Systems Requirements Documentation

Patient Tracker System

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INFO-C451

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Customer Problem Statement

Patients at hospitals and doctor's offices have to call to make an appointment, or they leave the appointment and can't remember what the doctor said. This has happened to many patients, and it can be frustrating playing phone tag with the doctor's office staff, just to get information about their appointment or schedule a new appointment.

With this system application, it is mainly focused around patients and their needs. The patients can schedule their appointments online, fill out the pre appointment paperwork ahead of time, and even check on their health. This application will allow shorter waiting times for appointments, due to the pre appointment paperwork already being filled out before the patient shows up to the appointment. Patients can also update their personal information through the system. Patients having the ability to do this themselves, will save time for the office staff from updating patient information. Along with scheduling an appointment, patients can also cancel or reschedule an appointment.

The office staff will have more free time to focus on the other tasks that they are assigned to, versus handing out information for the patient to fill out, updating the system with the new information, scheduling appointments, and updating patients on their appointments. This application will not remove all of these tasks entirely, because there may be some people that do not prefer to use the system, but it will help cut down on the redundancy of doing these tasks. Office staff will have to add any new patients into the system, but it will create them a username and password so the patient will have the opportunity to view and update their information themselves.

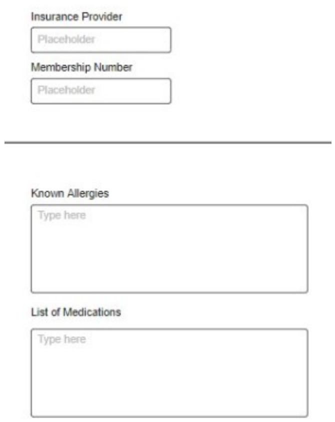
One of the amazing features of this application is allowing patients and staff to view prior appointment details. This actively demonstrates that a patient or staff can see the patient's test results; weight, height, the reason for the appointment, the date of the appointment, the provider, and information on any of the prescriptions they may have been prescribed. By having this option in the application, the patient can view this at any time after the appointment. Sometimes when people go to the doctor they don't feel well, which can cause them to not focus as clearly on the instructions the doctor is providing. With this application, the patient can view the notes after the appointment as many times as they like, so they will not forget right when the doctor leaves the room. The nurses and doctors will keep their notes for the patient's appointment in the system as well. Then once the appointment is over, they click update and the patient receives an email that they can review the appointment.

Another feature that will help ease the frustrations of patients, is that they can request refills on medications they are prescribed to. Once they request a medication refill, a staff member will review the request. They can see the last time it was renewed, how many more times the patient is able to renew, and they can approve or deny the request. This will save a lot of time from being on the phone with the office staff while they look up the patient, review the prescriptions, and either deny or approve the request. The only time a phone call will be required is if the request was denied.

Each person, staff or patient, will have a username and password in order to enter the application. This actively demonstrates that not anyone will be allowed to view patient records. For the exact purpose of this application, there will be an option for patients to download the application onto their computers. This application will not be available to anyone, it has to be sent out for users to download.

To summarize everything that has been stated so far, patients need a system that will allow them to access their medical records, create appointments, update their information, and view the status of their health. This system will also allow the staff to cut down on front desk phone calls and are able to focus on other tasks they may still have. Overall, this system will be very beneficial to not only the patients, but to the staff as well.

Glossary of Terms



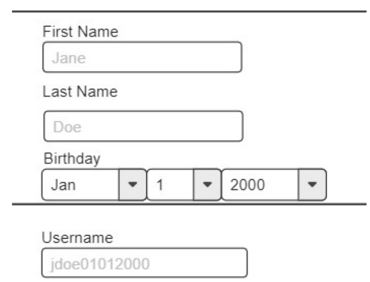
Pre Appointment Information

- **Pre Appointment Information** – This information will include confirming insurance information, any medications the patient is taking, and any known allergies.

- **Medication Refills** – This occurs when patients are prescribed medication that will allow refills. This could include, but not limited to allergy medication, headache medication, birth control, etc. Not all medications will be available for refills. A list of available medication refills will be provided when the patient goes to request it.

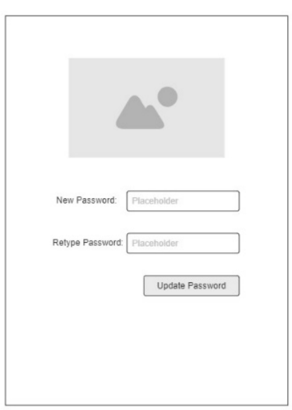
Medication Refills

- **Usernames** – Each user will be provided with a username in order to access the application. Usernames will be created using the first letter of the patients name, their last name, and their birthday.



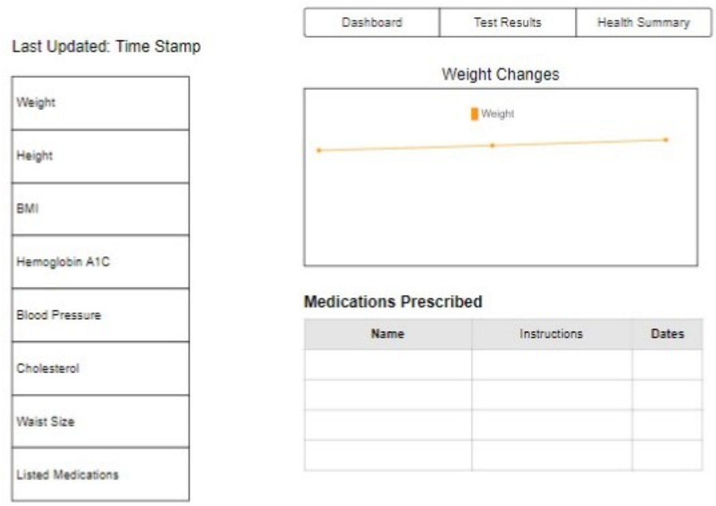
Usernames

- **Passwords** – Each user will be provided with a temporary password. This will allow the user to log into the application. If it is their first time signing in, a screen will pop up where the user will have to set a password.



Passwords

- **Patient Health Status** – This page is also known as My Health and will allow the patient and staff to view the status of the patient's health. They can view the status over time of their progress shown in line graphs.



Patient Health Status

System Requirements

Functional Requirements

No.	Priority Weight	Description
REQ-1: Log In	HIGH	All users will have to have a username and password in able to log into the application.
REQ-2: Update Information	HIGH	This will allow patients and staff to update patient information.
REQ-3: Cancel Appointment	HIGH	Allows patients the ability to cancel already scheduled appointments.
REQ-4: Reschedule Appointment	HIGH	Patients have the ability to reschedule already scheduled appointments.
REQ-5: Schedule Appointment	HIGH	This will allow patients to schedule their appointments online.
REQ-6: Pre Appointment Information	MEDIUM	Available to patients to fill out before their appointment. This will allow the check in process be faster.
REQ-7: Staff Patient Search	HIGH	Staff will be able to search the system for a patient to view their information.
REQ-8: Staff Appointment Update	HIGH	Staff will have the ability to enter the information and test result from the appointment and save it in the system.
REQ-9: Adding New Patient	HIGH	Staff can add a new patient into the system, which will generate a username and password for the patient.
REQ-10: Medication Refills	MEDIUM	Patients will have the ability to request medication refills online.
REQ-11: Medication Approvals	MEDIUM	Staff will have the ability to approve or deny the medication refills as well as review each request.
REQ-12: Prior Appointments	HIGH	Patients and staff will be able to review prior appointment notes from past appointments.
REQ-13: Staff View Patient Schedule	HIGH	The staff can view the schedule for the week or month and see all patient appointments.
REQ-14: Staff View Staff Schedule	LOW	The staff can view the schedule for other staff members and which doctors are working.
REQ-15: View My Health Page	MEDIUM	Staff and patients can view the My Health page to review the timeline of the patient’s health.
REQ-16: Log Out	HIGH	This allows the user to log out of the application.

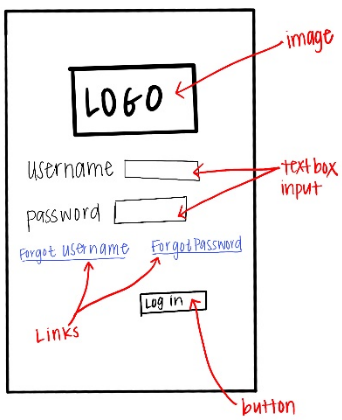
REQ-17: Request new password	MEDIUM	This allows the user to request a new password if they forgot theirs.
REQ-18: Create new password	MEDIUM	This allows the support team to create a new password if the user requests one.

Nonfunctional Requirements

1. *Supportability* – support will be available during office hours, updates will be completed around midnight when traffic is lower.
2. *Functionality* – capability the system will be able to withstand the size and functions of the system.
3. *Reliability* – the system will be able to maintain performance during all times of the day.
4. *Usability* – the system will be easy to use and many training documentations will be provided.
5. *Performance* – the response time and speed with be high. With more information being added, updates may have to be included to improve performance.

User Interface Requirements:

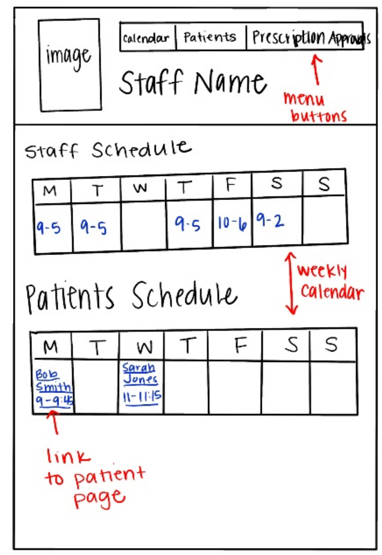
The user should be able to run this on a Windows or iOS computer. The application will just be a desktop icon, which will open a Log in Screen. Each user will have their own username and password that will be provided by the administrator. This will be sent via Email upon downloading the application. Once logged in the user will have a menu of buttons at the top of the screen, where they can navigate through the application. Below is a sketch and description of all the screens that will be included along with where the buttons, text boxes, and menus will be located.



Log In Screen

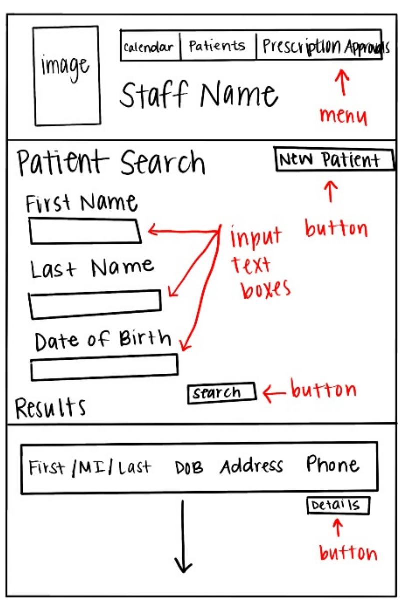
1. **Log In Screen** – This screen with be available for any user logging into the system. A logo of the health clinic or hospital will be included at the top. Each user will type in their username and password. Links will be provided if the user has forgotten either username or password.

2. **Staff Page –** This screen is what Staff would see when they log into the application. Here the staff can view their schedule and which doctor's they are working with this week. There is also a calendar for patient appointments for the week below it. Clicking the link for the customer name will send the user to the *Patient Info* Page. There is also a menu of buttons at the top, which will allow the staff to navigate through the application.



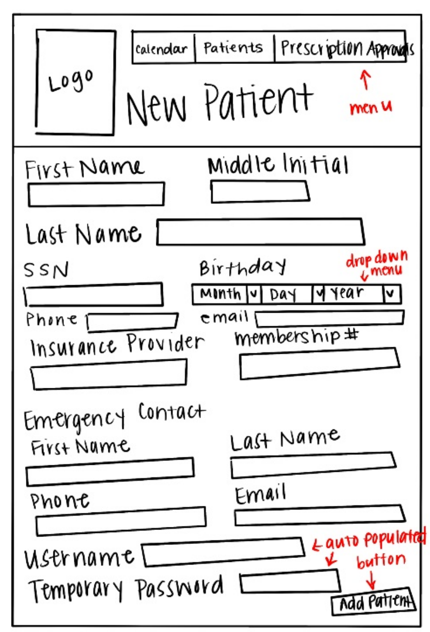
Staff Page

3. **Patient Search** – This page is where the staff can search for the patient. They can search by first name, last name, and date of birth. Below will be a list of all the possible options for that search. The staff can also click on NEW PATIENT to add a new patient to the system.



Patient Search

4. **New Patient –** This page allows the staff to add a new patient into the system. The staff enters the patient's name, Social Security Number, birthday, phone number, email, insurance information, and emergency contact. A username and temporary password are

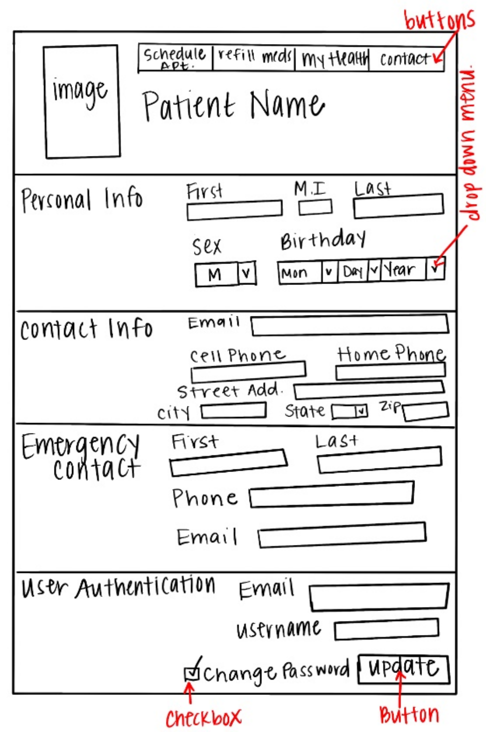


New Patient

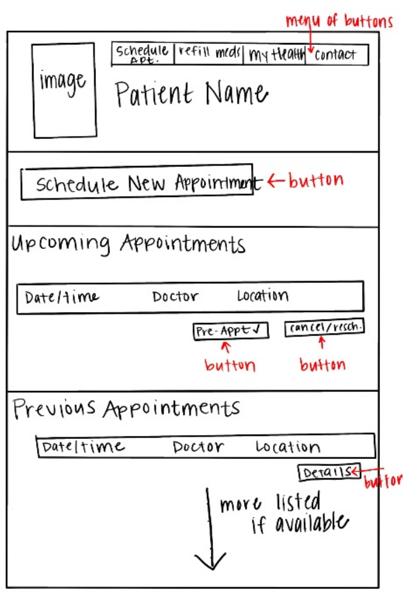
auto populated. The username will normally include the first initial of the patient's first name, their last name, and birthday. Once all the information is set up, the staff member can hit Add Patient. This will send an email to patient with their username and password if they wish to log in and fill out the rest of the paperwork on the *Profile Page*.

5. **Profile Page** – This screen will be first thing patients can view when they enter the system. This is known as the Profile Page. It includes the patient's name, contact information, emergency contact information, home address, and user authentication. The patient has an option to upload a photo of themselves for their profile. They also can update any of their information and save the update by hitting the update button at the bottom of the screen. User Authentication would allow the patient to update their username or change their password.

   At the top of the screen are 4 options the user can do. This includes scheduling an appointment, refilling medication, checking their health, and contacting the office. Each button will direct the patient to a different screen.

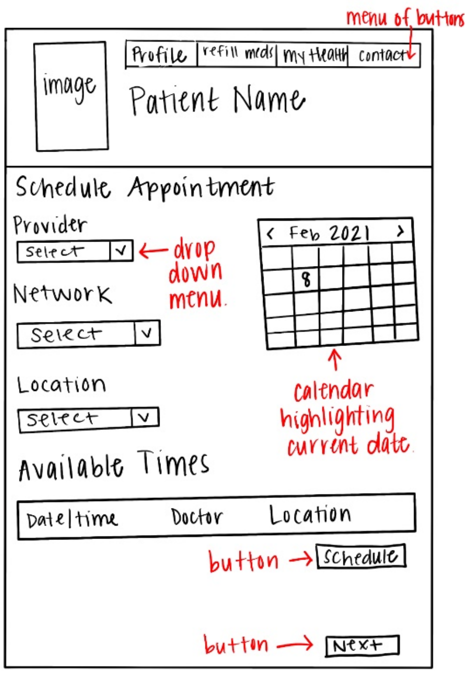


Profile Page



Appointment Page

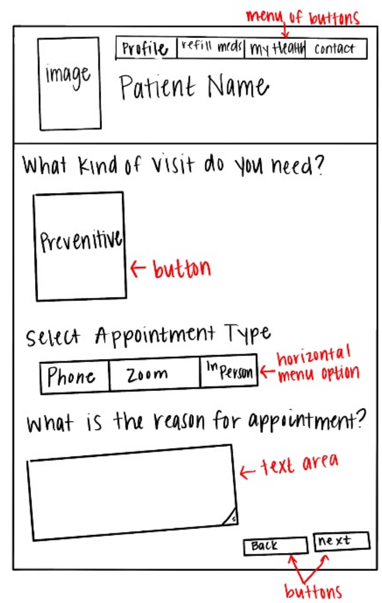
6. **Appointment Page** – When the user clicks on the Schedule Appointment button at the top of the screen, it will direct them to the Appointments page. This will allow the user to create a new appointment, view any upcoming appointments, reschedule or cancel the upcoming appointments, complete the pre-appointment questionnaire, or view any previous appointments.



Schedule New Appointment

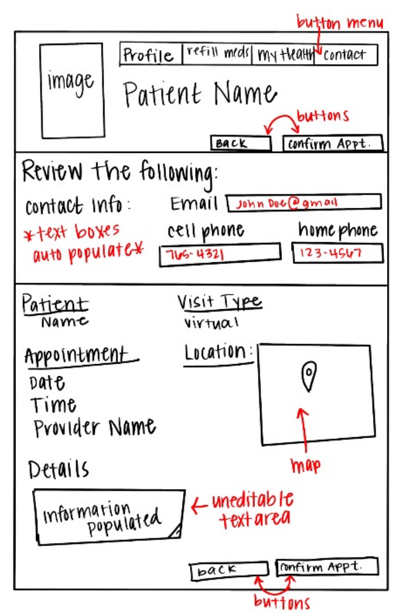
7. **Schedule New Appointment** – When the user clicks on the Schedule New Appointment button, the user will be able to choose a provider, network, and location using the available options in the drop down menu. To the right is a calendar, highlighting today's date. The user can pick any future date and view any available appointments at the location they choose. When they find an appointment that works for them, they can click schedule, which will select that time slot. The user will then click next to continue the sign up process.

