Medicine Alert

And

Reminder System

MARS

Team Number: 16

Team Members

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Table of Contents

Motivation & Decision

"Working on Projects gives us opportunity to learn and absorb new things!"

Modern programming languages, accompanying widely available development environments, provide an excellent place to work. A wide range of operating environments, including mobile devices, smart watches, cloud computing, robotics, embedded devices and games means that you can apply your programming skills in a wide range of different areas. Android development is one of the most challenging software development regions. **Android software development** is the process by which new applications are created for the Android operating system. Applications are usually developed in Java programming language using the Android software development kit (SDK), but other development environments are also available.

The study of effectiveness of medication prescribed for a certain disease is not only factored based on patient condition and acceptance of medication by patient's body but also revolves immensely on the administration of medication on time, at regular intervals and at exact prescribed dosage. This research helped us to decide on creating a mobile application which would keep track of medicine schedule for the patient to consume medicines at prescribed time via notification reminders.

Introduction

Staying healthy and getting medications exactly when our body needs them is vital, but sometimes we just forget. Taking our medication should be made as easy and automatic as possible, not yet another thing you need to add to your mental checklist. So, we as a team decided to use our programming knowledge in developing an application which can help users to maintain their health in a better way by taking their medications at appropriate times.

Medicine Alert and Reminder System is the system which provides the complete system for medicine management. It helps users to add their medicines with the recommended time and the app will remind to take medicines on specific time. If a medicine must have a minimum gap of hours, then app will remind of the next dosage of medicine after recommended gap between two dosages.

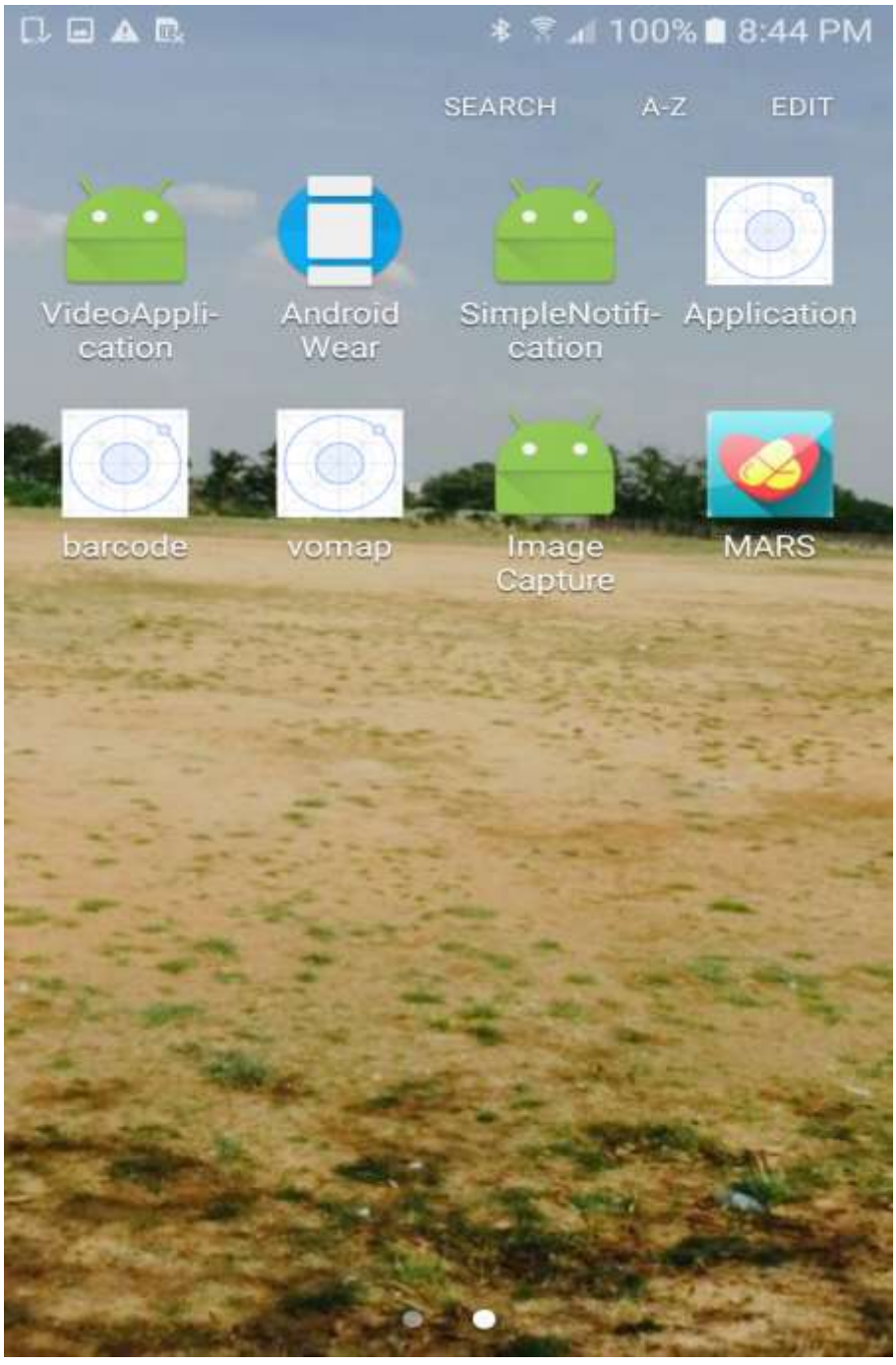
Monetary benefits of this application can be realized if we could prove that missing some dosages at crucial time of medicine schedule increases healing time and could lead to prolonged medicine schedule and hence adds health related cost to the user. In terms of avoiding stress due to prolonged medicine schedule, we recognizing the need of the users who require the assistance in making sure medicines and vitamins are consumed on timely basis.

Project Deployment

Here is a User Manual to walk through each view and associated functionality of the application.

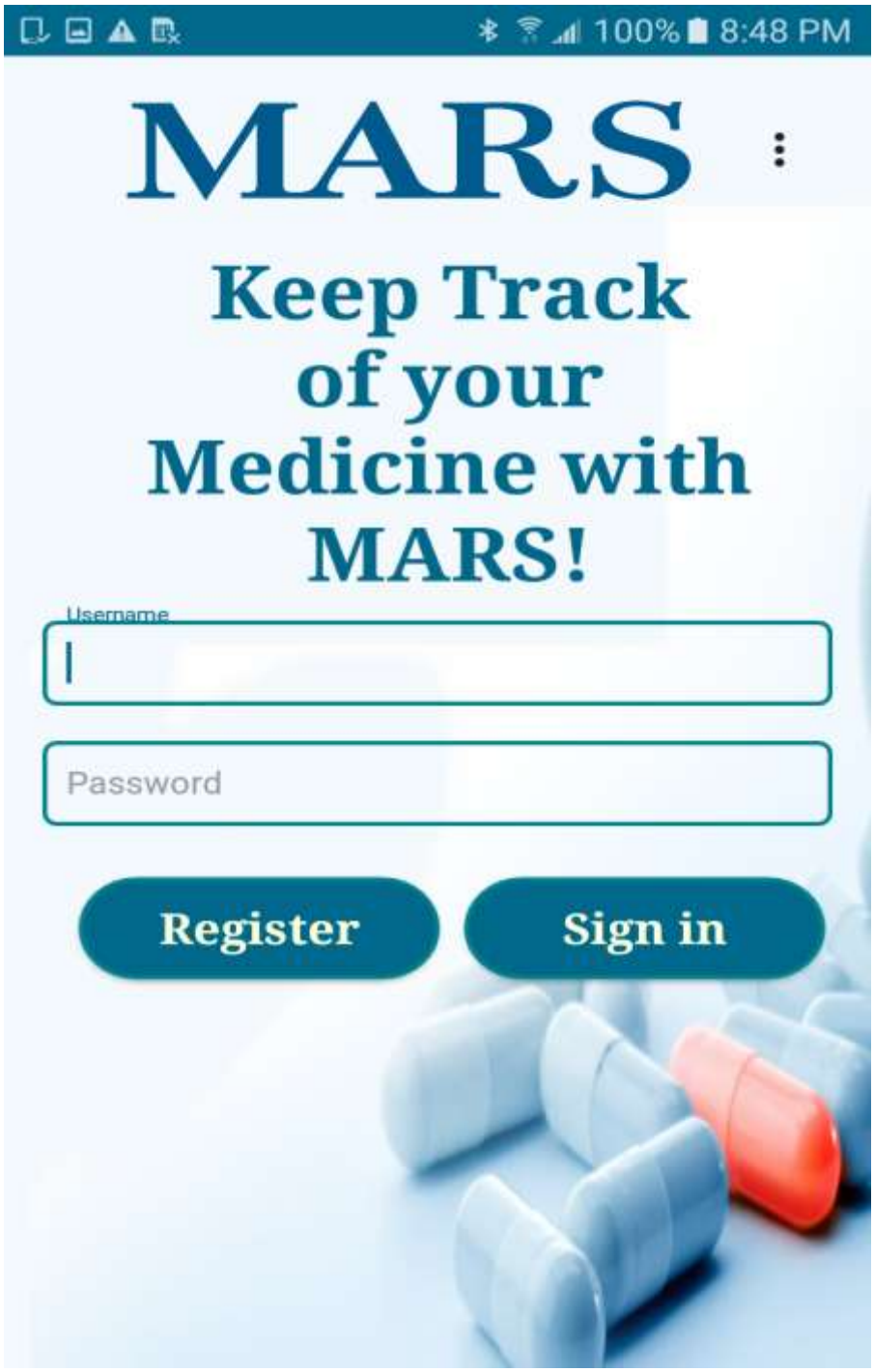
Application:

