt1731922856076: (Doctor: dr. John Smith )Mon, 18 Nov 2024 09:00| Status: Completed
       Enter full appointment ID to display past outcome record:
       Appt1731922856076
       Appointment records of Appt1731922856076
       ================================================
       Appointment ID        : Appt1731922856076
       Patient Name          : Alice Brown
       Doctor Name           : dr. John Smith
       Date and Time         : Mon, 18 Nov 2024 09:00
       Status                : Completed
       Outcome               : Chicken pox

       Prescribed Medicine
       ----------------------------------------------
       Paracetamol       5         NOT FULFILLED
       ----------------------------------------------
```

1.2   Doctor Actions

1.2.1   View Patient Medical Records

Doctors can see medical records of a patient through the first menu. It shows patient's particulars and their past appointment records.

```
=================================================
Hello John Smith, welcome to the doctor menu
1. View Patient Medical Records
2. Update Patient Medical Records (Outcome)
3. View Personal Schedule
4. Set Availability for Appointments
5. Accept or Decline Appointment Requests
6. View Upcoming Appointments
7. Record Appointment Outcome
8. Change Password
9. Logout
=================================================
Enter your choice: 1
1. P1001 Alice Brown
2. P1002 Bob Stone
3. P1003 Charlie White
Select patient:
1
Name            : Alice Brown
DOB             : 14 May 1980
Email           : alice.brown@example.com
Contact no.     : -1
Blood type      : A+
Previous appointment outcomes:
~ No appointment outcomes found!
```

1.2.2   Update Patient Medical Records

Doctors can also update previous records through the second option in the menu.

```
==================================================
Hello John Smith, welcome to the doctor menu
1. View Patient Medical Records
2. Update Patient Medical Records (Outcome)
3. View Personal Schedule
4. Set Availability for Appointments
5. Accept or Decline Appointment Requests
6. View Upcoming Appointments
7. Record Appointment Outcome
8. Change Password
9. Logout
==================================================
Enter your choice: 2
1. P1001 Alice Brown
2. P1002 Bob Stone
3. P1003 Charlie White
Select patient:
1
Past records:
Appt1731922856076. Mon, 18 Nov 2024: Fever
Select appointment ID of record to update:
Appt1731922856076
Enter updated record:
Chicken pox
Record updated!
```

1.2.3   View Personal Schedule

Doctors can see their personal schedule through option 3 on their menu. Upon selecting the option, they are required to choose a date within the next 7 days and their hourly schedule would be shown as below:

```
==================================================
Hello John Smith, welcome to the doctor menu
1. View Patient Medical Records
2. Update Patient Medical Records (Outcome)
3. View Personal Schedule
4. Set Availability for Appointments
5. Accept or Decline Appointment Requests
6. View Upcoming Appointments
7. Record Appointment Outcome
8. Change Password
9. Logout
==================================================
Enter your choice: 3
1. Sun, 17 Nov 2024
2. Mon, 18 Nov 2024
3. Tue, 19 Nov 2024
4. Wed, 20 Nov 2024
5. Thu, 21 Nov 2024
6. Fri, 22 Nov 2024
7. Sat, 23 Nov 2024
8. Back
Choose date:
```
```
1. Sun, 17 Nov 2024
2. Mon, 18 Nov 2024
3. Tue, 19 Nov 2024
4. Wed, 20 Nov 2024
5. Thu, 21 Nov 2024
6. Fri, 22 Nov 2024
7. Sat, 23 Nov 2024
8. Back
Choose date:
1
Sun, 17 Nov 2024
1. 09:00 : Available
2. 10:00 : Available
3. 11:00 : Available
4. 12:00 : Available
5. 13:00 : Available
6. 14:00 : Available
7. 15:00 : Available
```

Appointments are also shown in the schedule.

```
Mon, 18 Nov 2024
1. 09:00 : Appt1731921676048 Alice Brown
2. 10:00 : Available
3. 11:00 : Available
4. 12:00 : Available
5. 13:00 : Available
6. 14:00 : Available
7. 15:00 : Available
```

1.2.4   Set Availability for Appointments

They can also set their availability through option 4. Similarly, they are required to choose the designated date, then time, before indicating availability. The changes are reflected in their personal schedule.

1.2.5 Accept or Decline Appointment

Through the fifth menu, doctors can accept or decline appointments. They select the appointment and either accepts or declines it. The appointment will be reflected in their schedule.

1.2.6 View Upcoming Appointments

Option six on the menu will show doctors a list of their upcoming appointments.

1.2.7 Record Appointment Outcome

Appointment outcome can be updated through the 7th menu. After writing notes for the appointment, the list of medications prescribed is also asked in this menu.