8. **Schedule New Appointment Page 2** – After the user clicks NEXT, they will come to the screen where they can choose the kind of appointment they need. Button options will be available based on the type of appointments that location has available. In this instance Preventive is an option. Once that is selected they can choose the appointment type. This will be a menu button option, where the user can select any of the three options: Phone, Zoom, or In Person appointments. Finally, the user will type in the text area, the reason they are wanting the appointment. The user will also have the option to go back if they decide they don't want that appointment, or continue making the appointment. If the user clicks back it will direct them back to the Appointments Page.

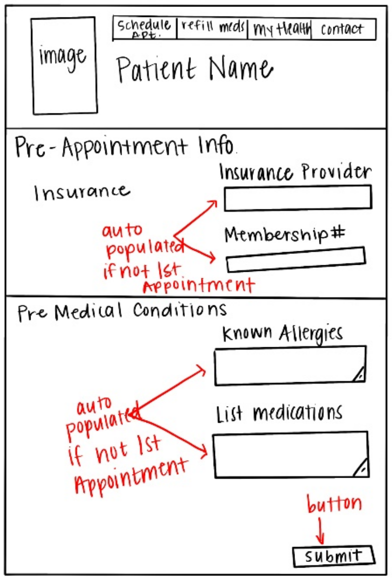


Schedule New Appointment 2

9. **New Appointment Page 3** – This page is where the user will review and confirm their appointment. They have the options to go back to the previous screen or confirm the appointment at the top of the screen and the bottom. The user will review their contact information, which will be auto populated from their profile. If the user finds this information is incorrect, they can manually update it and it will also save on their profile as well. Below their contact information is the appointment information. This will include the patient's name, the visit type, the location, the date and time of the appointment, the provider's information, and then the details they provided on the previous screen. Once confirmed, the user can hit confirm appointment. They will receive an email confirming the appointment along with the information about the appointment including all the information provided on this page.

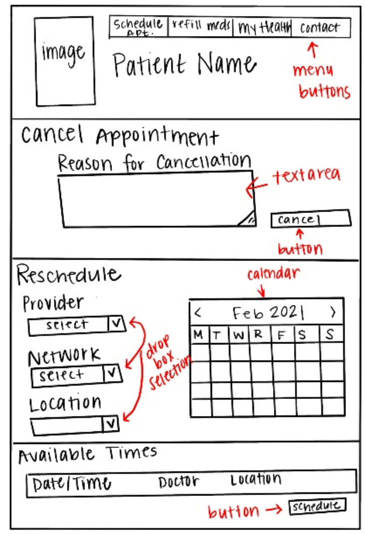


Schedule New Appointment 3



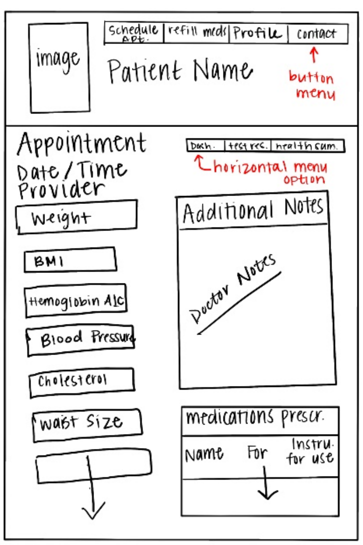
Pre Appointment Questionnaire

10. Pre-Appointment Page – On the *Appointment Page*, there is a button for the Pre-Appointment questionnaire that will need to be completed before the appointment. This will include the insurance information, any allergies or medications that the patient might have or be using. Filling this out will save time for the patient and staff, so it will not need to be completed while waiting in the waiting room. Once all the information is confirmed and filled out, the user can submit the questionnaire. If this patient has already had an appointment then this information will be auto filled in, from their previous visit. They can update it if they wish. If this is the patient's first time, they will need to fill this out. It will be saved and will auto populate for their next appointment.



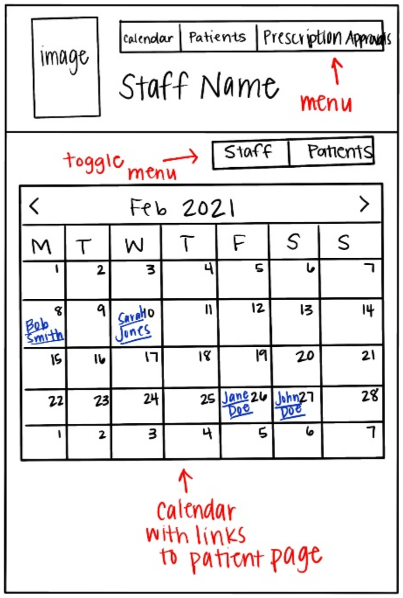
Cancel/Reschedule Page

11. Cancel/Reschedule Page – Also on the *Appointment Page* is a button to cancel or reschedule an appointment. When the user clicks this button, they are redirected to this page. At the top the user will have an option to cancel their appointment. They will need to provide a reason for their cancellation, then click cancel. This will send a notification to the office staff that an appointment has been cancelled and it will delete it from the calendar. If the patient wishes to reschedule, they can choose a provider, network, location, and day on the calendar. They can view available times and select the one that works for them. Once all the information is filled out, they will be redirected to the review page to confirm their rescheduled appointment ***Schedule New Appointment 3***. With cancelling an appointment, depending on the provider's policies, there may be restrictions to how early a patient can cancel the appointment.



Prior Appointment Details

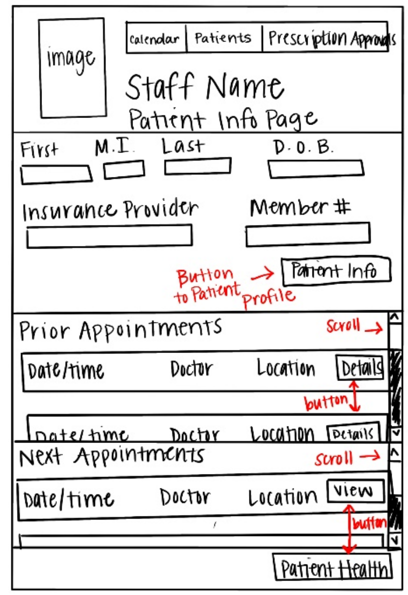
12. Prior Appointment Details – This page is found by clicking the Details button on the Appointment Page next to the previous appointments. When the user clicks on details they are sent to a page that will show the date and time of the appointment, the provider and all the health information collected from that appointment. This will include test results, weight, height, any doctor's notes, and the reason for the visit, and any medications prescribed by the doctor at that time.



Staff Calendar View

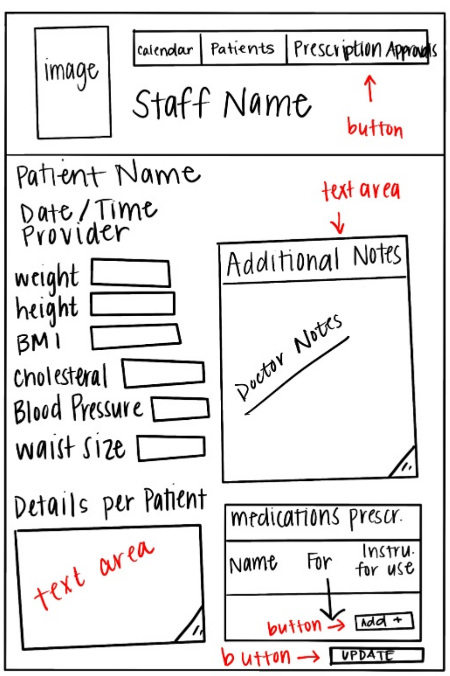
13. Staff Calendar View – This page includes a staff view or a patient view for appointments that month. This is a toggle view, so that patients and staff do not confuse the two. The patient view will provide links to the *Patient Info* page.

14. Patient Info Page – This page can be located from the Staff Calendar View or the Staff Page. When a patient comes in for an appointment, the staff member can click on the link to this page. This will show the patient's name, date of birth, insurance information, then a button to the Patient Info screen if they would like to view that. Below is a section for prior appointments, where the staff can view the *Prior Appointment Details* page. There is also Next Appointments, which has the patient's next appointments listed. When it is time for their appointment, the staff will hit the View button to take them to the *Staff Appointment Update* page. There is also a button at the bottom to view the patient's health page, which is known as *My Health Staff View*.



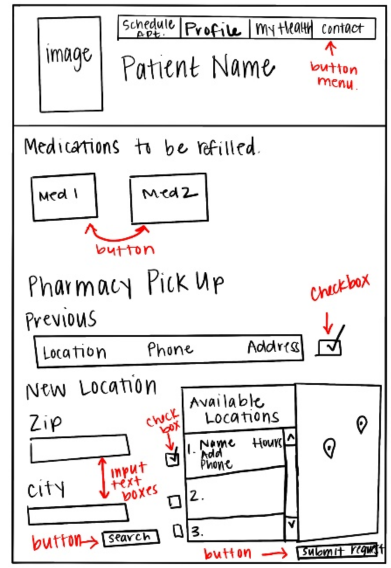
Patient Info Page

15. Staff Appointment Update – This page is where the staff can update the patient's information from the appointment. This would include, their weight, height, BMI, blood pressure, the details from the appointment like the reason behind it, any doctor notes, and add any medications they were prescribed for the appointment. Once the information has been completed, the staff would just click UPDATE. This will update the *My Health* page in the Patient view, so they can review their results of their appointment.

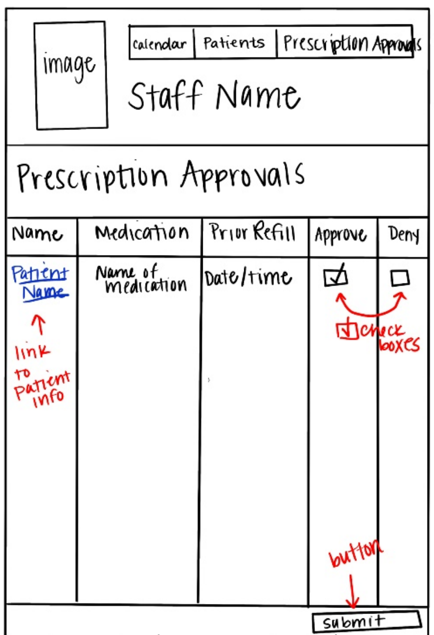


Staff Appointment Update

16. **Medication Refill** – When a user wants a refill on one of their prescriptions, they can click Medication Refill option at the top of the page. This will direct them to this page. The user will have options on medications they can refill. They can click on the medications, then choose the pharmacy they would like the medication sent to. If the user has had medication sent there before, this will be listed. They also have an option to search for another pharmacy. Once a pharmacy is selected, the user can submit the request. This will send a notification to the office staff to approve the refill. The user will receive an email that their request has been sent and that they will be notified within 24 hours if it was approved. Once approved, the user will receive an email with a time the prescription will be ready for pick up. The patient will also be able to see how many more refills they have available underneath the button of medication option



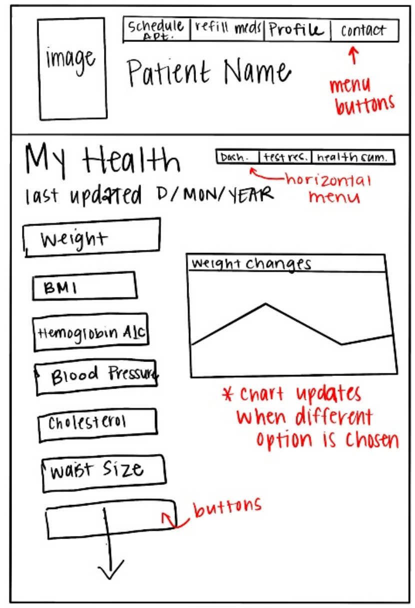
Medication Refill Page



Medication Approvals

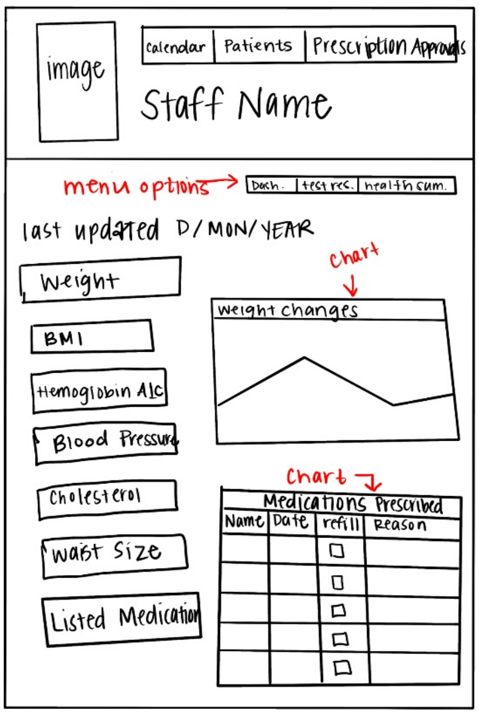
17. **Medication Approvals –** When the patient submits a request for medication refills, the request gets added to a queue on the Prescription Approvals tab for the staff. The staff will have to review the request, by seeing when it was previously refilled, check to see who prescribed it by clicking the link and reviewing the Patient Info Screen, then check the box to either approve or deny the request. Once they are done, they can hit submit at the bottom. If approved, this will send an email to the pharmacy and the user letting them know it has been confirmed. If denied, the patient will receive an email to call the office to discuss the refill request.

18. My Health – This page is available by clicking My Health on the menu buttons. This page will show the user their test results, health summary, and their health results based of all their appointments. When on the dashboard, the user can see their prior weight, BMI, Cholesterol, and all the variables that are taken during an appointment. When each one of those are clicked, a line graph will show up on the right, which will allow the user to see all their results. The test results option, will allow the user to view any blood tests that they recently have taken, and their health summary will show their progress over time.



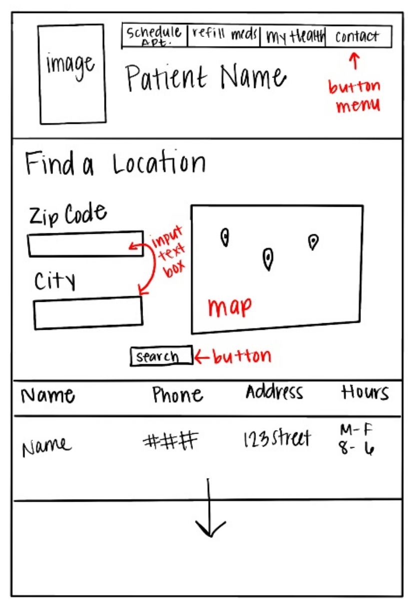
My Health Page

19. My Health Staff View - This page can be found by the staff by viewing the *Patient Info Page* and clicking the button for Patient Health at the bottom. There is a toggled list to the left side, where the staff can view a chart seeing the progress and prior results of the patient. They can also view the patient's listed medications, and any medications that were prescribed during that appointment and if it can be refilled or not. This is very similar to the *My Health* page, except for the medications prescribed and listed medication options.



My Health Staff View

20. Contact – This page is for contacting and finding a close location. The user can enter their zip code and city, then click search. The map on the right will update to show all the locations available in that zip code and city. Below will be a detailed list with the locations name, phone, address, and hours.



Contact Page

Functional Requirement Specification

Stakeholders: *Below is a list of stakeholders that would be interested in this application.*

- Nurses
- Doctors
- Front Desk Staff
- Patients
- Customer Support
- Project Manager
- VPN Connection Company
- Two Factor Authentication Company

Actors and Goals: *Below is a chart which shows the roles of people/devices that will interact directly with the system.*

Actors	Goals
VPN Connection Company	○ Allow the users to sign into VPN ○ Only allow users signed into VPN to access the application
Two Factor Authentication Company	○ Allow the users to have an extra set of authentication ○ Only allow users access to application if it passes Two Factor Authentication.
Patients	○ Update personal information ○ Log Into System ○ Log out of system ○ View personal information ○ Schedule a New Appointment ○ View Prior Appointment Details ○ Complete Pre Appointment Paperwork ○ Cancel Appointments ○ Reschedule Appointments ○ View health records/progress on My Health page ○ Request prescription refills ○ Search for offices in the area ○ View contact information for offices near them. ○ Create New Password
Nurses	○ Update patient information ○ Log into system ○ Log out of system ○ View patient information ○ View calendar of patient appointments ○ View calendar of staff schedule ○ View patient’s health records/progress ○ View patient’s prior appointment details ○ Update patient appointment details ○ Approve/deny prescription refills ○ Search for a patient

	o Add new patient o Schedule an appointment o Cancel an appointment o Reschedule an appointment o Create New Password
Doctors	o View patient information o Update Patient Information o Log into system o Log out of system o View calendar of patient appointments o View calendar of staff schedule o View patient's health records/progress o View patient's prior appointment details o Update patient appointment details o Approve/deny prescription refills o Search for a patient o Add new patient o Schedule an appointment o Cancel an appointment o Reschedule an appointment o Create New Password
Front Desk Staff	o Log into System o Log out of system o View calendar of patient appointments o View calendar of staff schedule o View patient contact information o Update patient information o Search for a patient o Schedule an appointment o Cancel an appointment o Reschedule an appointment o Create New Password
Customer Support	o Creates new password

Use Cases:

System Requirement	Description
REQ-1: Log In	All users will have to have a username and password in able to log into the application.
REQ-2: Update Information	This will allow patients and staff to update patient information.
REQ-3: Cancel Appointment	Allows patients the ability to cancel already scheduled appointments.