Our Application's (MARS) icon looks as shown below.



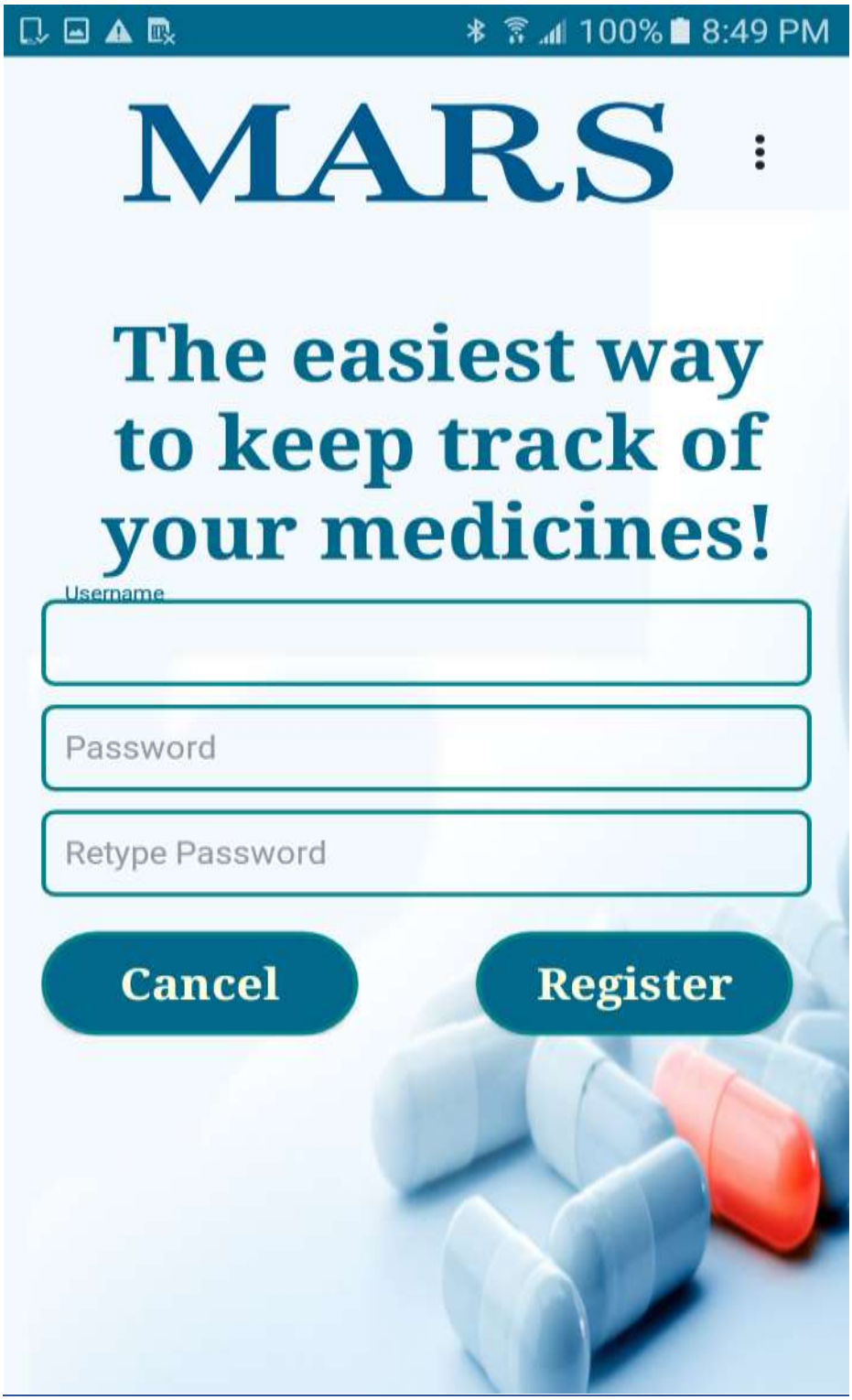
Login Activity Screen in Android:

Once the application is run in the Android Studio, the page which opens is the access page which asks for permission whether to use the contacts in the mobile or not as shown below. Once the permission is given to access the contacts application is redirected to the below page.

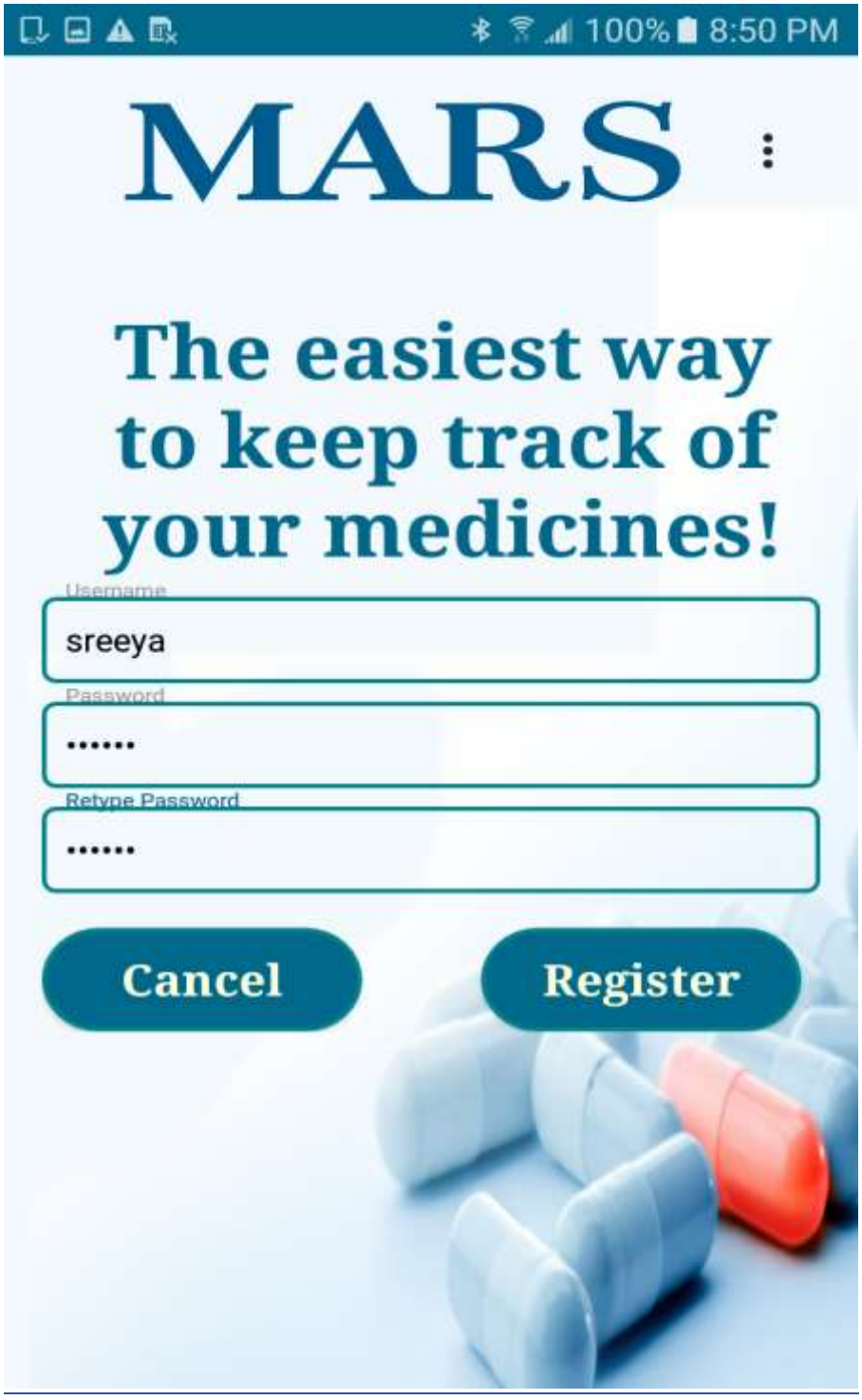


Register Activity in Android:

If the user/admin isn't registered with the application, then he will be redirected to the below page.