```
================================================
Hello John Smith, welcome to the doctor menu
1. View Patient Medical Records
2. Update Patient Medical Records (Outcome)
3. View Personal Schedule
4. Set Availability for Appointments
5. Accept or Decline Appointment Requests
6. View Upcoming Appointments
7. Record Appointment Outcome
8. Change Password
9. Logout
================================================
Enter your choice: 7
1. Appt1731921676048: (Alice Brown) Mon, 18 Nov 2024 09:00
Enter full appointment ID to update outcome:
Appt1731921676048
Enter appointment outcome:
feverish
```

```
Any medications prescribed?
1. Yes
2. No
Enter choice:
1
Medicine list:
1. Paracetamol
2. Ibuprofen
3. Amoxicillin
4. (Exit Menu)
Enter medicine index or Exit:
1
Enter medication amount:
5
```

The outcome is also reflected in patient's record.

```
Enter full appointment ID to display past outcome record:
Appt1731922856076
Appointment records of Appt1731922856076
================================================
Appointment ID          : Appt1731922856076
Patient Name            : Alice Brown
Doctor Name             : dr. John Smith
Date and Time           : Mon, 18 Nov 2024 09:00
Status                  : Completed
Outcome                 : Chicken pox

Prescribed Medicine
--------------------------------------------------
Paracetamol        5           NOT FULFILLED
--------------------------------------------------
```

1.3   Pharmacist Actions

1.3.1   View Appointment Outcome Record

The pharmacist can view the Appointment Outcome Record, specifically the medication orders needed for the prescription. This ensures privacy for the patient.

```
================================================
Hello Mark Lee, welcome to the Pharmacy menu
1. All medication orders
2. Display stock
3. Request restock menu
4. Request log
5. Change Password
6. Log off
================================================
Enter selection:
1


=================== Prescription ====================
Appointment ID        Medication    Amount Status
================================================
Appt1731862138076    Paracetamol    20     NOT FULFILLED
--------------------------------------------------
Enter Appointment ID to fulfil medicine:
```

1.3.2   Update Prescription Status

The pharmacist is able to fulfil prescription orders. Once fulfilled, they are automatically updated to be FULFILLED (Also known as 'Dispensed')

1.3.3   View Medication Inventory

Within the main Pharmacy menu, option 2: Display stock, shows all medications available, their Stock and the health of their stock level. Stock lvl is either OK or LOW, this is determined by the low stock alert amount in the CSV, this is not available to be edited by the Pharmacist but is changeable by the Administrator.

1.3.4   Submit Replenishment Request

If the pharmacist noticed that there is a medication that is low on stock, they can request a restock through the 3rd menu option. Upon selecting it, they are prompted to choose between requesting restock for all medications that are low in stock or selecting a certain medication. They are also asked to input the amount of medication to be restocked. After which, the request will be submitted pending administrator's approval.

```
=======================================
Hello Mark Lee, welcome to the Pharmacy menu
1. All medication orders
2. Display stock
3. Request restock menu
4. Request log
5. Change Password
6. Log off
=======================================
Enter selection:
3
=======================================
Medication          Amount      Stock lvl
=======================================
Paracetamol         100         OK
-----------------------------------------
Ibuprofen           50          OK
-----------------------------------------
Amoxicillin         75          OK
-----------------------------------------

1. Request restock - Specific medication
2. Request restock - All of low
3. Cancel restock request
4. Back
```

```
1. Request restock - Specific medication
2. Request restock - All of low
3. Cancel restock request
4. Back
Enter selection:
1
=======================================
Medication          Amount      Stock lvl
=======================================
Paracetamol         100         OK
-----------------------------------------
Ibuprofen           50          OK
-----------------------------------------
Amoxicillin         75          OK
-----------------------------------------

Which medication would you like to restock?
Paracetamol
How much would you like to restock?
50
Restock request has been made successfully.
```

1.4   Administrator actions

1.4.1   View and Manage Staff

Administrators can view and manage hospital staff through the first option in the menu. If they choose to view staff, there also have the option to filter staff through certain attributes or view all staff.

```
=======================================
Hello Sarah Lee, welcome to the Administrator menu
1. View and Manage Hospital Staff
2. Manage Appointments
3. View and Manage Medication Inventory
4. Approve Replenishment Requests
5. Change Password
6. Logout
=======================================
1
---- View and Manage Hospital Staff ----
1. View Hospital Staff
2. Manage Hospital Staff
3. Back
```

```
Viewing hospital staff...
1. Filter by Staff Role
2. Filter by Staff Gender
3. Filter by Staff Age
4. View all Staff
5. Back
4
Staff list:
Staff {StaffID='D001', Password: pass
        Role: Doctor Name: John Smith , Gender: Male , Age: 45}

Staff {StaffID='D002', Password: password
        Role: Doctor Name: Emily Clarke , Gender: Female , Age: 38}

Staff {StaffID='P001', Password: pass
        Role: Pharmacist Name: Mark Lee , Gender: Male , Age: 29}

Staff {StaffID='A001', Password: pass
        Role: Administrator Name: Sarah Lee , Gender: Female , Age: 40}
```

Furthermore, admins can add staff, edit their detail, or remove staff through the manage staff menu.