REQ-4: Reschedule Appointment	Patients have the ability to reschedule already scheduled appointments.
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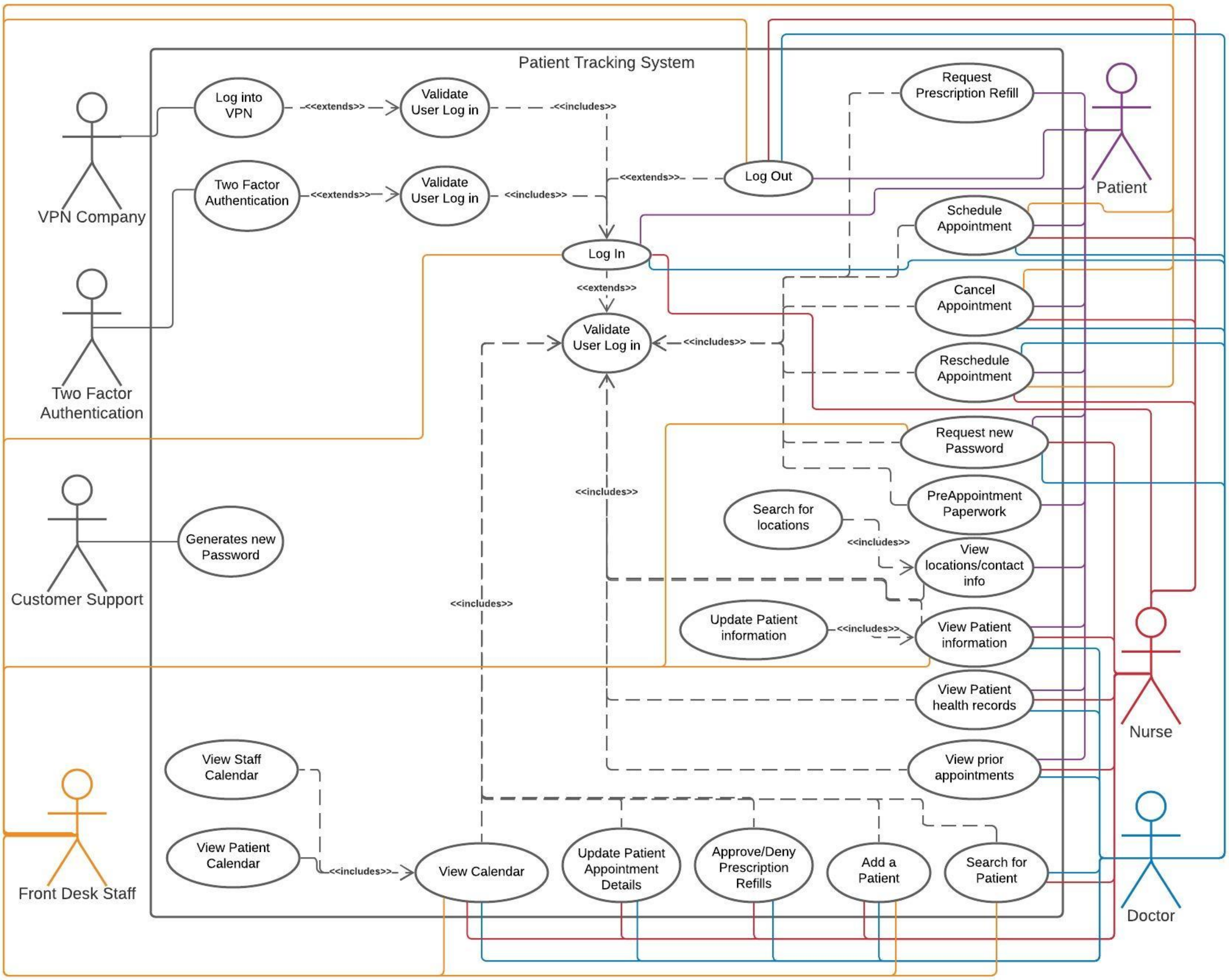
REQ-18: Create new password	This allows the support team to create a new password if the user requests one.

Use Case Diagram



Traceability Matrix

Req-ID	Requirement	Priority Weight	Test Case ID	Test Case Description	Status
1	Log In	HIGH	TC01	Login with invalid username and password	Passed
			TC02	Login without inputting username and password	Passed
			TC03	Login with valid credentials	Passed
			TC04	Login as patient	Passed
			TC05	Login as Front Desk Staff	Passed
			TC06	Login as Nurse	Passed
			TC07	Login as Doctor	Passed
2	Update Information	HIGH	TC08	Patient updates information	In Progress
			TC09	Front Desk updates information	Not Started
			TC10	Nurse updates information	Not Started
			TC11	Doctor updates information	Not Started
3	Cancel Appointment	HIGH	TC12	Patient cancels appointment	In Progress
			TC13	Front Desk cancels appointment	In Progress
			TC14	Nurse cancels appointment	In Progress
			TC15	Doctor cancels appointment	In Progress
4	Reschedule Appointment	HIGH	TC16	Patient reschedules appointment	In Progress
			TC17	Front desk reschedules appointment	In Progress
			TC18	Nurse reschedules appointment	In Progress
			TC19	Doctor reschedules appointment	In Progress
5	Schedule Appointment	HIGH	TC20	Patient schedules appointment	In Progress
			TC21	Front desk schedules appointment	In Progress
			TC22	Nurse schedules appointment	In Progress
			TC23	Doctor schedules appointment	In Progress
6	Pre-Appointment Information	MED	TC24	Patient completes pre-appointment information	Not Started
7	Staff Patient Search	HIGH	TC25	Front desk searches for patient	In Progress
			TC26	Nurse searches for patient	In Progress
			TC27	Doctor searches for patient	In Progress
8	Staff Appointment Update	HIGH	TC28	Nurse updates patient appointment page	In Progress
			TC29	Doctor updates patient appointment page	In Progress
9	Adding New Patient	HIGH	TC30	Front desk adds a new patient	In Progress
			TC31	Nurse adds a new patient	In Progress
			TC32	Doctor adds a new patient	In Progress
10	Medication Refills	MED	TC33	Patient requests medication refills	Not Started
11	Medication Approvals	MED	TC34	Nurse approves medication refills	Not Started
			TC35	Nurse denies medication refills	Not Started
			TC36	Doctor approves medication refills	Not Started

			TC37	Doctor denies medication refills	Not Started
12	Prior Appointments	HIGH	TC38	Patient views prior appointments	In Progress
			TC39	Nurse views prior appointments	In Progress
			TC40	Doctor views prior appointments	In Progress
13	Staff View Patient Schedule	HIGH	TC41	Front desk views patient schedule	In Progress
			TC42	Nurse views patient schedule	In Progress
			TC43	Doctor views patient schedule	In Progress
14	Staff View Staff Schedule	LOW	TC44	Front desk view staff schedule	Not Started
			TC45	Nurse views staff schedule	Not Started
			TC46	Doctor views staff schedule	Not Started
15	View My Health Page	MED	TC47	Patient views My Health Page	Not Started
			TC48	Nurse views My Health Page	Not Started
			TC49	Doctor views My Health Page	Not Started
16	Log Out	HIGH	TC50	Click CLOSE on login menu	Passed
			TC51	Patient clicks Exit in application menu	Passed
			TC52	Patient clicks Log Out in application menu	Passed
			TC53	Front Desk clicks Exit in application menu	Passed
			TC54	Front Desk clicks Log Out in application menu	Passed
			TC55	Nurse clicks Exit in application menu	Passed
			TC56	Nurse clicks Log Out in application menu	Passed
			TC57	Doctor clicks Exit in application menu	Passed
			TC58	Doctor clicks Log Out in application menu	Passed
17	Request new password	MED	TC59	user clicks forgot password link	Not Started
18	Create new password	MED	TC60	Customer support generates temp password	Not Started
			TC61	Customer support sends email link to create new password	Not Started

Fully-Dressed Description

Req-ID 1 Login: This requirement allows the user to log into the application using a username and password. Depending on the username, the application can tell if the user is a patient, nurse, doctor, or front desk staff person. Each type of user has a different view, so logging into the system is a really important step. If the username begins with a letter, then the patient will be logged in as a patient and have the patient view. The front desk staff have more restrictions in their view compared to the doctor or nurse. For staff users, depending on the first number of their username, that will tell the application which view the user should be logged into. If the username begins with 1, the user will be logged in as a doctor; if the username begins with 2, the user will be logged in as a nurse; if the username begins with 3, the user will be logged in as a front desk staff. The login screen will alert the user if they have the correct credentials to login. It will also notify them if nothing has been entered and if the credentials are incorrect. The user has an opportunity to hit the login button, or click enter after typing their password.

Req-ID 3 Cancel Appointment: If a patient would like to cancel their appointment, they would be able to do this on the Schedule Appointment page. They can view their Next Appointments and can click Cancel/Reschedule button. This action will direct the patient to the Cancel/Reschedule Page. At the top of the page, is where the user can cancel their appointment. All the patient has to do is explain why they are cancelling their appointment and then click cancel. Once they click cancel, it will remove the appointment from their view, and add it to the prior appointment with the status of Cancelled. The patient will also receive an email that their appointment has been cancelled. This option will be available depending on the office policy. If a patient can only cancel up to 24 hours before the appointment, then the option to cancel will not be available for the patient.

If a staff member would need to cancel an appointment for a patient, they can click on the calendar view and locate the appointment. When they click view, to the right they will be able to edit the appointment and click cancel. This will remove it from their calendar view and add it to the patient's prior appointments with the status of Cancelled.

Req-ID 4: Reschedule Appointment: If a patient would like to reschedule their appointment, they would be able to do this on the Schedule Appointment page. They can view their Next Appointments and can click Cancel/Reschedule button. This will direct the patient to the Cancel/Reschedule Page. At the bottom of this page, the patient can reschedule their appointment, by choosing the provider, network, and location in the drop down menus. To the right, they can choose a new date and view all available appointments. Once they decide they can click Schedule. This will direct them to the review page for the appointment. They will have to verify that their contact information is correct, and can make updates if needed. Any updates made will update their profile page. They will also need to review the appointment details including the provider name, date and time, they type of visit, location, and then the details they provided on the previous page. Once confirmed, they can hit the CONFIRM APPOINTMENT button. Once the appointment is confirmed, the appointment will update the staff calendar and an email will be sent to the patient confirming the appointment. It will also update the Next Appointments section. This option will be available depending on the office policy. If a patient can only cancel up to 24 hours before the appointment, then the option to cancel will not be available for the patient.

If a staff member would need to reschedule an appointment for a patient, they will click on the calendar and location the patient's current appointment. From there, they can click view and it will show up to the right side of the screen. The staff member can click the edit button and choose a different date, time, and provider for the patient. Once they click save it will update the staff calendar and the patient's Next Appointments section with updated information.

Req-ID 5 Schedule Appointment: For the patient to schedule an appointment, they will need to click the New Appointment button on the Schedule Appointment page. This will direct the user to a new page. They will have to use the dropdown menu to select an available provider, another dropdown for network, and another dropdown for location. To the right will be a calendar where the user can select a date they are interested in having the appointment. When a date is clicked, all the available times for that day will populate at the bottom of the screen. Once the patient finds the appointment they are interested in, they will click schedule and it will direct them to the next set of instructions. The patient will have to choose the kind of appointment, the type of appointment, and then enter the reason for the appointment. Once they are satisfied they can click

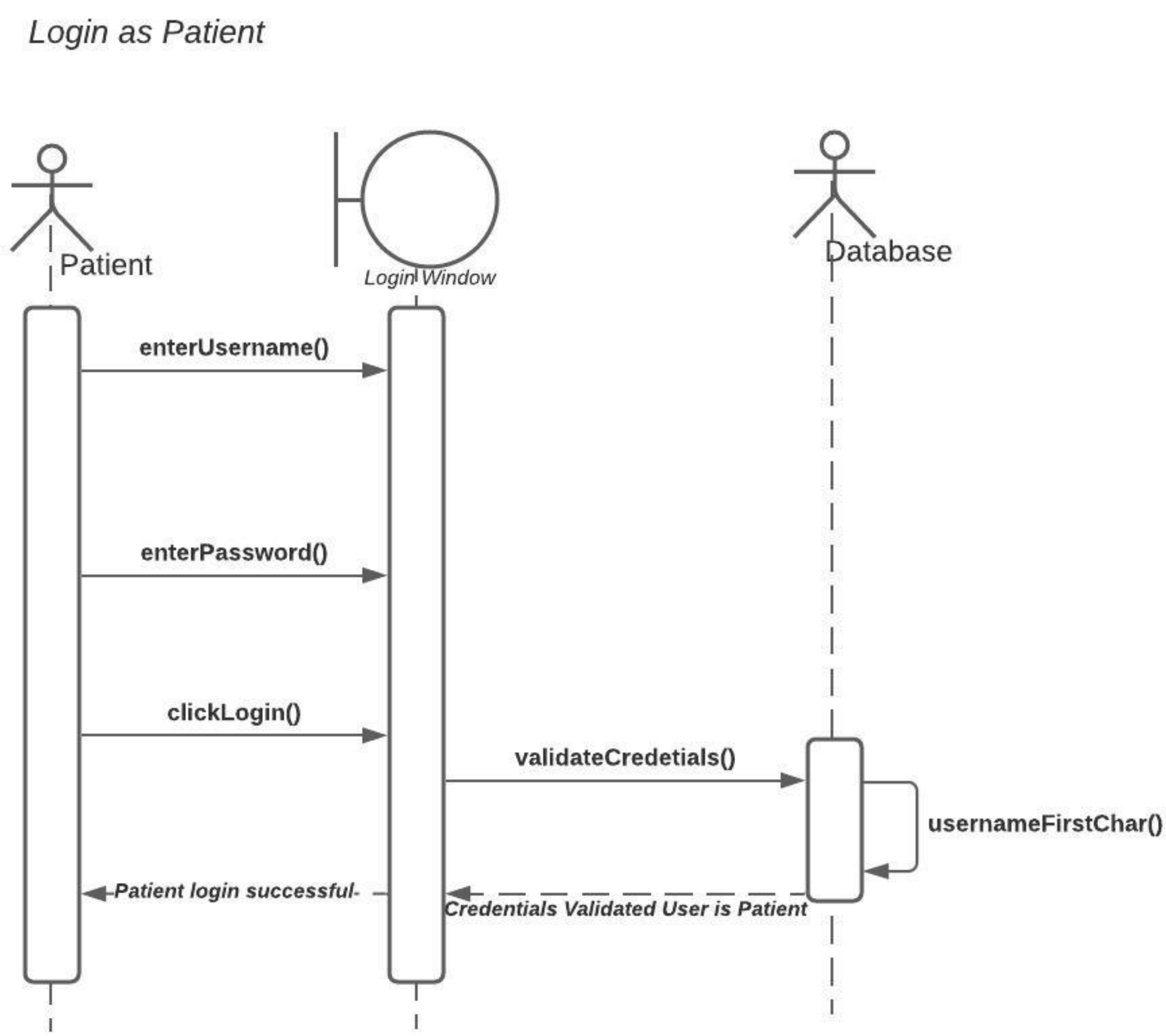
NEXT. If they decide not to proceed, they can click BACK and it will direct them back to the New Appointment page. When the patient clicks NEXT, it will direct them to the Review page. They will have to verify that their contact information is correct, and can make updates if needed. Any updates made will update their profile page. They will also need to review the appointment details including the provider name, date and time, they type of visit, location, and then the details they provided on the previous page. Once confirmed, they can hit the CONFIRM APPOINTMENT button. If they decide not to proceed, they can click the BACK button and it will redirect them back to the previous page. Once the appointment is confirmed, the appointment will be added to the staff calendar and an email will be sent to the patient confirming the appointment. It will also populate on the Next Appointments section, where the patient has access to the Pre-Appointment Information and can either cancel the appointment or reschedule it.

If the staff would like to create an appointment for a patient, they can do so by clicking on the calendar option on their menu. When the staff member is on the calendar page, they can view the calendar and add appointments for the patients by clicking ADD APPOINTMENT on the day of the week the patient would like their appointment. They will enter the patient's name, provider, type, start time, and reason for the appointment. Once it is added to the calendar, the patient will receive an email confirming the appointment. It will also populate on the Next Appointments section, where the patient has access to the Pre-Appointment Information and can either cancel the appointment or reschedule it.

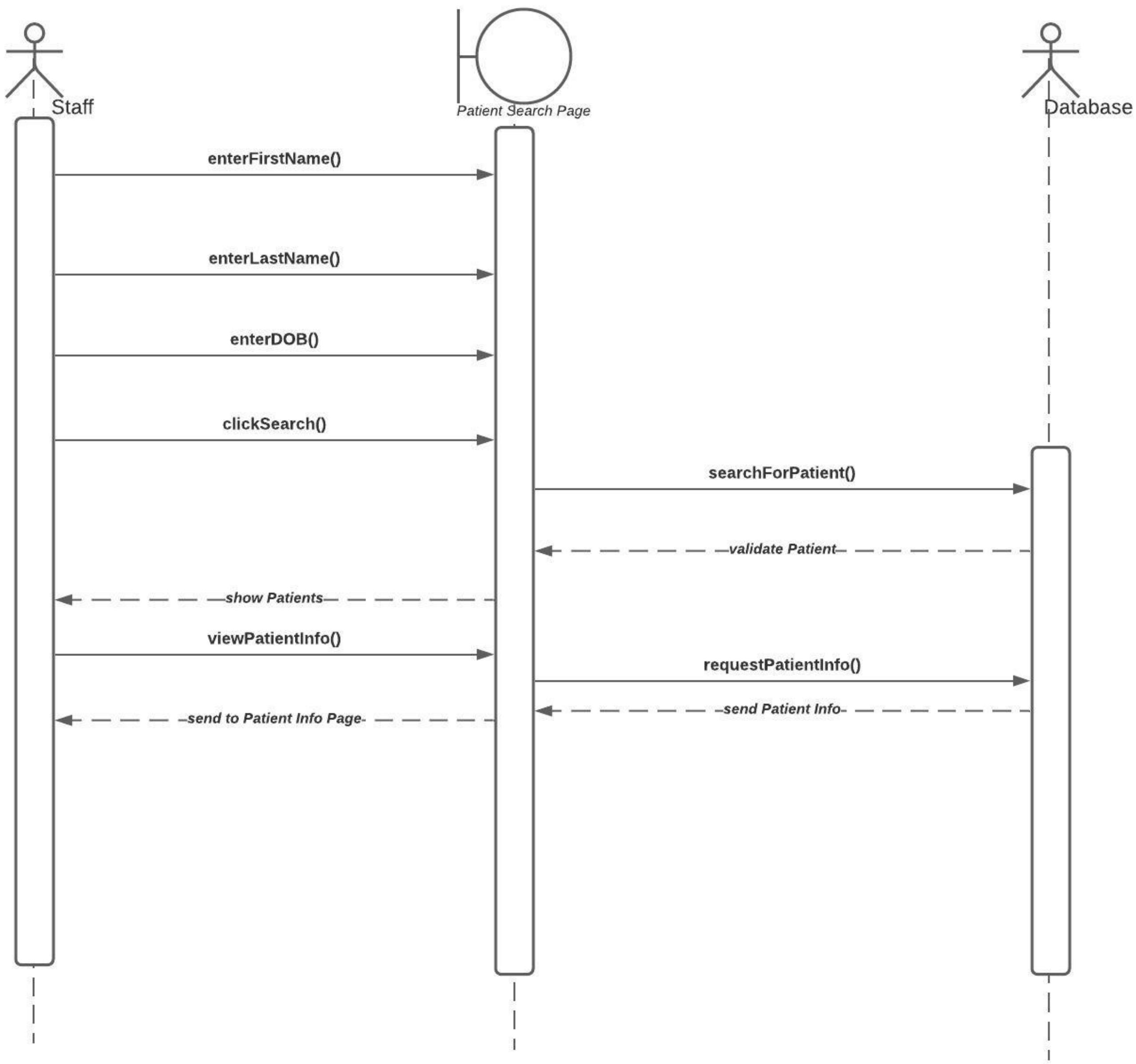
Req-ID 7 Staff Patient Search: All staff members have an opportunity to search for a patient. Each staff member can enter the first name, last name, and use the drop down menus for the date of birth of the patient and hit the search button. If any of the patients have that name and date of birth they will populate at the bottom of the screen in a table. This table will provide the patient's name, date of birth, address, phone number, and email. There will also be a button to take the staff member to the Patient Profile page where they can view their contact information. This page also has a button called Add New Patient. This button will direct the staff to a new page where they can create a new patient for the system.