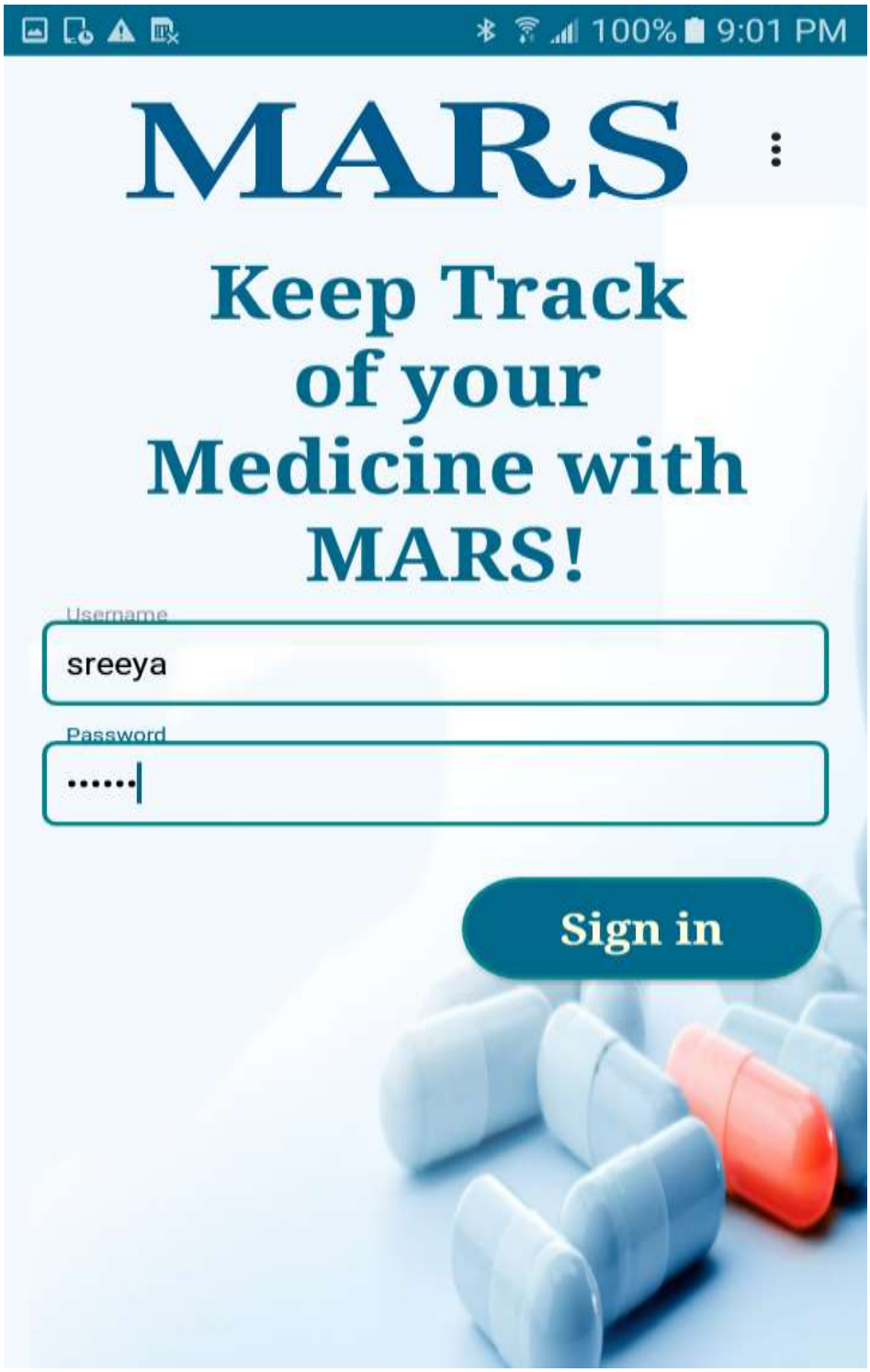


Now the user will fill all the details which are required to get registered into the application as shown below else the application gives an error message.



Login Activity in Android:

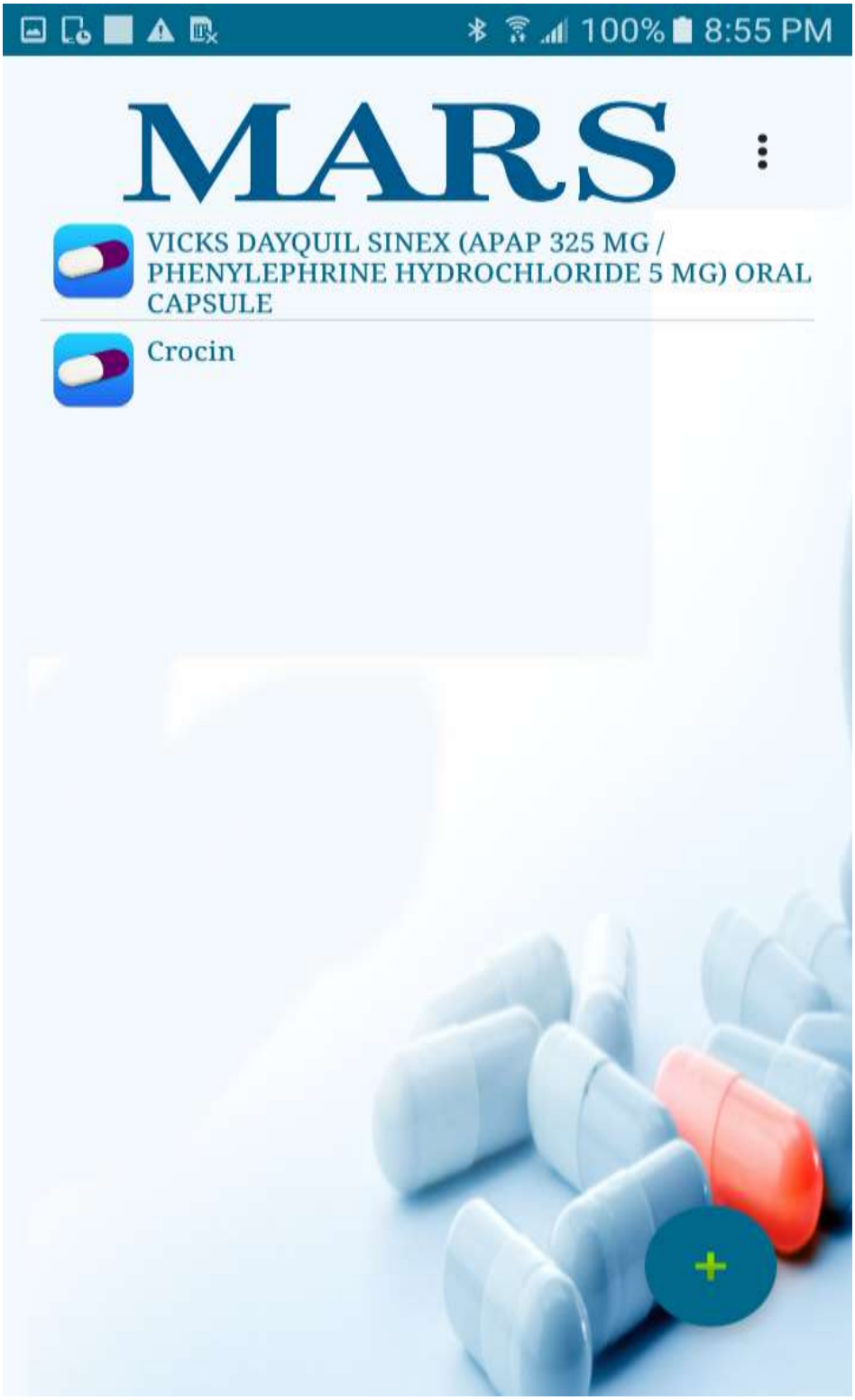
After the user is registered into the application, he will be redirected to the login page. Now, the user will enter his own credentials in order to login to the application.