```
                                                              ---- Update hospital staff ----
                                                              Enter User ID of staff to update:
                                                              D003
                                                              Staff ID        : D003
          ----------Manage hospital staff------------        Name            : James Bond
          Select action:                                      Gender          : Male
          1. Add Staff                                        Age             : 69
          2. Update Staff Details                             Role            : Doctor
          3. Remove Staff                                     Select item to edit:
          4. Back                                             1. Name
          1                                                   2. Gender
          ---- Add hospital staff ----                        3. Age
          Enter User ID: D003                                 4. Role
          Enter Name: James Bond                              5. Back
          Enter Role: Doctor                                  3
          Enter Gender: Male                                  Enter new staff age:
          Enter Age: 69                                       42
          Staff member added successfully.                    Age changed successfully!
          [D003, James Bond, Doctor, Male, 69 years old] added successfully.
```

```
          Staff list:
          Staff {StaffID='D001', Password: password
                  Role: Doctor Name: John Smith , Gender: Male , Age: 45}

          Staff {StaffID='D002', Password: password
                  Role: Doctor Name: Emily Clarke , Gender: Female , Age: 38}

          Staff {StaffID='P001', Password: password
                  Role: Pharmacist Name: Mark Lee , Gender: Male , Age: 29}

          Staff {StaffID='A001', Password: pas
                  Role: Administrator Name: Sarah Lee , Gender: Female , Age: 40}

          Staff {StaffID='D003', Password: password
                  Role: Doctor Name: James Bond , Gender: Male , Age: 69}
```

```
          ---- Remove hospital staff ----
          Enter the User ID of the staff member to remove: D003
          Staff member removed successfully.
          User ID D003 removed.
```

1.4.2 View Appointment Details

Admins can see the details of any appointments through the second menu option. They also have the option to filter appointments based on doctors or patients. Alternatively, they can also search for a specific appointment through Appointment ID

```
==========================================
Hello Sarah Lee, welcome to the Administrator menu
1. View and Manage Hospital Staff
2. Manage Appointments
3. View and Manage Medication Inventory
4. Approve Replenishment Requests
5. Change Password
6. Logout
==========================================
2
1. View Appointment Details
2. Manage Appointment Details
3. Back
Select option:
1
--------View Appointment Details----------
1. Filter by doctor
2. Filter by patient
3. Filter by Appointment ID
4. Back
Select option:
1
```

```
Enter doctor ID:
D001
Viewing appointments for D001 John Smith

Appointment ID  : Appt1731922856076
Date                    : Mon, 18 Nov 2024
Time                    : 09:00
Patient                 : Alice Brown
Status                  : Completed
Outcome                 : Chicken pox
```

1.4.3 View and Manage Medication Inventory

Admins are able to alter medication inventory through the third menu. They can add new medications or edit the details of an existing medication.

```
Select action:
1. Add Medication
2. Update Medication Fields
3. Back
2
Updating medication...
---- Update Medication ----
Enter name of medication to update:
Paracetamol
Name            : Paracetamol
Quantity              : 100
Low Stock Alert       : 20
Select item to edit:
1. Name
2. Quantity
3. Low Stock Alert
4. Back
2
Enter new medicine quantity:
150
Quantity changed successfully!
```

The changes are then reflected in the inventory.

```
Select action:
1. View Medicine Inventory
2. Manage Medicine Inventory
3. Back
1
Viewing medication...
================================================
Medication        Amount    Stock lvl
================================================
Paracetamol         150       OK
------------------------------------------------
Ibuprofen            50       OK
------------------------------------------------
Amoxicillin          75       OK
------------------------------------------------
back                  4       OK
------------------------------------------------
```

1.4.4   Approve Replenish Request

After a pharmacist submits a request to replenish a medication, an administrator needs to approve the request through the fourth menu. Upon doing so, a list of pending requests is shown. After approval, the updated medicine inventory is displayed as below:

```
--------- Approve replenishment requests ---------
1. View approved replenishment requests
2. View pending replenishment requests
3. Approve pending replenishment requests
4. Back
Enter selection:
3
Pending replenishment requests:
restockID  Medicine           Amount    Status
1          Paracetamol          50       Pending_Admin
Enter Restock ID of request to approve:
1
50 has been added to Paracetamol
================================================
Medication        Amount    Stock lvl
================================================
Paracetamol         150       OK
------------------------------------------------
Ibuprofen            50       OK
------------------------------------------------
Amoxicillin          75       OK
------------------------------------------------
```

1.5   Login

1.5.1   First-Time Login and Password Change

Upon first login, users will be prompted to change their password.

On subsequent logins, users will be required to make use of their new password.

1.5.2   Login with Incorrect Credentials

When users put in the wrong password or username, login will fail and user is prompted to enter their login details again.