Req-ID 8 Staff Appointment Update: This page is available for only nurses and doctors. For the patient's appointment, the nurse or doctor will have to click on the patient's appointment on the calendar. This will direct them to the Patient Information Page. In the next appointments section of that page, the nurse and doctor will click view. Once they land on this page, this is where the nurse will input all the information taken during the screening, before the doctor comes into the room. This includes their weight, height, BMI, Blood Pressure, etc. There will be a section that pulls from the patient where it specifies the reason for the appointment. There will be a section for nurses to take and leave any additional notes for the doctor. When the nurse gets ready to leave, they will click SAVE. This will save the information on the page for the doctor to come and edit. Once the doctor logs in, the information from the screening should already be filled out. The doctor can then add any additional notes in the doctor section. Below that will be a table where the doctor can add prescriptions. Only the doctor has the ability to add prescriptions to this page. Once the appointment has concluded, the doctor will click Update and it will save that information on the page. That will close the appointment and move it to the Prior Appointments section.

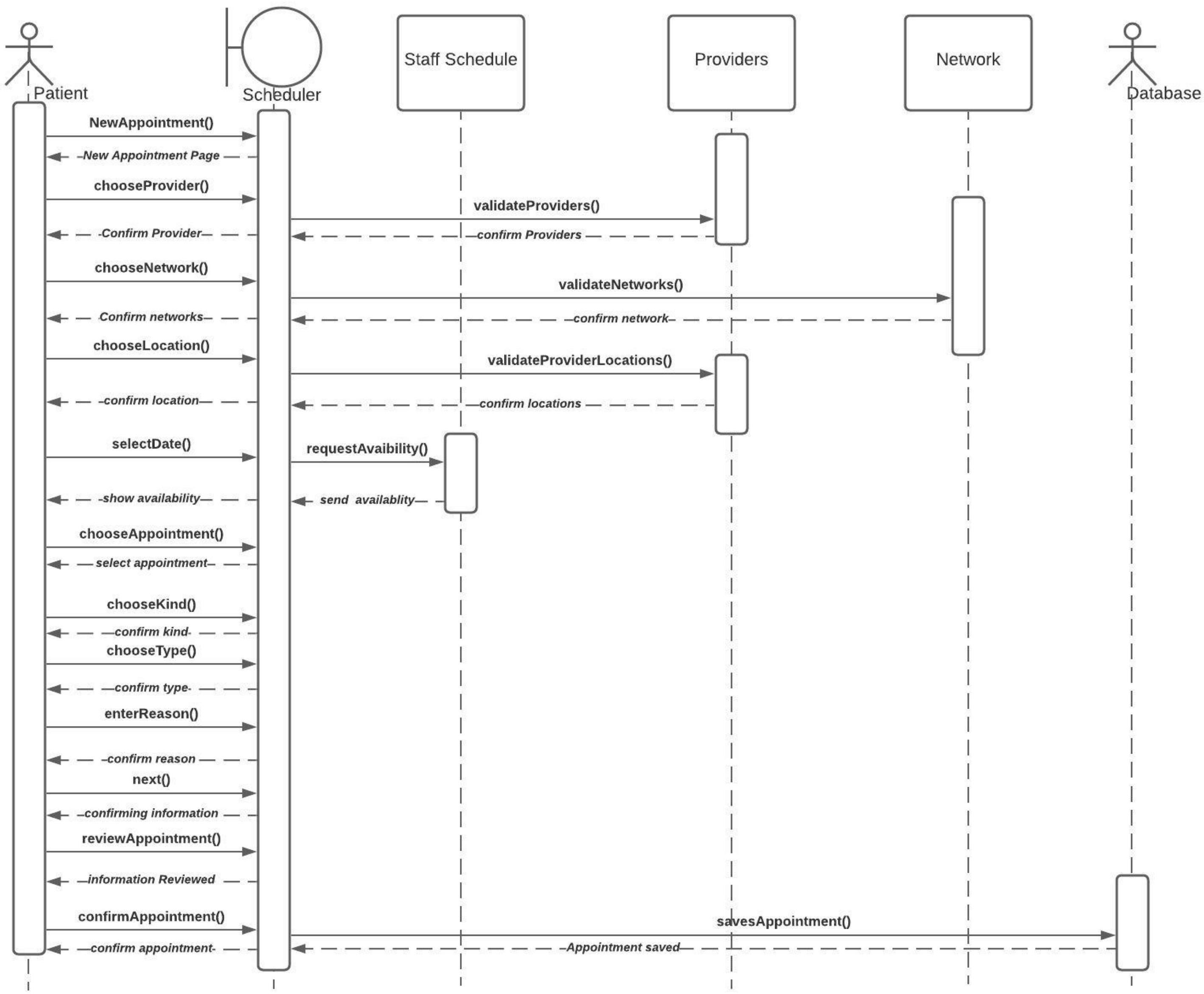
System Sequence Diagrams



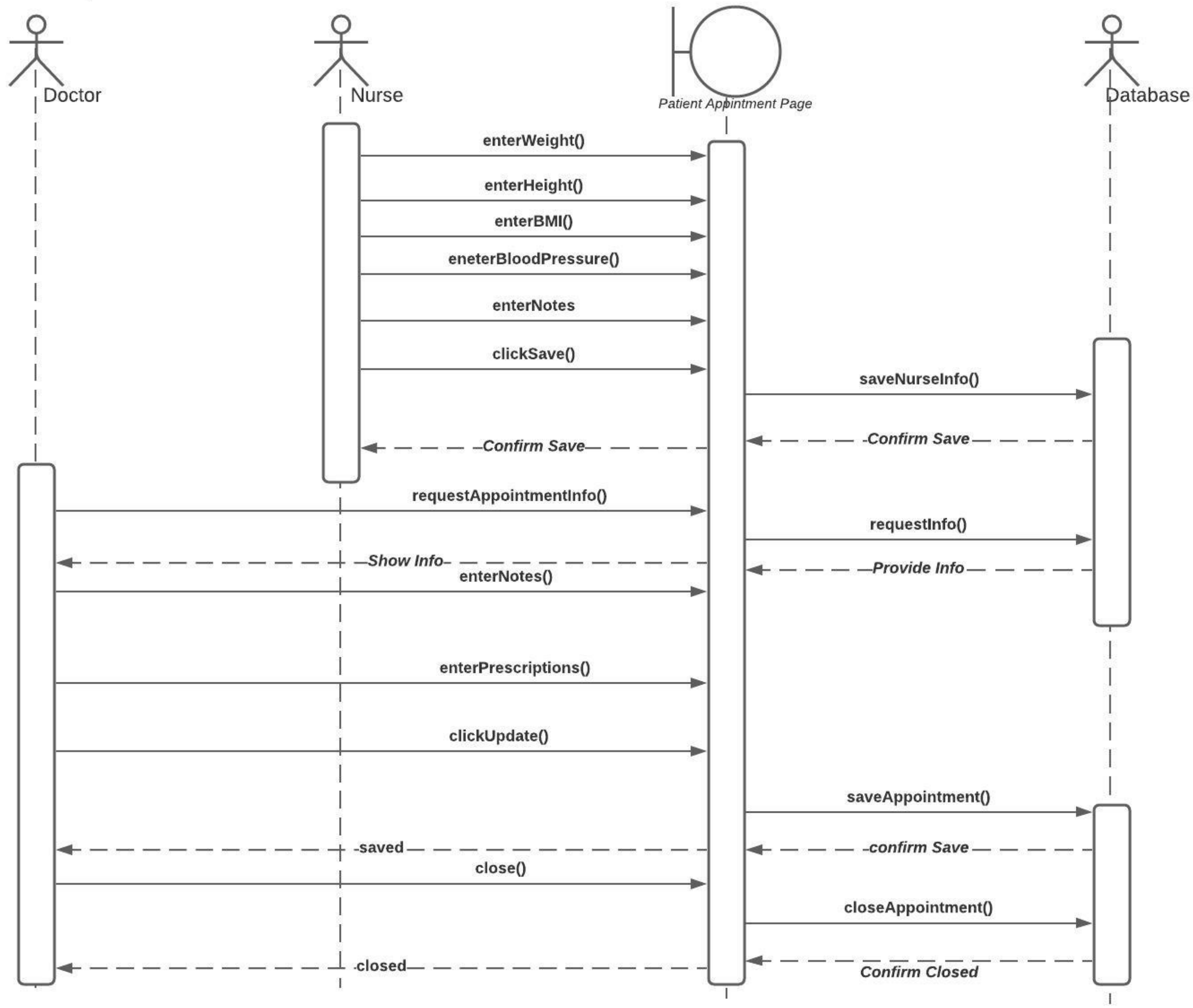
Patient Search as any Staff Member



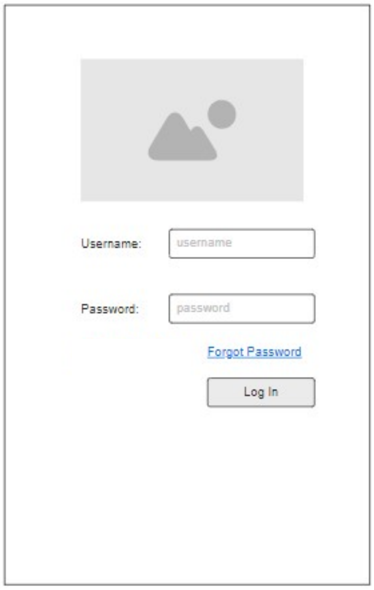
Schedule Appointment as Patient



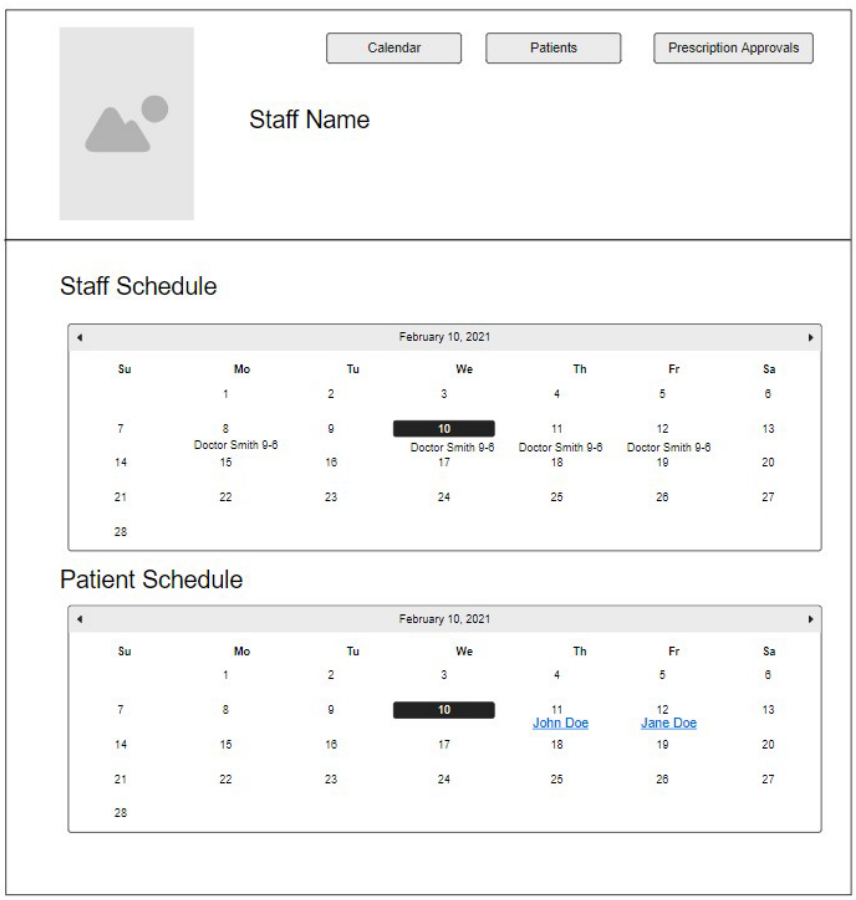
Staff Appointment Update



User Interface Specification

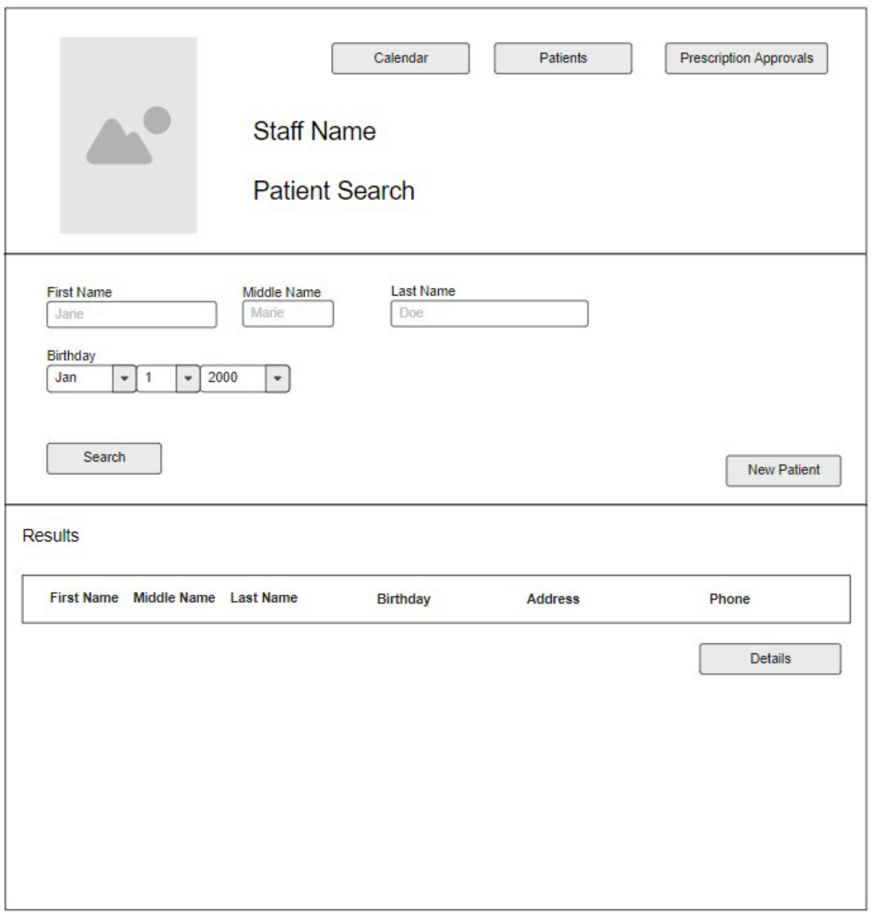


1. Login – This screen allows the user to enter their username and password. The user will have an option to click enter after typing their password or clicking the Log In button. Depending on the beginning of the username, the program will determine which view to log into. If the username starts with a letter, the patient view will open; if it starts with 1 the doctor view will open; if it starts with 2 the nurse view will open; and if it starts with 3 the front desk view will open. If the user happens to forget their password, they can click the link "Forgot Password". This will send them to a new screen to enter their username and email. Customer Support will then create a new temporary password and email a link to the user for them to log in and create a new password. Above the input screens will be the office's logo.

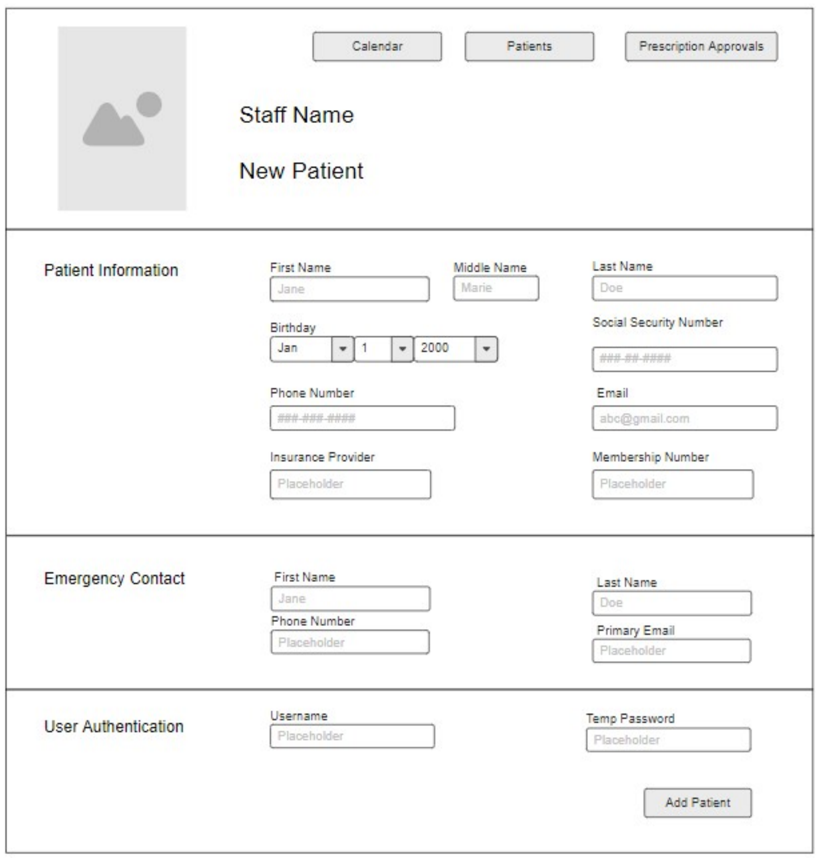


2. Staff Page – The doctor, nurse, and front desk view should all have the same home screen look and feel. There will be an image of the office's logo. Where it says "Staff Name" the user's name should populate there, indicating the user is on their page. A menu will be located at the top. Depending on the view, there will be different options. Nurses and Doctors will have *Calendar, Search Patients*, and *Prescription Approvals*. Front Desk staff will only have *Calendar* and *Search Patients*. Two calendars are on this screen. These will be weekly calendars for staff to be able to just view the week versus the monthly view. The staff can view the staff schedule to see what doctor is working when, and also have a patient view where they can see the patients coming in that week. Patient names will be a link that the staff can click. This will take them to the *Patient Information Page*.