Main Activity in Android:

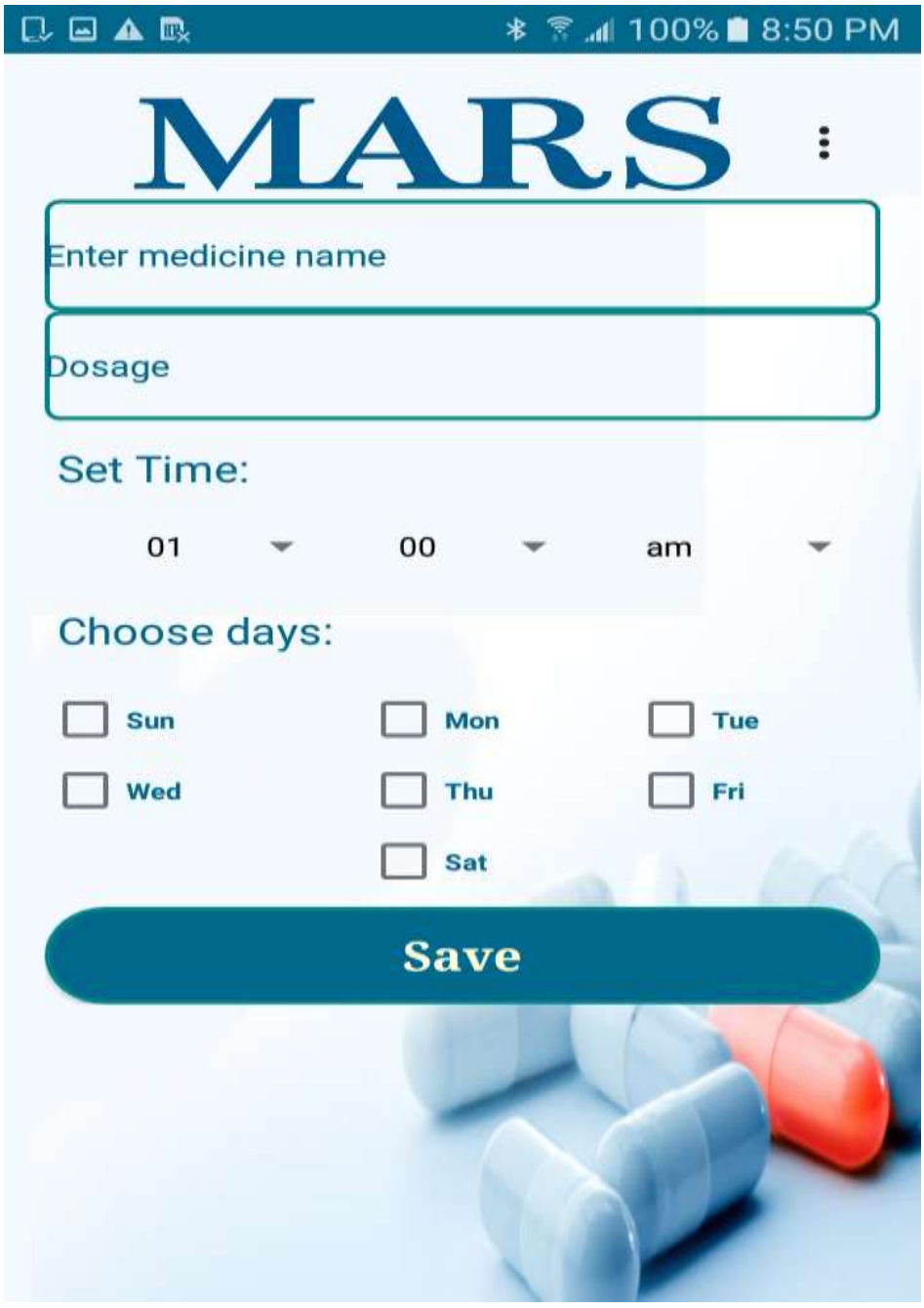
Once the user has logged in, the login page is redirected to the main activity page. On clicking "+" the user can add the medicine and the list of medicines added get displayed here.

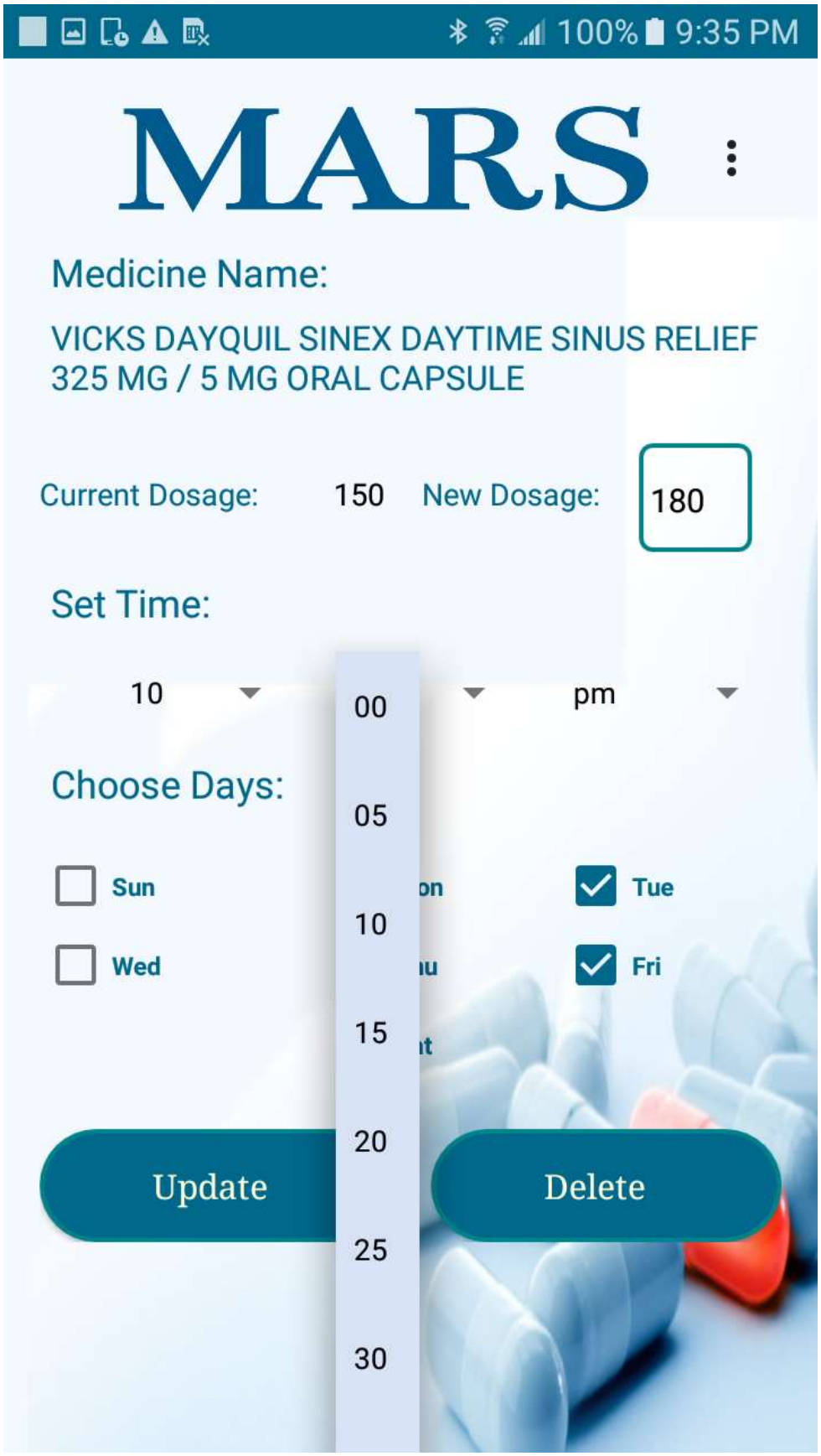
The below Image shows the list of medicines which were added by using add activity.

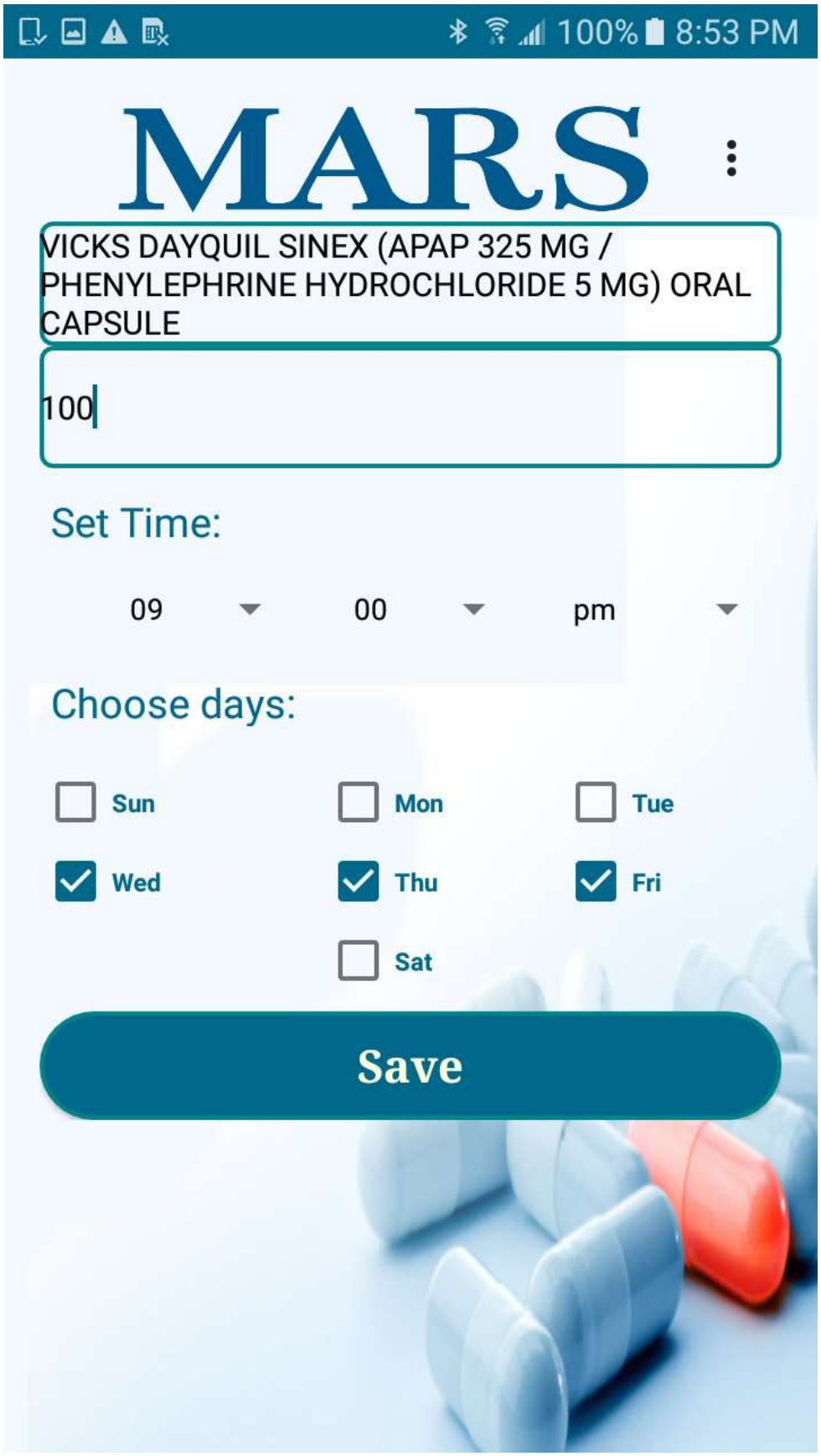


Add Activity in Android:

On clicking "+" button present in the main page user is redirected to the Add Activity where the user's medicine information is filled in. The user now will enter the Medicine name, dosage amount and also the time and days on which the medicine should be taken as shown below. Now, this information is stored in new user file which gets created as the user fills in new medicine information into Add Activity.

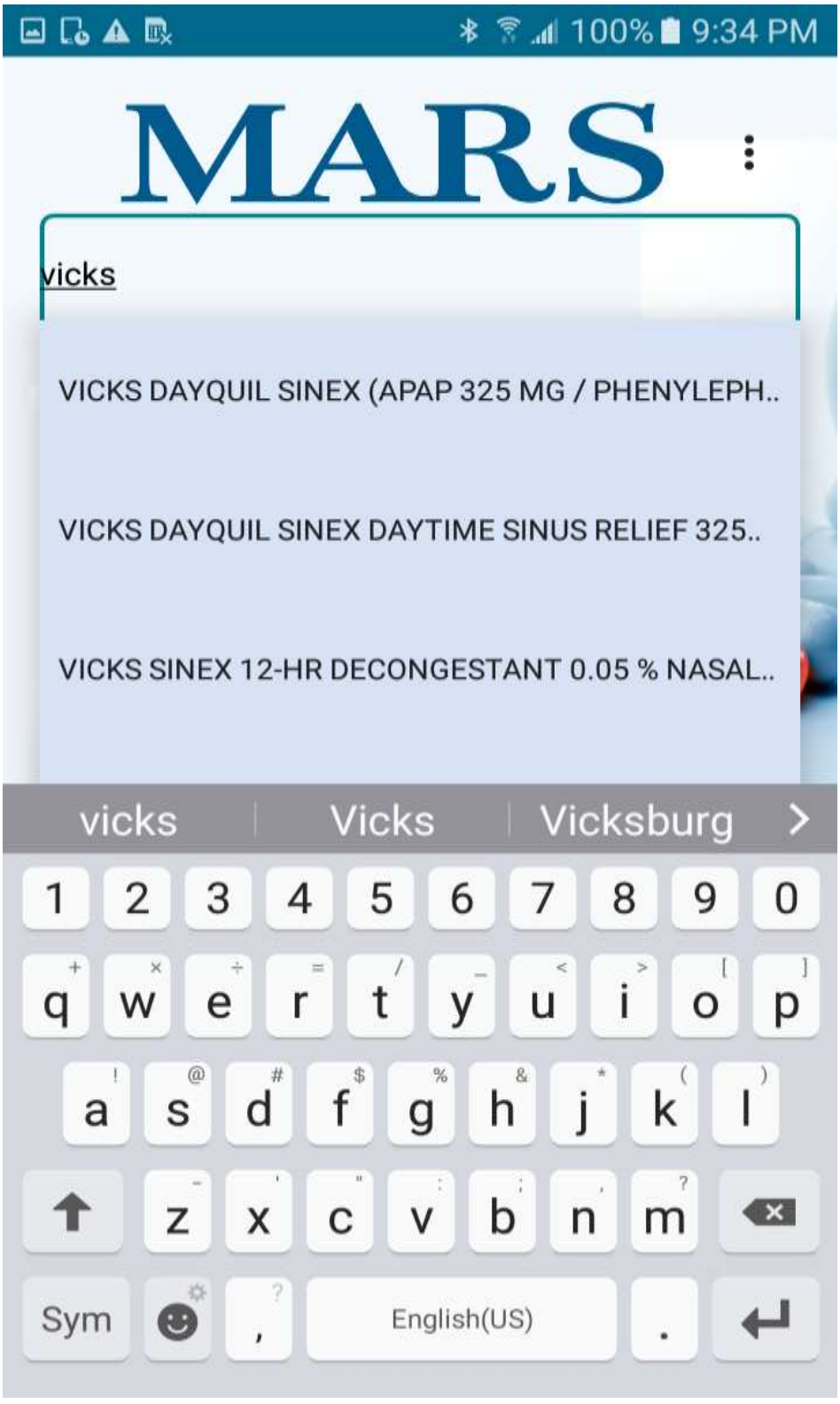



100% 9:35 PM
MARS
Medicine Name:
VICKS DAYQUIL SINEX DAYTIME SINUS RELIEF 325 MG / 5 MG ORAL CAPSULE
Current Dosage: 150
New Dosage: 180
Set Time:
10
00
pm
Choose Days:
Sun
Tue
Wed
Fri
05
10
15
20
25
30
Update
Delete