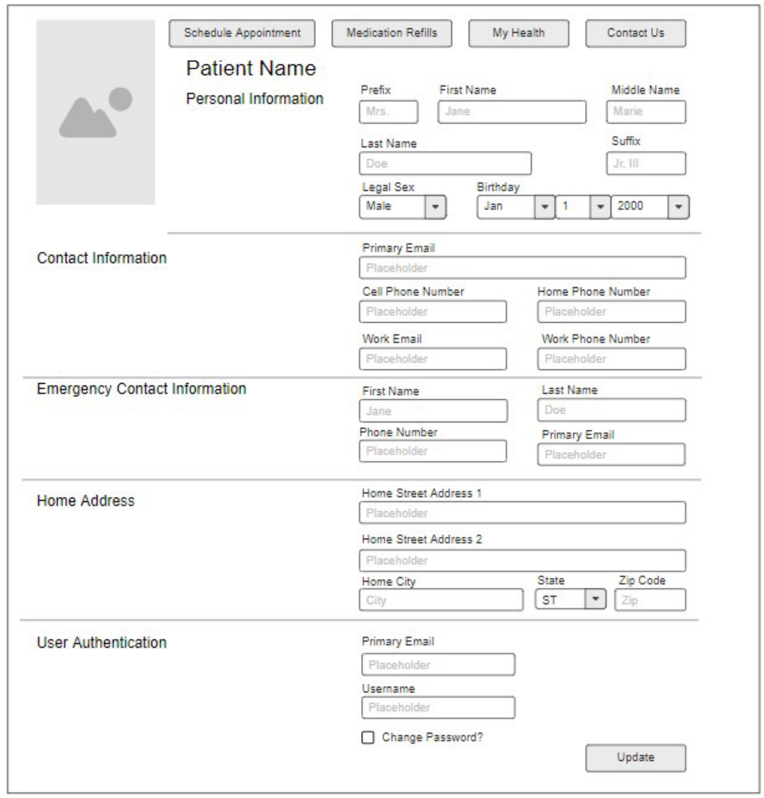
3. **Patient Search** – This page will allow all staff members to search for a patient in the system. At the top will be the menu of navigation for the staff view, a logo image, the staff member name, and below that will be the name of the page. In this case is *Patient Search*. On this page, the user can enter the patient's first name, middle name, and last name into the text fields. They do not have to include the middle name, but it will help the search results be more accurate. They will also need to enter the patient's birthday using the drop down boxes for Month, Day, and Year. Once all information is entered, the user can click Search. If any results are found a list of patients with those credentials will show up in the results section. This section will provide the patient's first name, middle name, last name, birthday, address, and phone number. If this is the patient the staff member is looking for they can click the details button and it will send the staff member to the *Patient Information Page*. If the patient was not found in the system or is a new patient, the staff member can click the New Patient button, which will send them to the *New Patient Page* to enter a new patient into the program.



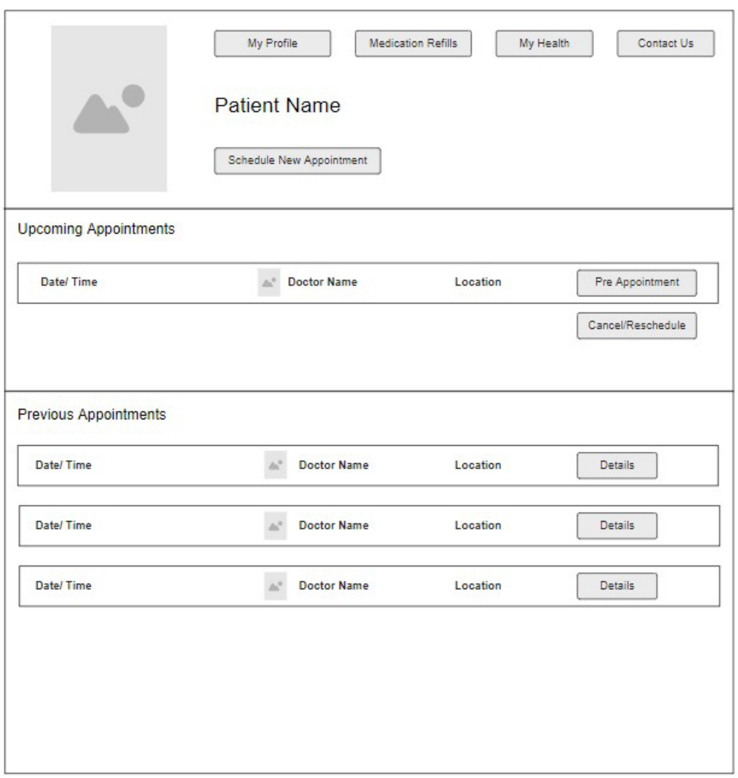
4. **New Patient** – The New Patient page allows all staff member views to create a new patient for the system. The top portion of the page is very similar to the other pages with the navigation menu, logo, staff member name, and the name of the page. The staff member will start the page by entering the first name, middle name and last name into the text fields. They will then need to complete the birthday by choose the correct month, day and year from the drop down menus. The staff member must then enter the patient's social security number, phone number, email, and insurance provider, and membership number, emergency contact person including their first name, last name, phone, and email. From there the system will auto populate the patient's username by taking the first digit of their first name, combined with their last name, and their birthday. The system will also auto populate a temporary password for the user to be able to log in. When all the information has been entered, the staff member just clicks Add Patient. This will add the patient into the system and send them an email with a link to download the application, their username, and temporary password. The first time the user logs in with the temporary password, they will be allowed to create their own password.



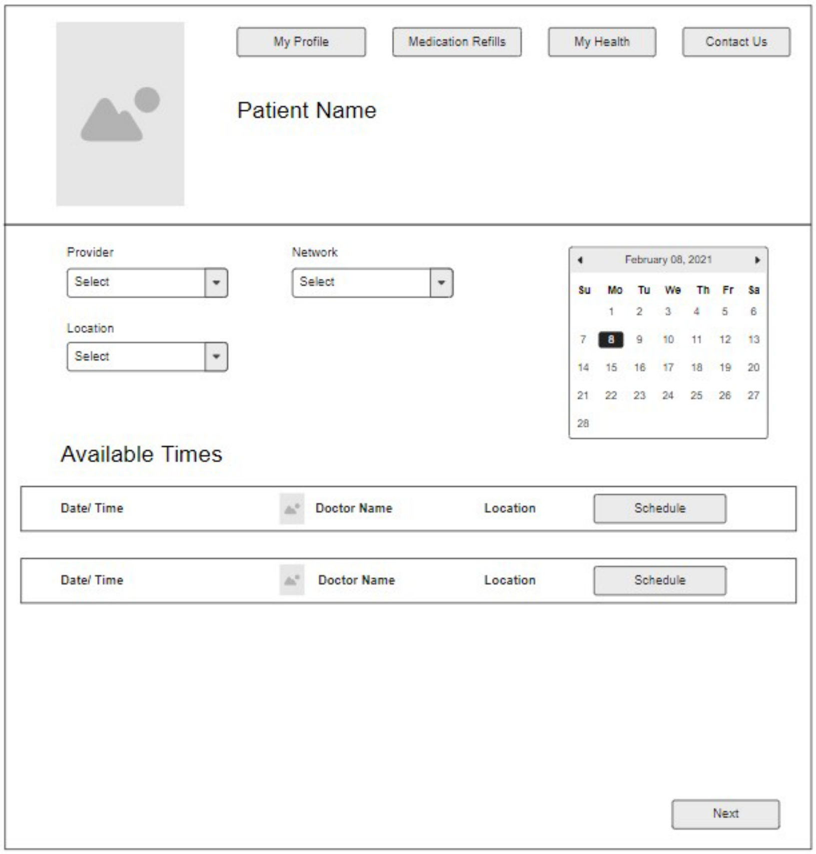
5. **Patient Home Page** – The *Patient Home Page* is the home screen for the patients view. The top of this page has the navigation menu and then to the left is a logo and then the patient's name will be auto populated. Below the header is where the Patient can update and view their personal information. If the patient has already been in the in the program, this information should already be filled out. If this is the first time the patient has been in the program, they will need to update some of their information like legal sex, and home address. If the patient would like to update any of the text fields, they would just need to click inside the box and update it. The changes made to this page will not save unless the patient hits the update button at the bottom of the page. The User Authentication section is where the user can view their email and their username. They will not be able to update their username, but if the patient would like to change their password, they can check the Change Password? Checkbox and click update. This will send them an email with a link to update their password.



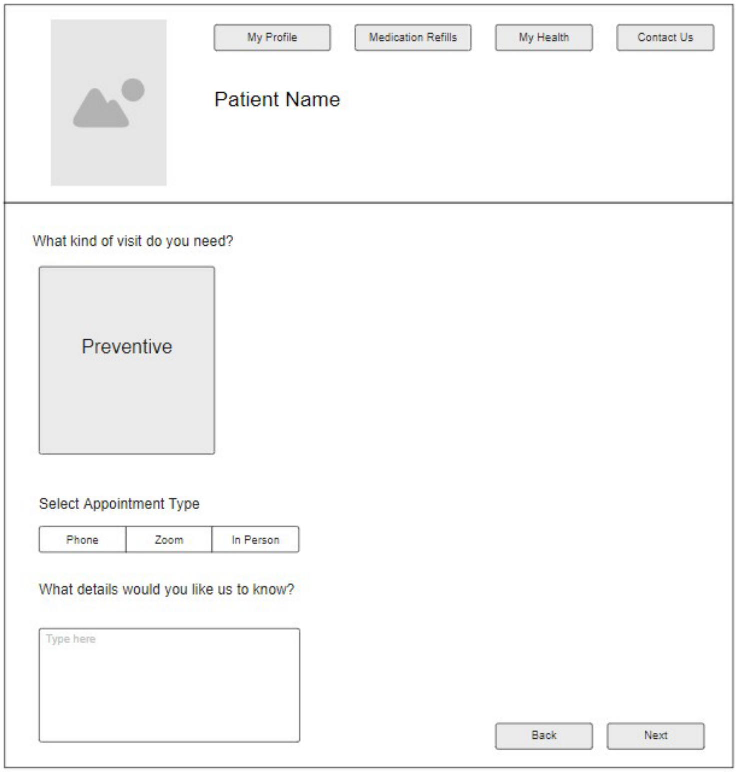
6. **Appointment Page** – The *Appointment Page* can be found by clicking Schedule Appointment in the menu in the patient view. This will have a similar header with a menu at the top, a logo image to the left, and the patient's name. This page has three options on what to do next. If the patient would like to schedule a new appointment, they would click the Schedule New Appointment button. This will direct them to the *Schedule Appointment Page 1* screen. Below that button is a section for upcoming appointments. This is where the patient can see all their future appointments. The future appointments will show the data and time of the appointment, the doctor's name, location, and then an option to complete the Pre



Appointment information. If the patient would like to complete the Pre Appointment informtaion, they would click that button and they would be directed to the *Pre Appointment Information* page. The patient's will also have an option to cancel or reschedule an appointment. If they wish to do that, they will just need to click the Cancel/Reschedule button and that will direct them to the *Cancel/Reschedule* Page. Below the upcoming appointments section is the Previous Appointments section. This section will show all the appointments the patient had with the provider. It will show the date and time the appointment occurred, the doctor's name, location, and then a Details button. The Details button will direct the patient to the *Appointment Details* page where they can view all their test results, reason for appointment, and any notes left from the doctor that occurred from the appointment.

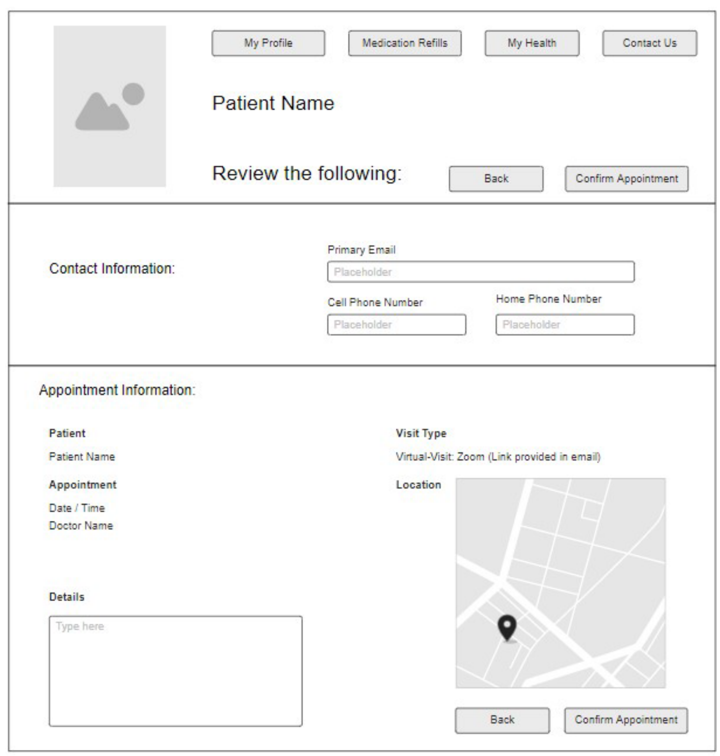


7. Schedule New Appointment Page 1– When the patient clicks Schedule New Appointment from the *Schedule Appointment* page, they will be directed to this page. This is the first step in creating an appointment. The patient will choose a provider, network, and location in the drop down menu options. From there they can choose a date on the calendar to the right. When they click on a day, any available appointments will show up in the Available Times section below. The Available Times section will show the date and time of the appointment, the doctor's name, location and an option to lock in the appointment with the schedule button. When the patient finds a day and available time that suits their needs, they can click Schedule to lock in the appointment, then they can click Next to take them to the next section.

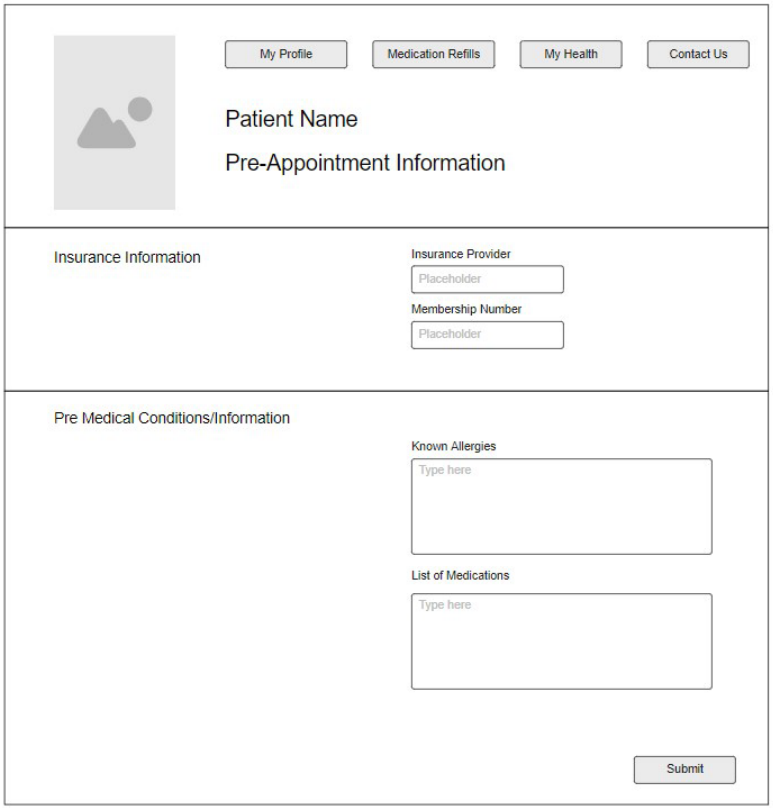


8. **Schedule New Appointment Page 2 -** After the patient finds a time that works for their appointment that would bring them to this screen. The patient will have to choose what kind of appointment this is. The kind of appointment determines the end time of the appointment. Labs would only take about 15 minutes and Preventive appointments would take about 45 minutes. Depending on what is offered at that specific location and time they will show as options under the kind of visit. After the patient chooses what kind of appointment they are looking for, they will also select the type appointment. Depending on the location, they could provide phone appointments, video call appointments, or in person appointments. Once the patient chooses what option works best for them, they will enter the reason they want the appointment below in the text area. From here the user can click Next to move forward with scheduling the appointment, or they can click Back. Clicking Back will send them to the *Schedule New Appointment Page 1* where they can change the date, time, provider, and location.