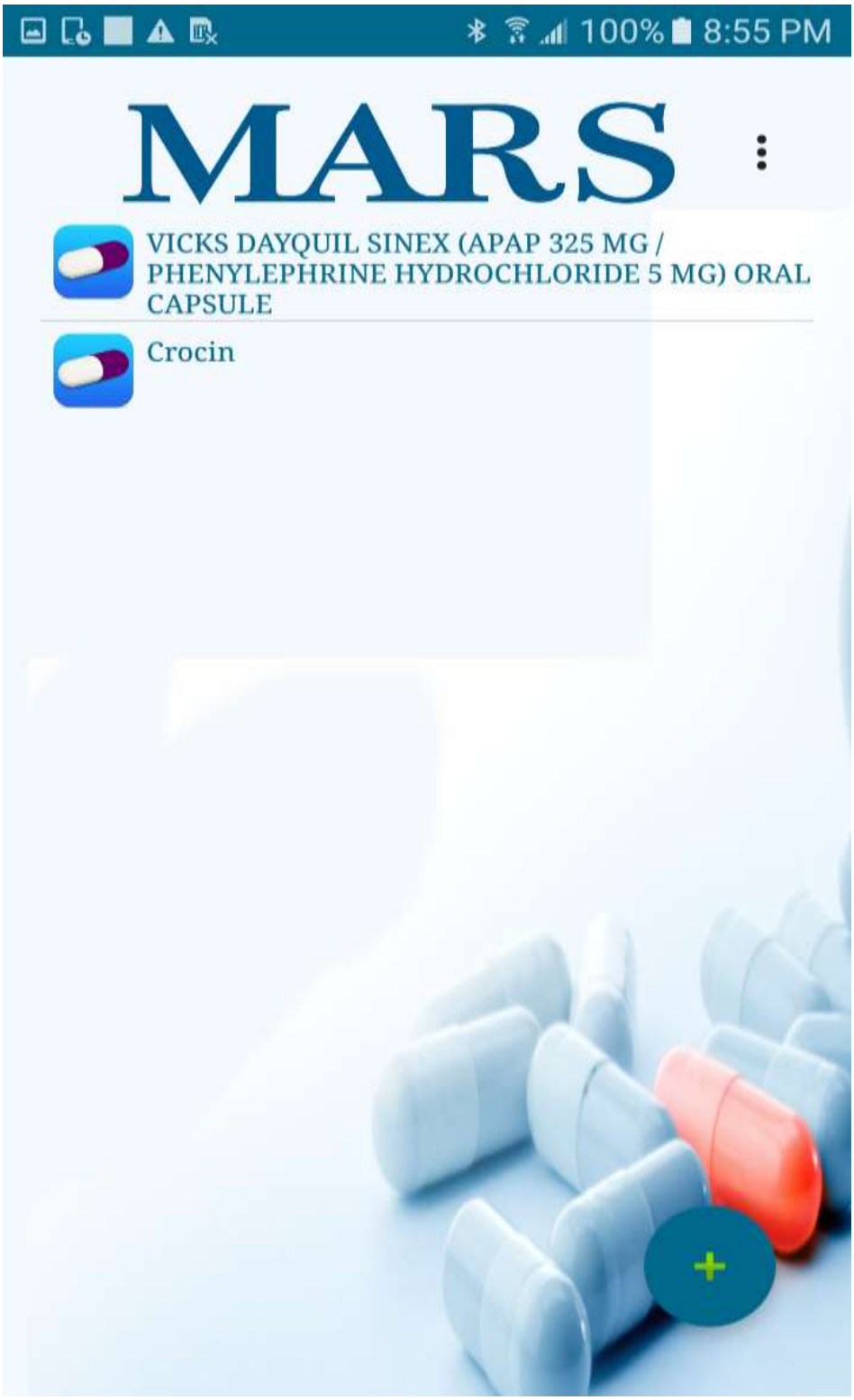

100% 8:53 PM
MARS
VICKS DAYQUIL SINEX (APAP 325 MG / PHENYLEPHRINE HYDROCHLORIDE 5 MG) ORAL CAPSULE
100
Set Time:
09
00
pm
Choose days:
Sun
Mon
Tue
Wed
Thu
Fri
Sat
Save

Auto Complete API in Add Activity:

This API is used to search the medicine's name while entering the medicine details in Add Activity.

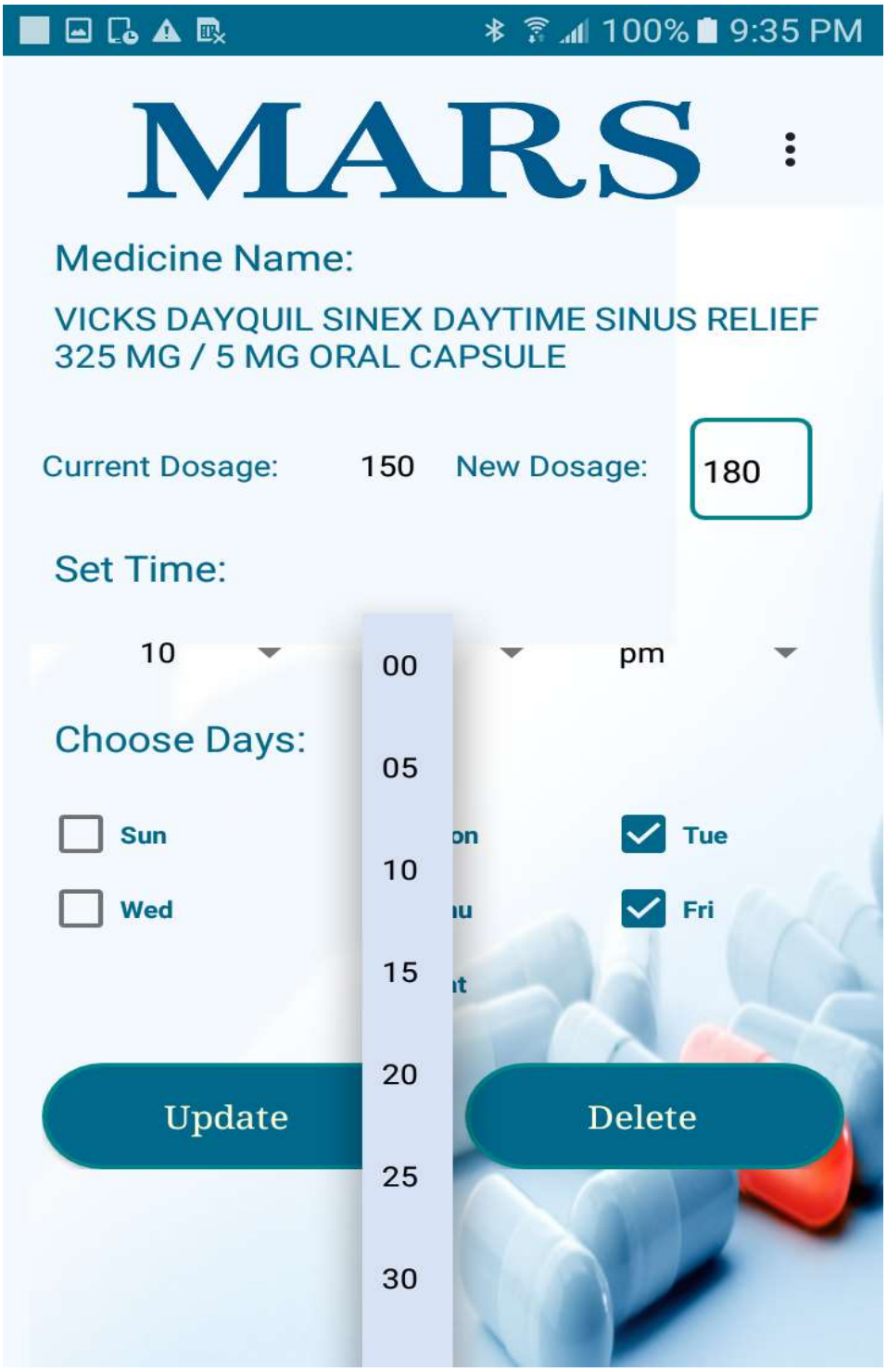


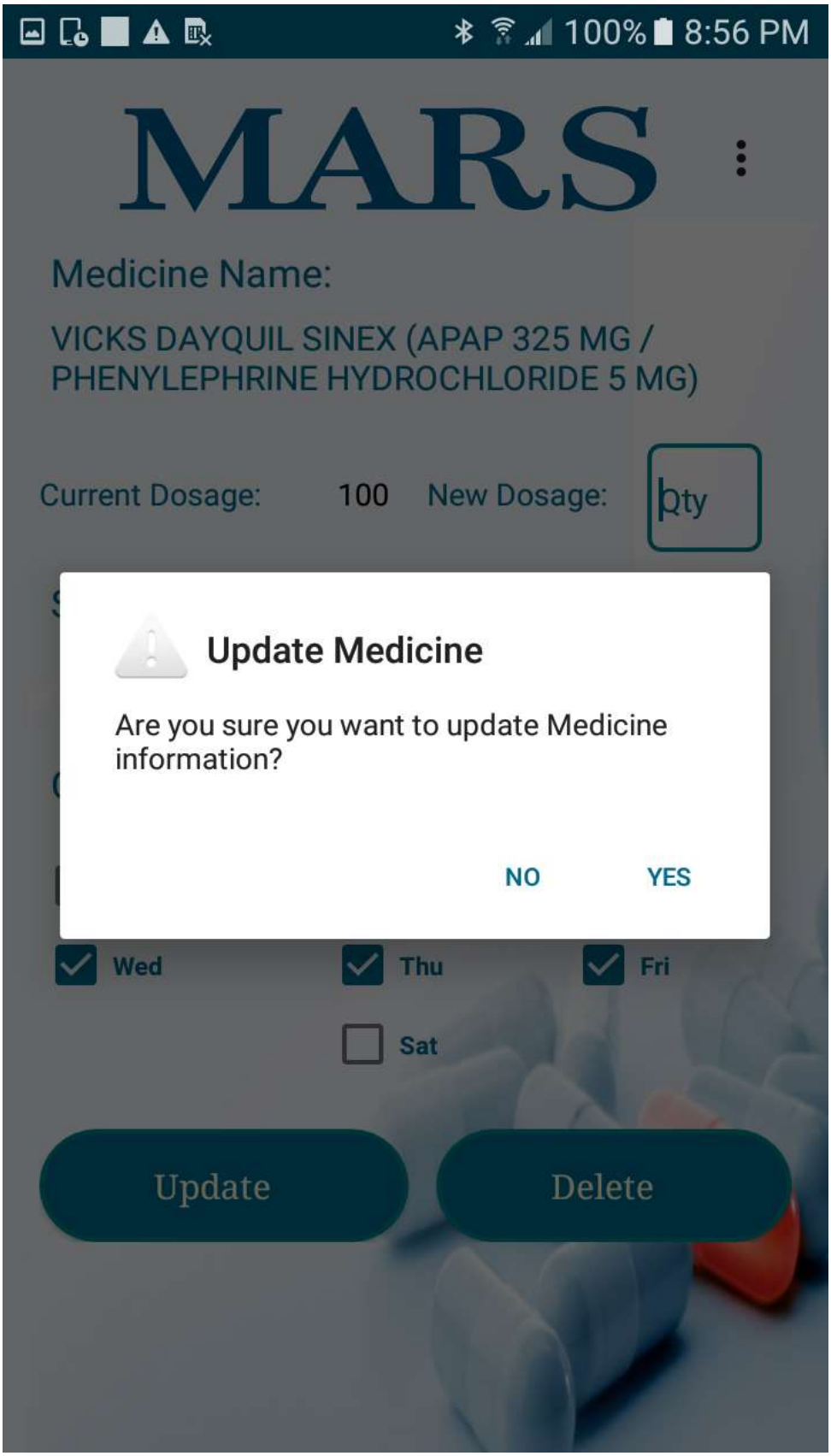
This user file gets saved with the name of the medicine and appears as an icon in Main Activity as shown below. On click of these medicine icons user will be redirected to Update Activity.