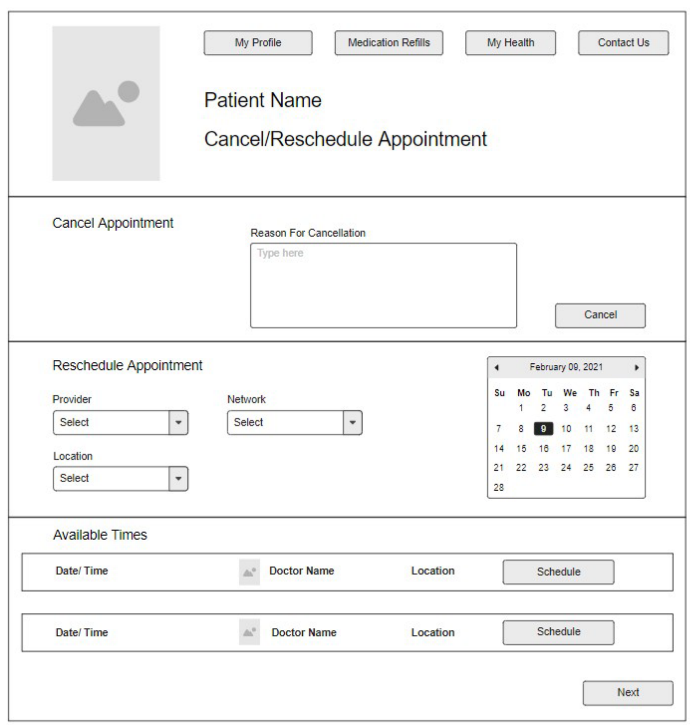
9. **Schedule New Appointment Page 3 –** This is the final page for the patient to schedule their appointment. This is mainly the review page, so the patient can review their contact information in the top section. Any updates that the patient makes on this page will also update their information on their home page as well. Below the contact information is the information about their visit including: the patient name, visit type, date and time, doctor, location with a map, and the reason they provided for creating the appointment. If the patient is ready to confirm the appointment they can click Confirm Appointment either at the top of



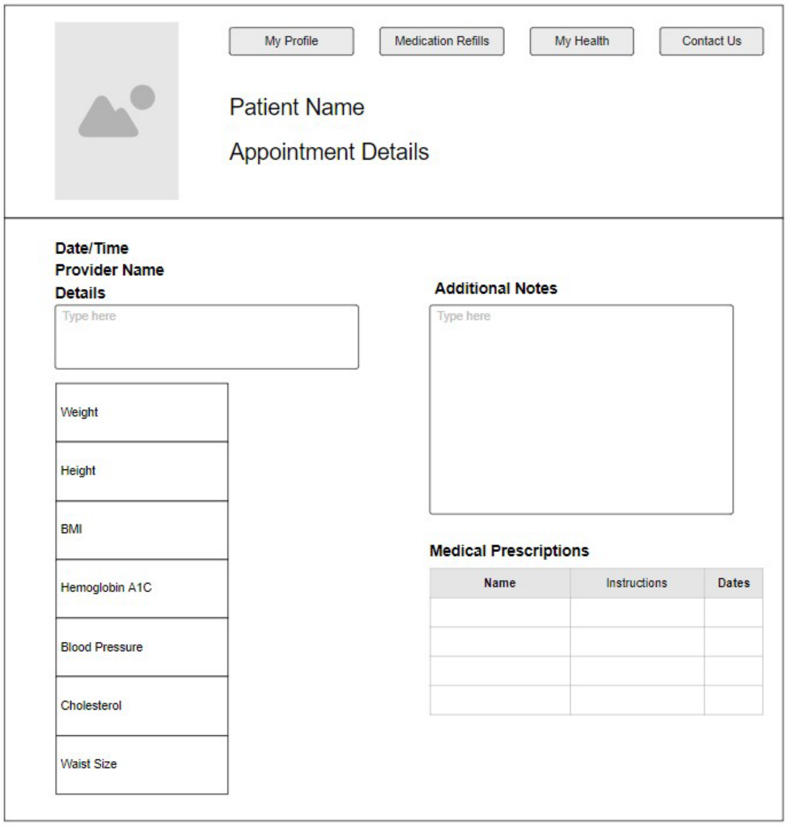
the page or the bottom of the page. Once they hit confirm, this will add the appointment to their Upcoming Appointments section on the *Appointment Page* and also add it to the *Staff Calendar*. There is also a Back button, in case the patient would like to make any changes, this button will allow the patient to go back to the *Schedule New Appointment Page 2*.



10. Pre Appointment Page – On the *Appointment Page* the patient can see their Upcoming Appointments and click the Pre Appointment button next to their upcoming appointment. This will direct them to this page, where the patient can fill this information out before the appointment. This will help eliminate wait time in the waiting rooms before the appointment. On this page, the patient can view and update their insurance information. If this is their first appointment the patient may have to enter their insurance information if the staff did not enter it when creating their profile. Below the insurance information is where the patient can enter any pre-medical conditions, any known allergies, and a list of medications they are taking. If a patient has already scheduled an appointment before, this should auto populate where the patient can just review and make updates if needed. Once all the areas are filled out and completed, the patient can submit the pre appointment information.

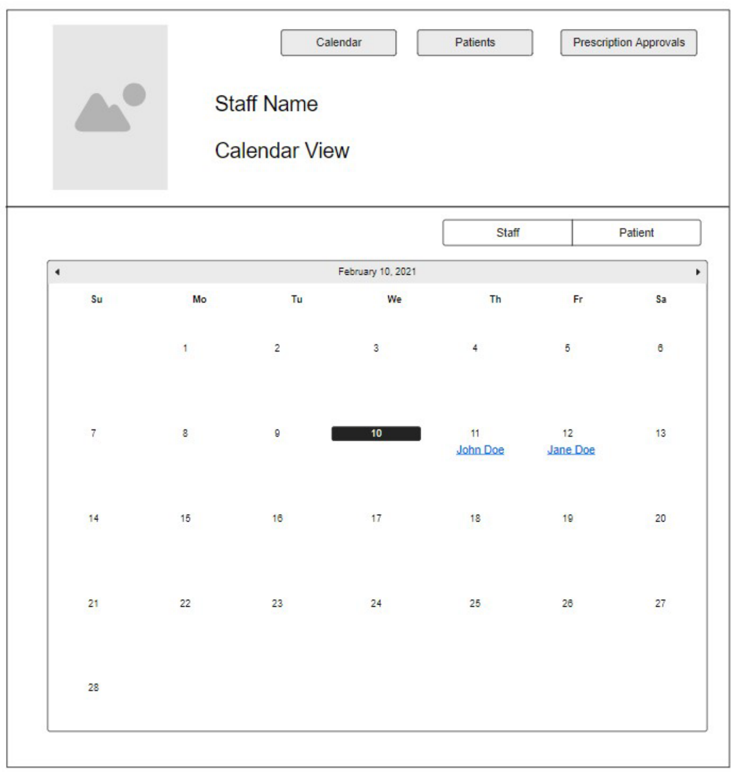


11. Cancel/Reschedule Page – On the *Appointment Page* the patient can view their Upcoming Appointments. If they wish to cancel or reschedule an appointment, they can click the button to do so next to their appointment. On this page the top portion is where the patient can cancel the appointment. To cancel, the patient will enter the reasoning behind cancelling the appointment, then click cancel. This will send a notification to the staff that the appointment has been cancelled, and will remove it from their calendar. This will also move this appointment to the Previous Appointment section with a status of



cancelled. To reschedule an appointment, the patient can view the second portion of the screen, where they can choose a provider, network, and location from the drop down menu options. To the right is a calendar, where they can pick a date to see any available times appointments are available. Once they decide on a new date and time, they can click Schedule and that will take them to the *Schedule Appointment Page 3* where they can review their information and reasoning behind the appointment. Please note that this page may not be available due to the provider's policies. Some provider's do not allow cancellations or reschedules up to 24 hours before the appointment. This page can be adjusted depending on the provider's restrictions.

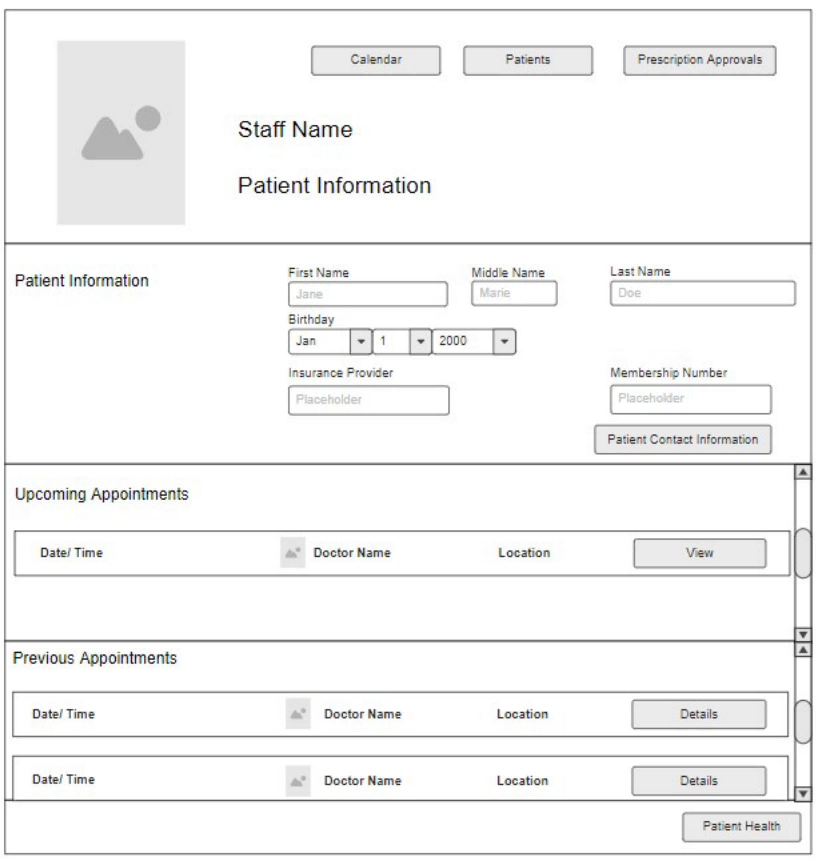
12. **Prior Appointment Details –** On the *Appointment Page* under the Previous Appointments section, there is a details button. If the patient wishes to view any notes on their previous appointments, they can click the Details button and it will direct them to this page. This page will show the patient the date and time of the appointment, the doctor's name, and all the health information that was collected during the appointment. This page does not allow any editing, but the patient can view any notes, the reasoning behind the appointment, any medications they were prescribed, and their test results.



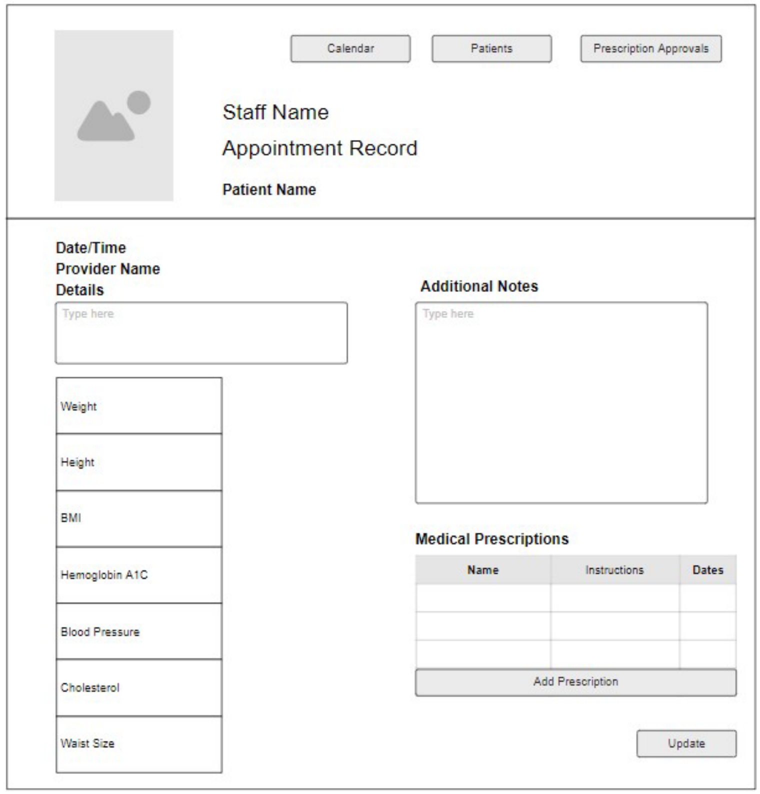
13. **Staff Calendar –** All the staff views have an option in the menu to view the calendar. This calendar will show the staff schedule for the month and the patient schedule for the month. There will be a toggle menu to change the view from staff to patient views. All the patient appointments will have two links. The first link will be their name. This will direct the staff to the *Patient Information Page*. The second link will only be available to the nurse and

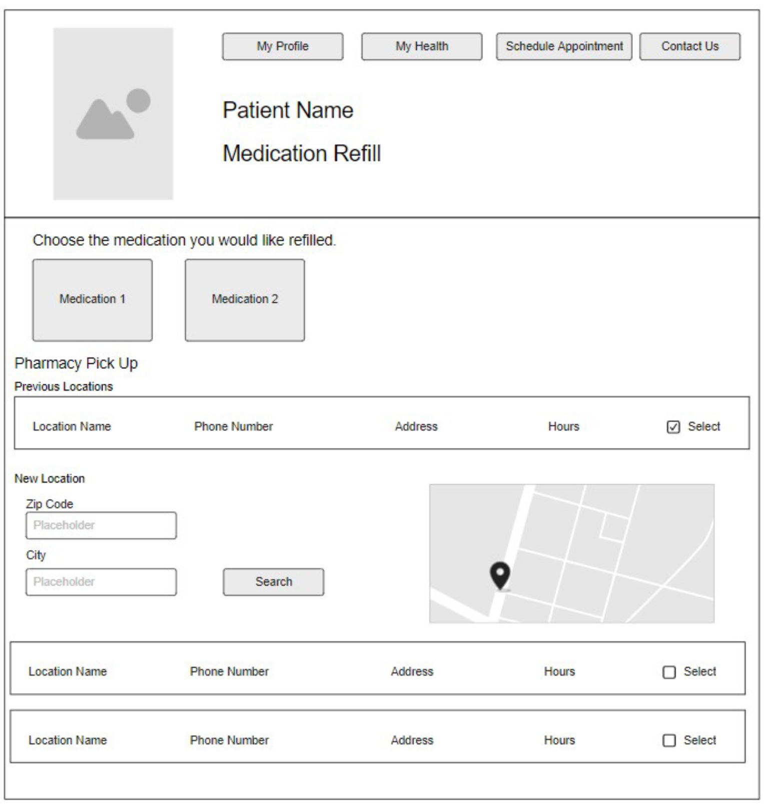
doctor views, but there will be a link to the *Appointment Update Page*. That will be the page for the appointment for the nurse and doctor to input data from the appointment. Staff can also create appointments, reschedule appointments, and cancel appointments for patients by clicking the add button on the day to add an appointment or clicking the edit feature on the already created appointment to cancel or reschedule.

14. **Patient Information Page –** This page can be found by all staff members by clicking the name of the patient on the calendar. This could be on the actual calendar page, or the staff home page. This page will show the patient's information like first name, middle name, last name, date of birth, and insurance information. If the staff needed more information like a home address or emergency contact information, they can click on Patient Info button, which will direct them to the *Patient Home Page* which will allow them to update and view that patient's information for them. Below that section would be the Upcoming Appointments and Previous Appointments Sections. These sections look very similar to the patient view on the *Appointment Page* however, the front desk staff will not have a Details button for the previous appointments or a view button for upcoming appointments section. The nurse and doctor view will have those options. The View button for upcoming appointments will direct the nurse and doctor to the *Appointment Update Page*. The Details button will direct the nurse and doctor to the *Previous Appointment Page.* At the bottom of this page nurses and doctors will have a button to view Patient Health. This will direct them to the *My Health Staff View* page for the patient to view their health progress.



15. **Staff Appointment Update –** This is only available for the nurse and doctor view. During appointments, the nurse and doctors can view this page and input all the data they gathered from the appointment, including the test results, weight, height, BMI, blood pressure, etc. Below the test results is a reasoning behind the appointment, specified by the patient. To the right will be a text area box for doctors and nurses to write down information from the appointment. Nurses will be able to view the medications table, but only the doctor view will be able to add medications that need to be prescribed to the patient. Once the nurse has entered the information and ready for the doctor to come in and do their checkup, they will click Save/Update. Then the doctor will be able to go in and see the updated version from the nurse. The doctor will be able to add notes and add prescriptions, then once the appointment has concluded, they can click Update and it will close the appointment. This will move the appointment to Previous Appointments section and the Details button will be available for the nurses, doctors, and patients to access.

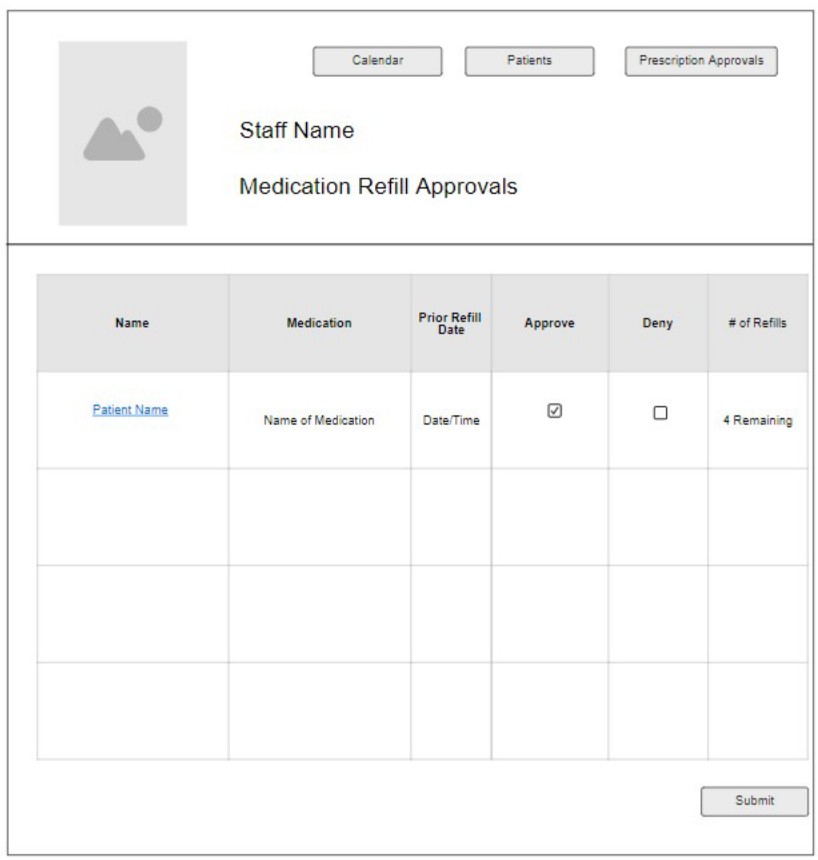




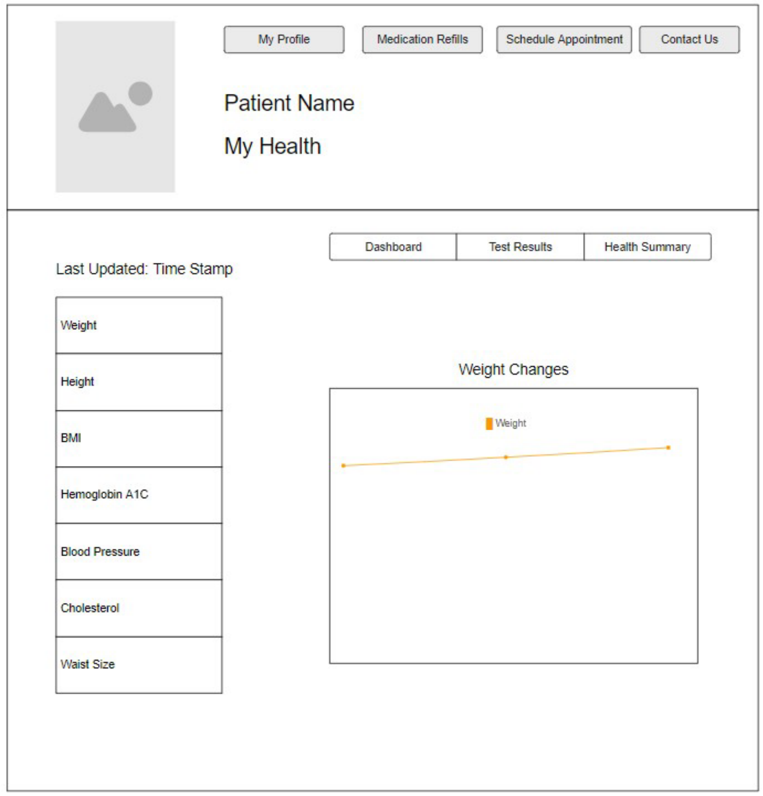
16. **Medication Refill –** This page can be found in the patient view on the menu. This is where the patient can refill their prescriptions without having to call the doctor's office. The first section will be all the medications available to be refilled. If they are grayed out, they are not eligible to be refilled yet. Some prescriptions can only be refilled once a month, so depending on the requirements some prescriptions may not be available yet. Underneath all the medications

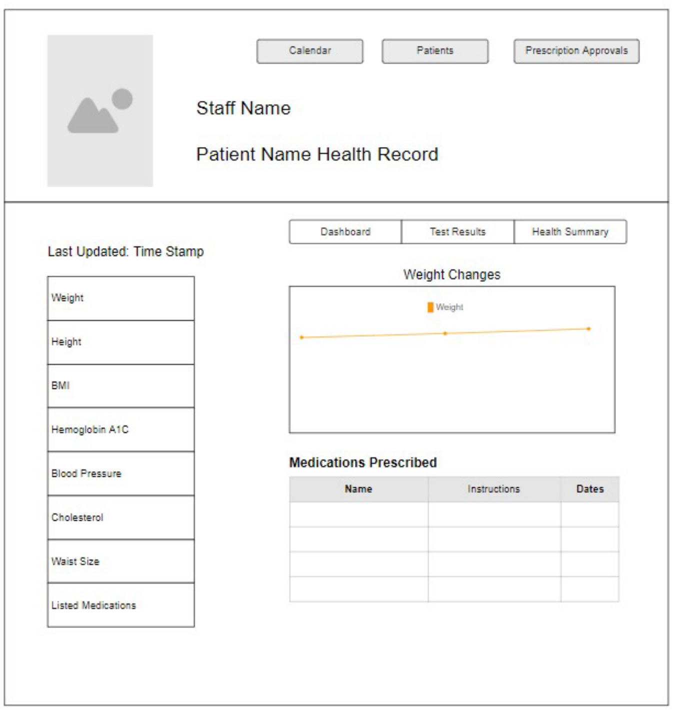
will be how many refills are left before an appointment is required, or refills are ended. There will also be a section on when the previous refill was created. Once the patient chooses the medication they would like refilled, they will be able to choose a pharmacy. If the patient has used a pharmacy before, this will be available to the patient to click the check box to choose that pharmacy. If they would like to choose a different pharmacy, they can enter a zip code and city, then click search. To the right will be a map showing all the available pharmacies and locations available in that area they requested. The patient can choose one by clicking the check box. Once the form has been completed, the patient can click Submit Request. This will email a confirmation email to the patient that their request has been submitted and that they will receive approvals within 24 hours. This will also put the request in the *Prescription Approvals* page for the nurses and doctors to review and either approve or deny. If the patient would like to request more than one prescription, they will need a request for each one.

17. **Prescription Approvals –** When a patient submits a request for a prescription refill, this will send a request to the nurses and doctors queue. This page can be found on the menu on the nurse and doctor view under Prescription Approvals. On this page is a queue where all the requests for prescription approvals will come in. There will be a table with the patient's name, the prescription name, and the previous refill, number of refills left, and approved or denied check boxes. If the nurse or doctor would like more information of the medication, they can click on the link for the patient's name. This will take them to the *Patient Information Page* where they can then go to *My Health Staff View* page to view all the medications and reasons behind the medication. If the prescription is approved for a refill, the nurse or doctor can click the approved check box and then click Submit at the bottom of the page. This will send an email confirmation of the approval to the patient and then send the prescription to the pharmacy to prepare the medication. This will also update the previous prescription refill date and number of refills left. If the nurse or doctor denies the prescription refill, the patient will receive an email to call and talk to the nurse or doctor about the reasoning behind it.



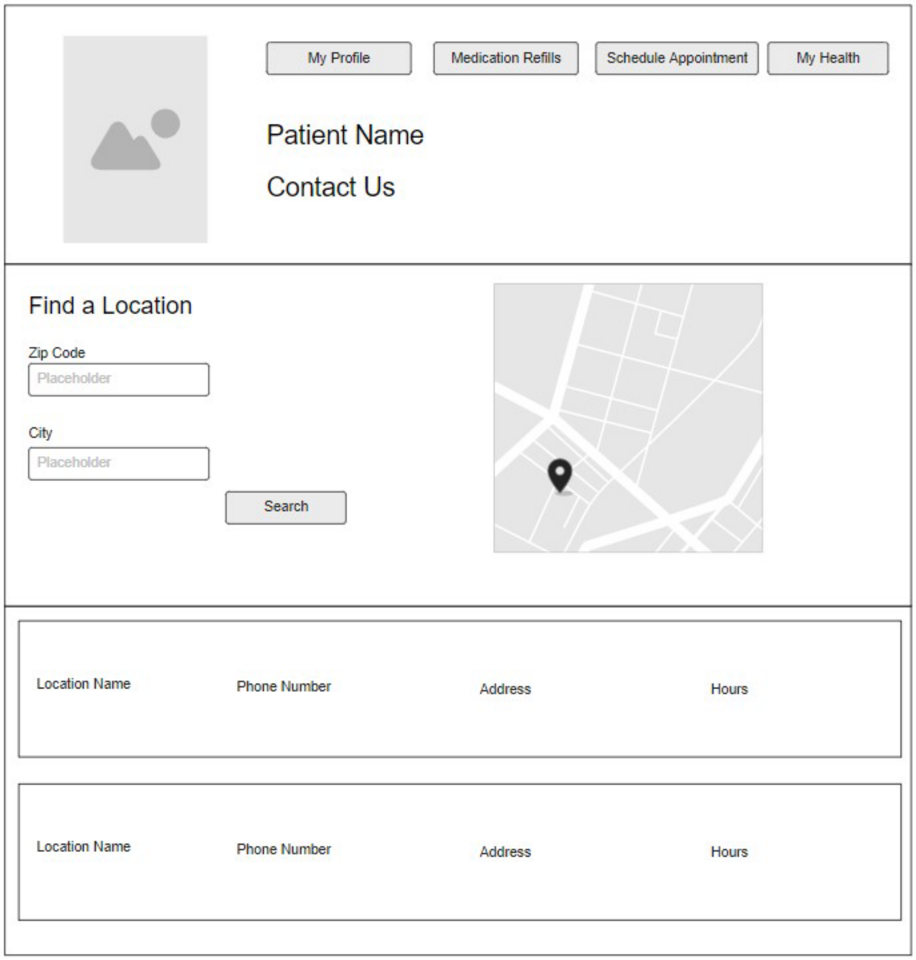
18. My Health – This page is available to the patients by clicking on My Health in the menu options at the top of the screen. The My Health page will allow the patient to view their health records over time. It will show their height, weight, blood pressure, cholesterol, etc in a chart to the right. The left side column will be a toggle menu so the patient can switch options and the chart on the right will update to that appropriate title. This will allow the patient to view their progress over time. A time stamp of when the page was most recently updated will show near the top, so the patient can see how accurate the charts are.





19. My Health Staff View – This page can be located by going to the *Patient Information* page and clicking *My Health* at the bottom of the screen. This will only be available for nurse and doctor views. This page will be very similar to the patient view in regards to the charts of progress and the left side toggle menu. However, the staff view will allow the staff to view all the medications that were prescribed to the patient and how many refills are left and the reasoning behind the medications. This will help the staff be able to research more on the prescriptions and whether they can approve or deny the refill requests. There will also be a link to the appointment page when the medication was prescribed.

20. **Contact Page –** This page is an option in the Patient View menu. This will allow the patient to enter a zip code and city to locate any offices in the area. Once the patient enters the city and zip code, they can click search and the map to the right will populate with nearby locations. Below will be the name of the location, phone number, address, and the hours of the particular office.

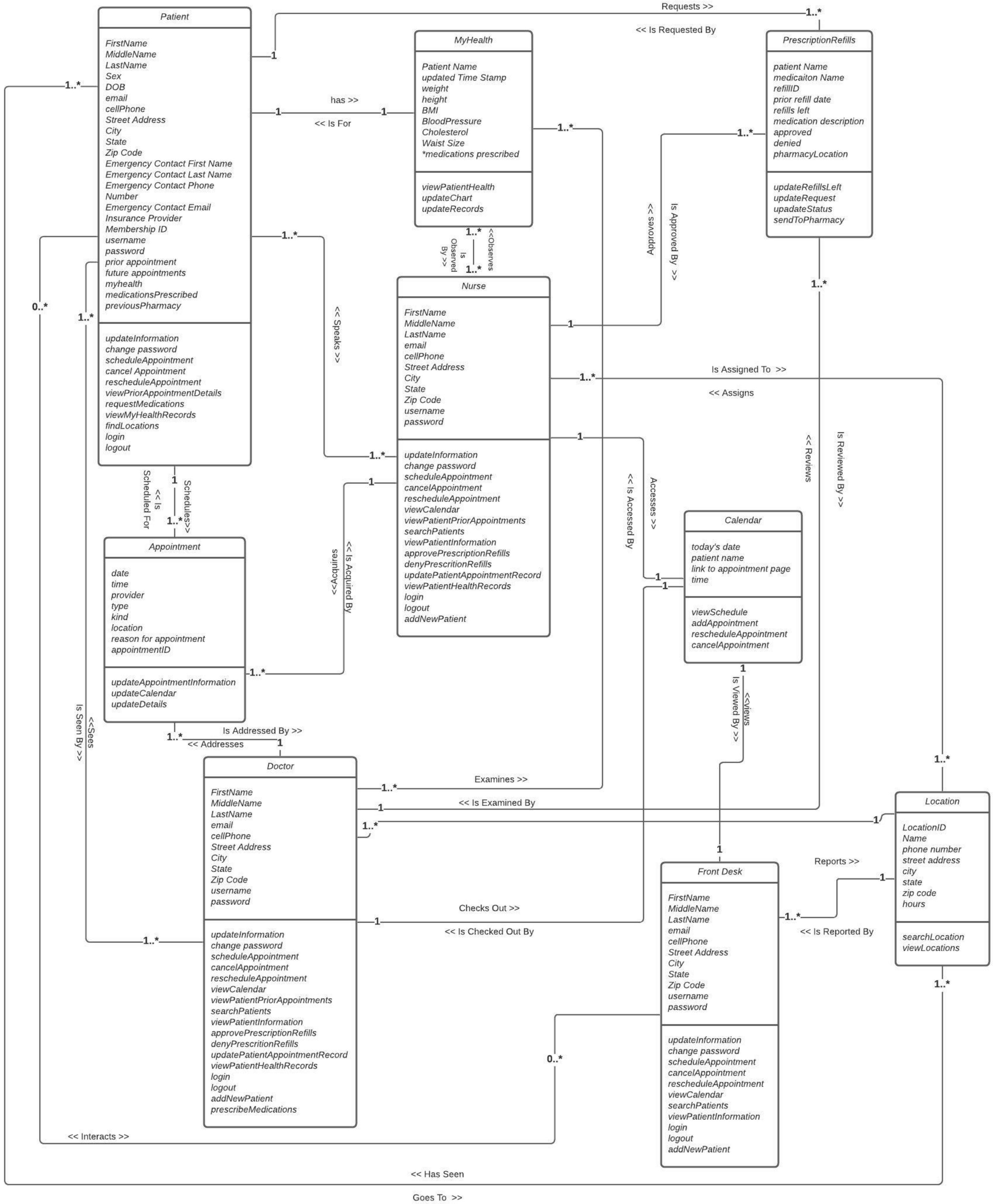


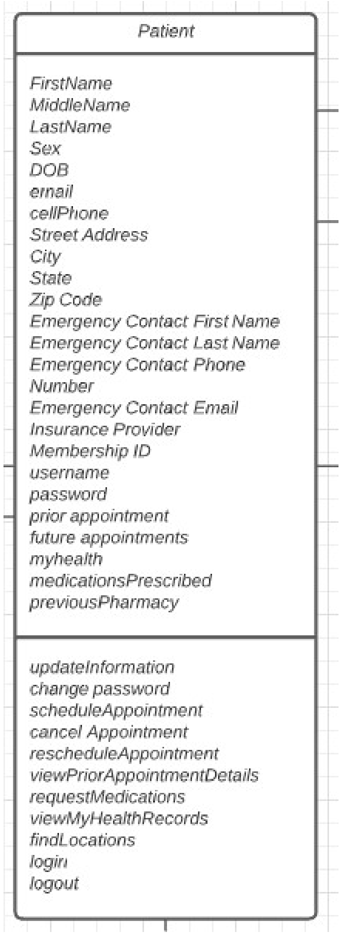
User Effort Estimation

Below is a chart that will select some of the major use cases and the number of clicks needed to complete those scenarios.

Use Case	**Least Amount of Clicks**
Log In Screen	3
Search for Patient	4/5
Add a New Patient	16
Schedule New Appointment (Patient)	11
Schedule New Appointment (Staff)	7
Cancel an Appointment (Patient)	2
Reschedule and Appointment (Patient)	6
Cancel an Appointment (Staff)	3
Reschedule an Appointment (Staff)	5
Staff Appointment Update (Nurses)	8
Staff Appointment Update (Doctors)	6
Medication Refills – pharmacy was previously used	3
Medication Refills – new pharmacy	6
Prescription Approvals	3
Find a Location	3

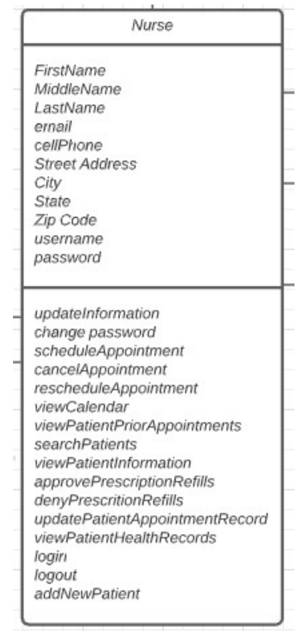
Domain Analysis



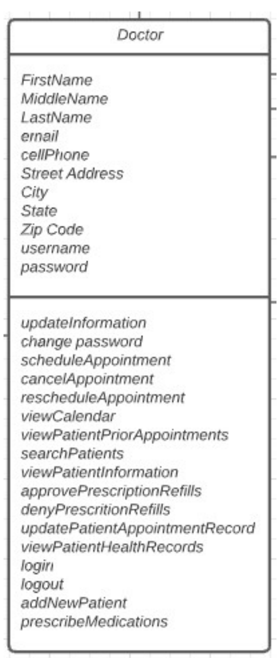


Domain Model (Details)

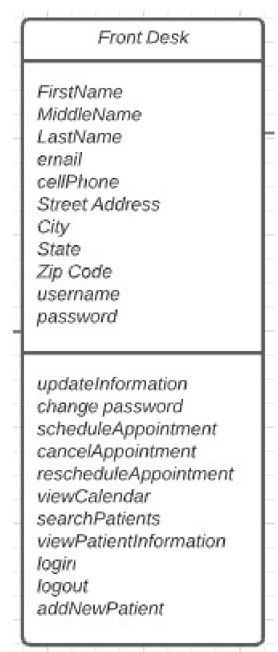
1. **Patient** – The attributes listed on the top are all of the items that the application will store in the database. Below are the methods that will need to be executed in order to do specific tasks like updating information, changing the password, scheduling appointments, canceling appointments, and rescheduling appointments.



2. **Nurse** - The attributes listed on the top are all of the items that the application will store in the database. Below are the methods that will need to be executed in order to do specific tasks like viewing the calendar, adding new patients, approving prescription refills, and updating appointment information for the patient.

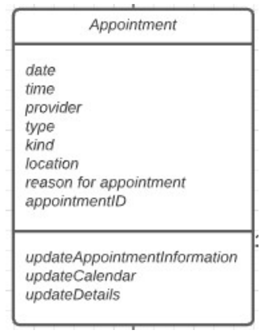


3. **Doctor** - The attributes listed on the top are all of the items that the application will store in the database. Below are the methods that will need to be executed in order to do specific tasks like viewing the calendar, adding new patients, approving prescription refills, prescribing medications and updating appointment information for the patient.

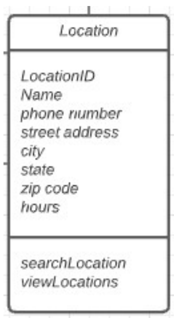


4. Front Desk - The attributes listed on the top are all of the items that the application will store in the database. Below are the methods that will need to be executed in order to do specific tasks like viewing the calendar, adding new patients, and searching for patient's information.

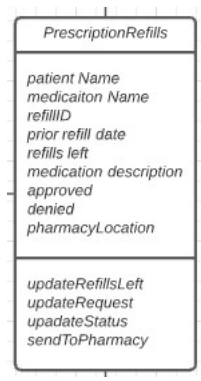
5. **Calendar** – This will hold all the information on the patient's appointment by date. It will also contain a link to the patient's information page. The methods will allow the staff members to add appointments, cancel appointments, and update appointments.



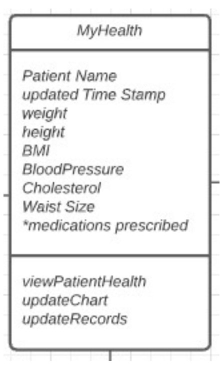
6. **Appointment** – The attributes associated to the appointment will include the date and time, the provider, location, kind of visit, type of visit, and any details left by the patient. The methods will include updating the information and calendar.



7. **Location** – The attributes associated with the location will be the address, phone number, hours, and the name of the location. The methods associated with this class would include, searching for a particular location and viewing the information from the location.



8. **Prescription Refills** – The attributes for this class will include the patient's name, number of refills left, prior refill date, the name of prescription, and if it is approved or denied. The methods involved in this class will include updating the refills left count for when the prescription is approved, updating the request with either approval or denied factors, and sending the prescription to the pharmacy.



9. **MyHealth** – The attributes for this class will include the patient's information. For the staff view the nurses and doctors will also be able to view the prescriptions that were prescribed to the patient and when. The methods involved in this case will be updating the charts to view the patient's progress, updating the records, and viewing the patient's records.

Due to visibility of the domain model, a detailed chart of relationships and associations are listed in the chart below.

Class	Association	Relationship	Class
Patient	Is seen by	One-to-many	Doctor
Doctor	Sees	One-to-many	Patient
Patient	Speaks	One-to-many	Nurse
Nurse	Speaks	One-to-many	Patient
Patient	Schedules	One-to-many	Appointment
Appointment	Is scheduled for	One-to-one	Patient
Patient	Interacts	Zero-to-many	Front Desk
Front Desk	Interacts	Zero-to-many	Patient
Patient	Goes to	One-to-many	Location
Location	Has seen	One-to-many	Patient
Patient	has	One-to-one	My Health
My Health	Is for	One-to-one	Patient
Patient	Requests	One-to-many	Prescription Refills
Prescription Refills	Is Requested By	One-to-one	Patient
Front Desk	Views	One-to-one	Calendar
Calendar	Is Viewed By	One-to-one	Front Desk
Front Desk	Reports	One-to-one	Location
Location	Is Reported By	One-to-many	Front Desk
Nurse	Acquires	One-to-many	Appointment
Appointment	Is Acquired By	One-to-one	Nurse
Nurse	Accesses	One-to-one	Calendar
Calendar	Is Accessed By	One-to-one	Nurse
Nurse	Is Assigned To	One-to-many	Location
Location	Assigns	One-to-many	Nurse
Nurse	Observes	One-to-many	My Health
My Health	Is Observed By	One-to-many	Nurse
Nurse	Approved	One-to-Many	Prescription Refills
Prescription Refills	Is Approved By	One-to-One	Nurse
Doctor	Addresses	One-to-many	Appointment
Appointment	Is Addressed By	One-to-one	Doctor
Doctor	Checks Out	One-to-one	Calendar
Calendar	Is Checked Out By	One-to-one	Doctor
Doctor	Covers	One-to-many	Location
Location	Is Covered By	One-to-many	Doctor
Doctor	Examines	One-to-many	My Health
My Health	Is Examined By	One-to-many	Doctor
Doctor	Reviews	One-to-many	Prescription Refills
Prescription Refills	Is Reviewed By	One-to-One	Doctor

System Operation Contracts

Login Use Case

Contract CO1: enterUsername	
Operation	enterUsername(username: UserName)
Cross Reference	Use Case: Login
Preconditions	User is trying to log into system
Post conditions	• Username is associated with patient account *(association formed)* • Username is associated with front desk account *(association formed)* • Username is associated with nurse account *(association formed)* • Username is associated with doctor account *(association formed)*

Contract CO2: enterPassword	
Operation	enterPassword(password: PassWord)
Cross Reference	Use Case: Login
Preconditions	User is trying to log into system
Post conditions	• Password is associated with user's username *(association formed)*

Contract CO3: clickLogin	
Operation	clickLogin(username: UserName, password: Password)
Cross Reference	Use Case: Login
Preconditions	User is trying to log into system
Post conditions	• Username instance un is created *(instance created)* • Username is associated with user account *(association formed)* • Password instance pd is created *(instance created)* • Password is associated with user's username *(association formed)*

Contract CO4: validateCredentials	
Operation	validateCredentials(username: UserName, password: PassWord)
Cross Reference	Use Case: Login
Preconditions	User is trying to log into system
Post conditions	• Username and password are associated with account in database *(association formed)*

Contract CO5: usernameFirstChar	
Operation	usernameFirstChar(username: UserName)
Cross Reference	Use Case: Login
Preconditions	User is trying to log into system
Post conditions	• Username is associated with patient account *(association formed)* • Username is associated with front desk account *(association formed)* • Username is associated with nurse account *(association formed)* • Username is associated with doctor account *(association formed)*

Schedule Appointment Use Case

Contract CO1: newAppointment	
Operation	newAppointment()
Cross Reference	Use Case: Schedule Appointment
Preconditions	User is trying to schedule new appointment
Post conditions	• newAppointment instance na is created *(instance created)* • Attributes of na were initialized

Contract CO2: chooseProvider	
Operation	chooseProvider(provider : pvdr)
Cross Reference	Use Case: Schedule Appointment
Preconditions	User is trying to schedule new appointment
Post conditions	• Provider became provider chosen *(attribute modification)*

Contract CO3: validateProviders	
Operation	validateProviders(provider : pvdr)
Cross Reference	Use Case: Schedule Appointment
Preconditions	User is trying to schedule new appointment
Post conditions	• provider is associated with doctor account *(association formed)*

Contract CO4: chooseNetwork	
Operation	chooseNetwork (network : Net)
Cross Reference	Use Case: Schedule Appointment
Preconditions	User is trying to schedule new appointment
Post conditions	• network became network chosen *(attribute modification)*

Contract CO5: validateNetworks	
Operation	validateNetworks (network : Net)
Cross Reference	Use Case: Schedule Appointment
Preconditions	User is trying to schedule new appointment
Post conditions	• network is associated with doctor account *(association formed)*

Contract CO6: chooseLocation	
Operation	chooseLocation (provider: prvdr, network : Net, location : loc)
Cross Reference	Use Case: Schedule Appointment
Preconditions	User is trying to schedule new appointment
Post conditions	• location became location chosen *(attribute modification)*

Contract CO7: validateProviderLocations	
Operation	validateProviderLocations(provider: prvdr, network : Net, location : loc)
Cross Reference	Use Case: Schedule Appointment
Preconditions	User is trying to schedule new appointment
Post conditions	• location is associated with location *(association formed)*

Contract CO8: selectDate	
Operation	selectDate (provider: prvdr, network : Net, location : loc)
Cross Reference	Use Case: Schedule Appointment
Preconditions	User is trying to schedule new appointment
Post conditions	• selectDate is associated with calendar *(association formed)* • selectDate.date/time became dat and time chosen *(attribute modification)*

Contract CO9: requestAvailability	
Operation	requestAvailability (provider: prvdr, network : Net, location : loc, date : dt)
Cross Reference	Use Case: Schedule Appointment
Preconditions	User is trying to schedule new appointment
Post conditions	• requestAvailability is associated with calendar *(association formed)*

Contract CO10: chooseKind	
Operation	chooseKind (kind : knd)
Cross Reference	Use Case: Schedule Appointment
Preconditions	User is trying to schedule new appointment
Post conditions	• kind became kind chosen *(attribute modification)*

Contract CO11: chooseType	
Operation	chooseType (type : tp)
Cross Reference	Use Case: Schedule Appointment
Preconditions	User is trying to schedule new appointment
Post conditions	• Type became type chosen *(attribute modification)*

Contract CO12: enterReason	
Operation	enterReason (reason : rsn)
Cross Reference	Use Case: Schedule Appointment
Preconditions	User is trying to schedule new appointment
Post conditions	• reason became reason provided *(attribute modification)*

Contract CO13: next	
Operation	Next (kind: knd, type : tp, reason : rsn)
Cross Reference	Use Case: Schedule Appointment
Preconditions	User is trying to schedule new appointment
Post conditions	• appointment instance apt was created *(instance created)* • Attributes of apt were initialized

Contract CO14: reviewAppointment	
Operation	reviewAppointment
Cross Reference	Use Case: Schedule Appointment
Preconditions	User is trying to schedule new appointment
Post conditions	• Apt was associated with appointment *(association formed)*

Contract CO15: confirmAppointment	
Operation	confirmAppointment
Cross Reference	Use Case: Schedule Appointment
Preconditions	User is trying to schedule new appointment
Post conditions	• Apt was associated with appointment *(association formed)*

Contract CO16: savesAppointment	
Operation	savesAppointment
Cross Reference	Use Case: Schedule Appointment
Preconditions	User is trying to schedule new appointment
Post conditions	• Apt was associated with appointment *(association formed)*

Staff Appointment Update

Contract CO1: enterWeight	
Operation	enterWeight(weight : Weight)
Cross Reference	Use Case: Staff Appointment Update
Preconditions	Nurse and Doctor are updating patient appointment information
Post conditions	• Weight became weight entered *(attribute modification)*

Contract CO2: enterHeight	
Operation	enterHeight(height : Height)
Cross Reference	Use Case: Staff Appointment Update
Preconditions	Nurse and Doctor are updating patient appointment information
Post conditions	• height became height entered *(attribute modification)*

Contract CO3: enterBMI	
Operation	enterBMI(bmi : BMI)
Cross Reference	Use Case: Staff Appointment Update
Preconditions	Nurse and Doctor are updating patient appointment information
Post conditions	• bmi became BMI entered *(attribute modification)*

Contract CO4: enterBloodPressure	
Operation	enterBloodPressure(bloodPressure : bp)
Cross Reference	Use Case: Staff Appointment Update
Preconditions	Nurse and Doctor are updating patient appointment information
Post conditions	• Blood Pressure became blood pressure entered *(attribute modification)*

Contract CO5: enterNotes	
Operation	enterNotes (notes : Notes)
Cross Reference	Use Case: Staff Appointment Update
Preconditions	Nurse and Doctor are updating patient appointment information
Post conditions	• Notes became notes entered *(attribute modification)*

Contract CO6: clickSave	
Operation	clickSave (weight : Weight, height : Height, bloodPressure : bp, notes : Notes)
Cross Reference	Use Case: Staff Appointment Update
Preconditions	Nurse and Doctor are updating patient appointment information
Post conditions	• Patient Record instance pr was created *(instance created)*

Contract CO7: saveNurseInfo	
Operation	saveNurseInfo (weight : Weight, height : Height, bloodPressure : bp, notes : Notes)
Cross Reference	Use Case: Staff Appointment Update
Preconditions	Nurse and Doctor are updating patient appointment information
Post conditions	• Patient Record instance pr was created *(instance created)*

Contract CO8: requestAppointmentInfo	
Operation	requestAppointmentInfo (weight : Weight, height : Height, bloodPressure : bp, notes : Notes)
Cross Reference	Use Case: Staff Appointment Update
Preconditions	Nurse and Doctor are updating patient appointment information
Post conditions	• Patient Record is associated with patient account *(association formed)*

Contract CO9: enterNotes	
Operation	enterNotes (notes : Notes)
Cross Reference	Use Case: Staff Appointment Update
Preconditions	Nurse and Doctor are updating patient appointment information
Post conditions	• Notes became notes entered *(attribute modification)*

Contract CO10: enterPrescriptions	
Operation	enterPrescriptions(name : Name, refillnum : Refills, dosage : dose, date : Date)
Cross Reference	Use Case: Staff Appointment Update
Preconditions	Nurse and Doctor are updating patient appointment information
Post conditions	• prescription became prescription entered *(attribute modification)*

Contract CO11: clickUpdate	
Operation	clickUpdate (notes : Notes, prescriptions : ps)
Cross Reference	Use Case: Staff Appointment Update
Preconditions	Nurse and Doctor are updating patient appointment information
Post conditions	• Patient Record instance pr was created *(instance created)*

Contract CO12: saveAppointment	
Operation	saveAppointment (notes : Notes, prescriptions : ps)
Cross Reference	Use Case: Staff Appointment Update
Preconditions	Nurse and Doctor are updating patient appointment information
Post conditions	• Patient Record instance pr was created *(instance created)*

Contract CO13: closeAppointment	
Operation	closeAppointment ()
Cross Reference	Use Case: Staff Appointment Update
Preconditions	Nurse and Doctor are updating patient appointment information
Post conditions	• Patient Record instance pr was created *(instance created)*

Patient Search

Contract CO1: enterFirstName	
Operation	enterFirstName(firstname : fname)
Cross Reference	Use Case: Patient Search
Preconditions	Staff Member is searching for a patient
Post conditions	• First Name became First Name entered *(attribute modification)*

Contract CO2: enterLastName	
Operation	enterLastName(lastName : lname)
Cross Reference	Use Case: Patient Search
Preconditions	Staff Member is searching for a patient
Post conditions	• Last Name became Last Name entered *(attribute modification)*

Contract CO3: enterDOB	
Operation	enterDOB(month : m, day : dd, year : yyyy)
Cross Reference	Use Case: Patient Search
Preconditions	Staff Member is searching for a patient
Post conditions	• Month became Month entered *(attribute modification)* • Day became Day entered *(attribute modification)* • Year became Year entered *(attribute modification)*

Contract CO4: clickSearch	
Operation	clickSearch(firstName : fname, lastName : lname, month : m, day : dd, year : yyyy)
Cross Reference	Use Case: Patient Search
Preconditions	Staff Member is searching for a patient
Post conditions	• First Name is associated with patient account *(association formed)* • Last Name is associated with patient account *(association formed)* • Month is associated with patient account *(association formed)* • Day is associated with front desk account *(association formed)* • Year is associated with nurse account *(association formed)* • Patient instance pat was created *(instance created)*

Contract CO5: searchForPatient	
Operation	searchForPatient (firstName : fname, lastName : lname, month : m, day : dd, year : yyyy)
Cross Reference	Use Case: Patient Search
Preconditions	Staff Member is searching for a patient
Post conditions	• First Name is associated with patient account *(association formed)* • Last Name is associated with patient account *(association formed)* • Month is associated with patient account *(association formed)* • Day is associated with front desk account *(association formed)* • Year is associated with nurse account *(association formed)*

Contract CO6: viewPatientInfo	
Operation	viewPatientInfo (patientInfo : patinfo)
Cross Reference	Use Case: Patient Search
Preconditions	Staff Member is searching for a patient
Post conditions	• Patient info instance patinfo was created *(instance created)* • Patinfo is associated with Patient, based on clickSearch *(associated formed)*

Project Size Estimation

Based on use case points

Technical Complexity Factors (TCP)

Factor	Description	Weight	Perceived Complexity	Calculated Factor (Weight * perceived Complexity)
T1	Distributed System	2	5	10
T2	Performance	1	4	4
T3	End User Efficiency	1	2	2
T4	Complex internal Processing	1	4	4
T5	Reusability	1	2	2
T6	Easy to Install	0.5	5	2.5
T7	Easy to Use	0.5	3	1.5
T8	Portable	2	3	6
T9	Easy to Change	1	3	3
T10	Concurrent	1	2	2
T11	Special Security Features	1	2	2
T12	Provides Direct Access for Third Parties	1	5	5
T13	Special User Training	1	3	3
			TOTAL FACTOR	47
			TECHNICAL COMPLEXITY FACTORS	**1.07**

Environmental Complexity Factors (ECF)

Factor	Description	Weight	Perceived Complexity	Calculated Factor (Weight * perceived Complexity)
E1	Familiarity with UML	1.5	4	6
E2	Application Experience	0.5	2	1
E3	Object Oriented Experience	1	5	5
E4	Lead Analyst Capability	2	2	4
E5	Motivation	3	1	3
E6	Stable Requirements	2	5	10
E7	Part-Time Workers	-1	0	0
E8	Difficult Programming Language	3	1	3
			TOTAL FACTOR	32
			ENVIRONMENTAL COMPLEXITY FACTORS	**0.44**

Unadjusted Use Case Points (UUCP)

Unadjusted Use Case Weight (UUCW)

Use Case Type	Description	Weight	Number of Use Cases	Result
Simple	Touches only a single database entity. Implementation involves less than 5 classes.	5	10	50
Average	Touches 2 or more database entities. Implementation involves 5 to 10 classes.	10	4	40
Complex	Touches 3 or more database entities. Implementation would involve more than 10 classes	15	4	60
			TOTAL UUCW	150

Unadjusted Actor Weight (UAW)

Use Case Type	Description	Weight	Number of Actors	Result
Simple	Actor is another system (API)	1	1	1
Average	Actor is another system through a protocol (TCP/IP)	0	0	0
Complex	Actor is a person.	17	4	68
			TOTAL UAW	69

Unadjusted Use Case Points = Unadjusted Use Case Weight + Unadjusted Actor Weight
Unadjusted Use Case Points = 150 + 69 = **219**

Productivity Factor (PF)

Productivity Factor
10

Use Case Points = TCF * ECF * UUCP * PF
Use Case Points = 1.07 *0.44 * 219 * 10 = 1031.05 or 1032 hours.
It would take one developer 26 weeks to complete the application.

Plan of Work

Task	**Details**	**Due Date**
Finish HIGH priority Designs	Finish all the main screens for all the high priority screens.	3/8/2021
Main screens	Be able to use one screen for multiple user views but lock certain parts for particular users.	3/10/2021
Save data	Be able to save data in the program.	3/12/2021
Pull up data	Be able to pull up user's information based on their username and password.	3/15/2021
Add Patient	Be able to add a patient to the program.	3/17/2021
Patient Search	Be able to search the program for a patient.	3/18/2021
Update data	Be able to update any data and saving it in the program.	3/18/2021
Schedule Appointment- patient view	Be able to schedule an appointment and have it save in the program. It will also need to populate on the staff calendar.	3/24/2021
Schedule Appointment – Staff	Be able to schedule an appointment and have it save to the patient appointment page and the calendar.	3/27/2021
Cancel Appointment – patient	Be able to cancel appointment and have it update the patient appointment page and staff calendar.	3/29/2021
Cancel Appointment – Staff	Be able to cancel appointment and have it update the patient appointment page and the staff calendar.	3/29/2021
Reschedule Appointment – Patient	Be able to reschedule appointment and have it update the patient appointment page and the staff calendar.	4/2/2021
Reschedule Appointment – Staff	Be able to reschedule appointment and have it update the patient appointment page and the staff calendar.	4/2/2021
Staff update appointment	Be able to have the staff update the appointment and save it. This will move it to the prior appointments section.	4/8/2021
Prior Appointments	Be able to view prior appointments for all views.	4/10/2021
Design all MED Priority pages	Set up all the text boxes and buttons on all the main pages for the medium priority use cases.	4/17/2021
Pre Appointment Page	Be able to have patient fill this out and save information in the program.	4/21/2021
Medication Refills	Be able to have the patient request any medication refills are available based on the prescriptions prescribed from the doctor in prior appointments.	4/24/2021

Medication Approvals	Be able to have nurses and doctors view all the medication refill requests and be able to approve or deny any requests.	4/28/2021
My Health	Be able to view patient results and progress. This should be the patient view, nurse view, and doctor view.	5/1/2021
Request new Password	Allow the user to request a new password.	5/1/2021
Forgot Username	Allow the user to click forgot username and send it to them in the email they have on file.	5/1/2021
Staff Calendar View	Allow the staff to enter their hours on the calendar so they know when doctors are working.	5/5/2021

References

Marathon Health. (2021, 02 06). Retrieved from Marathon Health Portal: https://member.ourhealth.org/sign_in

This page was an example of how a patient portal should be used. Referencing the information needed for appointments, and the steps to set up appointments was key in understanding how to create an application that will be doing this task. I used my parent's login information in order to see how their portal worked and how to incorporate their basic concepts into my own application.

Baxter, S. (2021, 02 6). Nurse at Jane Pauley.

I interviewed Shaunee Baxter, who is a nurse at Jane Pauley. She helped indicate the type of information that nurses look for at the beginning of appointments like weight, height, blood pressure, heart rate, pulse, and temperature for vitals. This information was helpful to the Appointment Details pages.