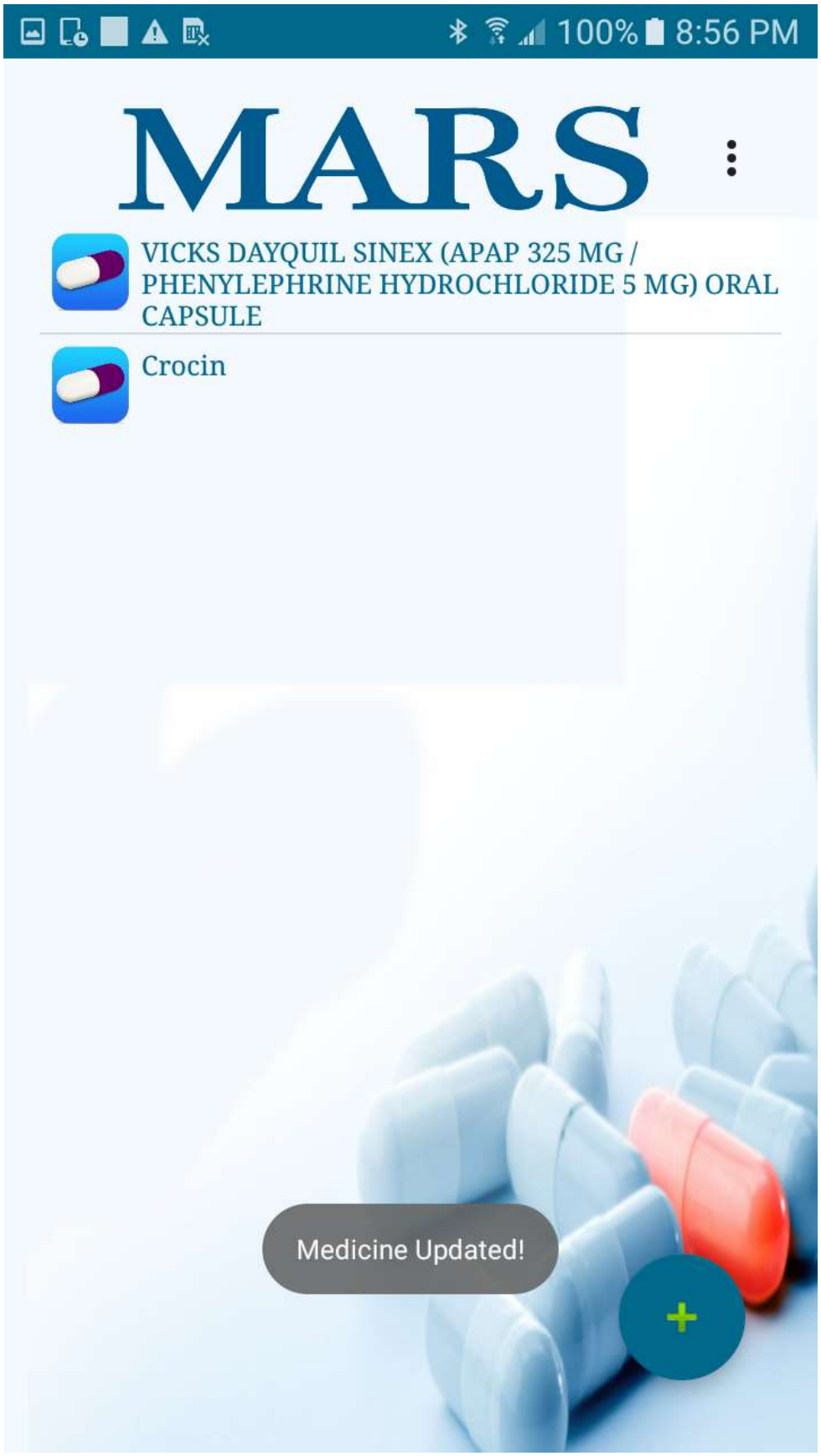


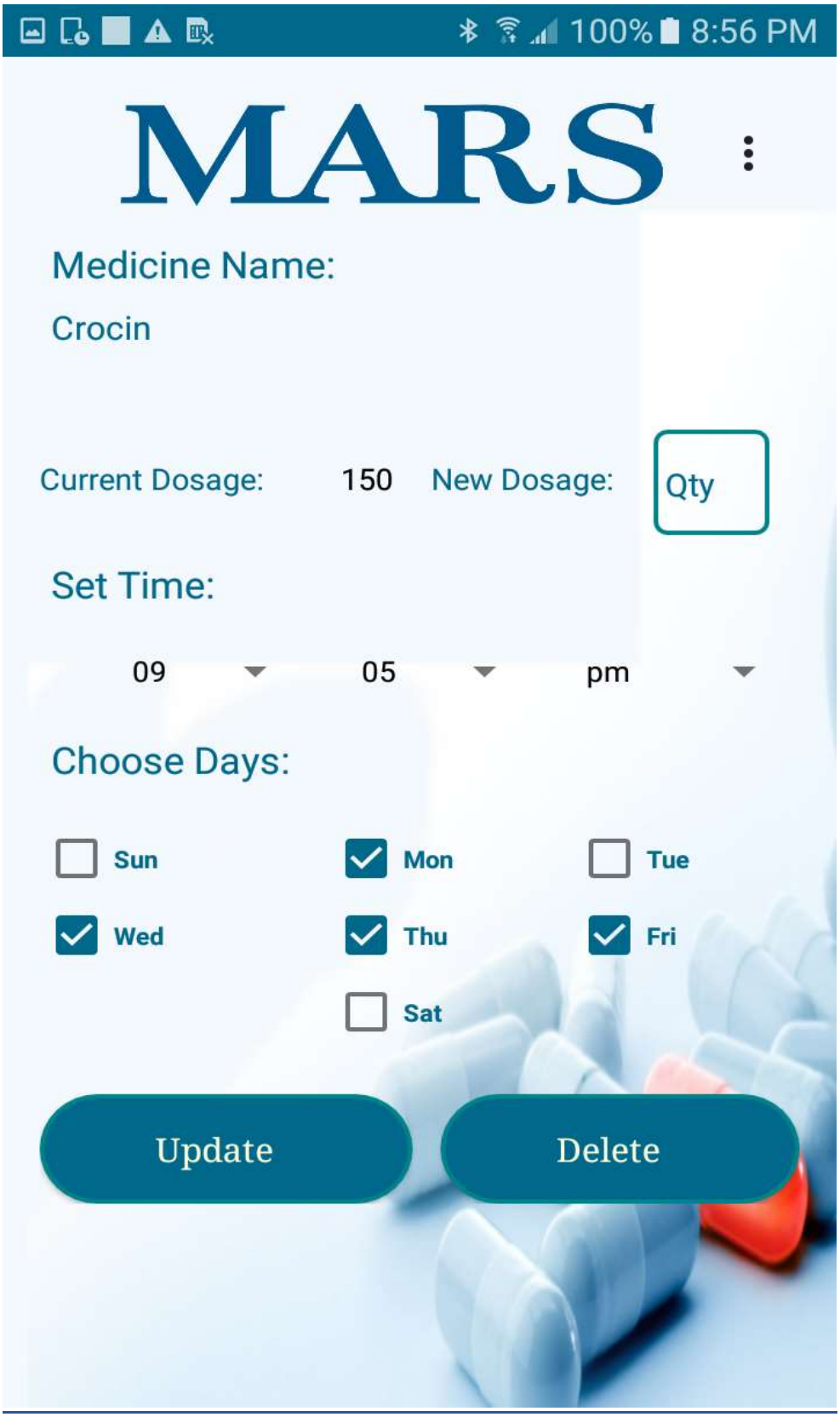
Update Activity Screen in Android:

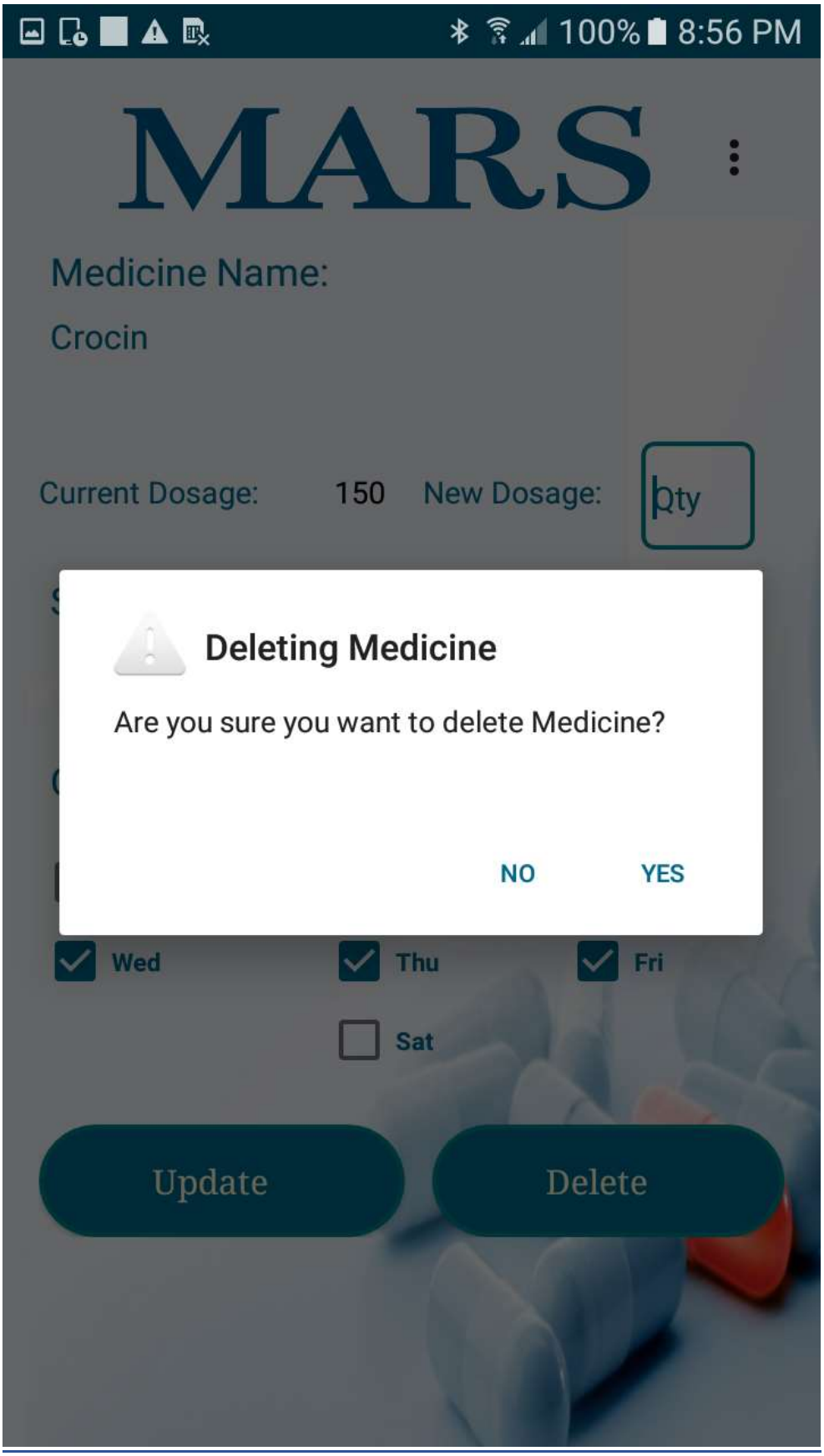
If the user wants to update the medicine details he can do it in Update page where he can edit the dosage, time and days on which medicine should be taken. If the user wants to delete the medicine from his list, he can also do it here.




100% 8:56 PM
MARS
Medicine Name:
VICKS DAYQUIL SINEX (APAP 325 MG / PHENYLEPHRINE HYDROCHLORIDE 5 MG)
Current Dosage: 100 New Dosage: Qty
Update Medicine
Are you sure you want to update Medicine information?
NO
YES
Wed
Thu
Fri
Sat
Update
Delete

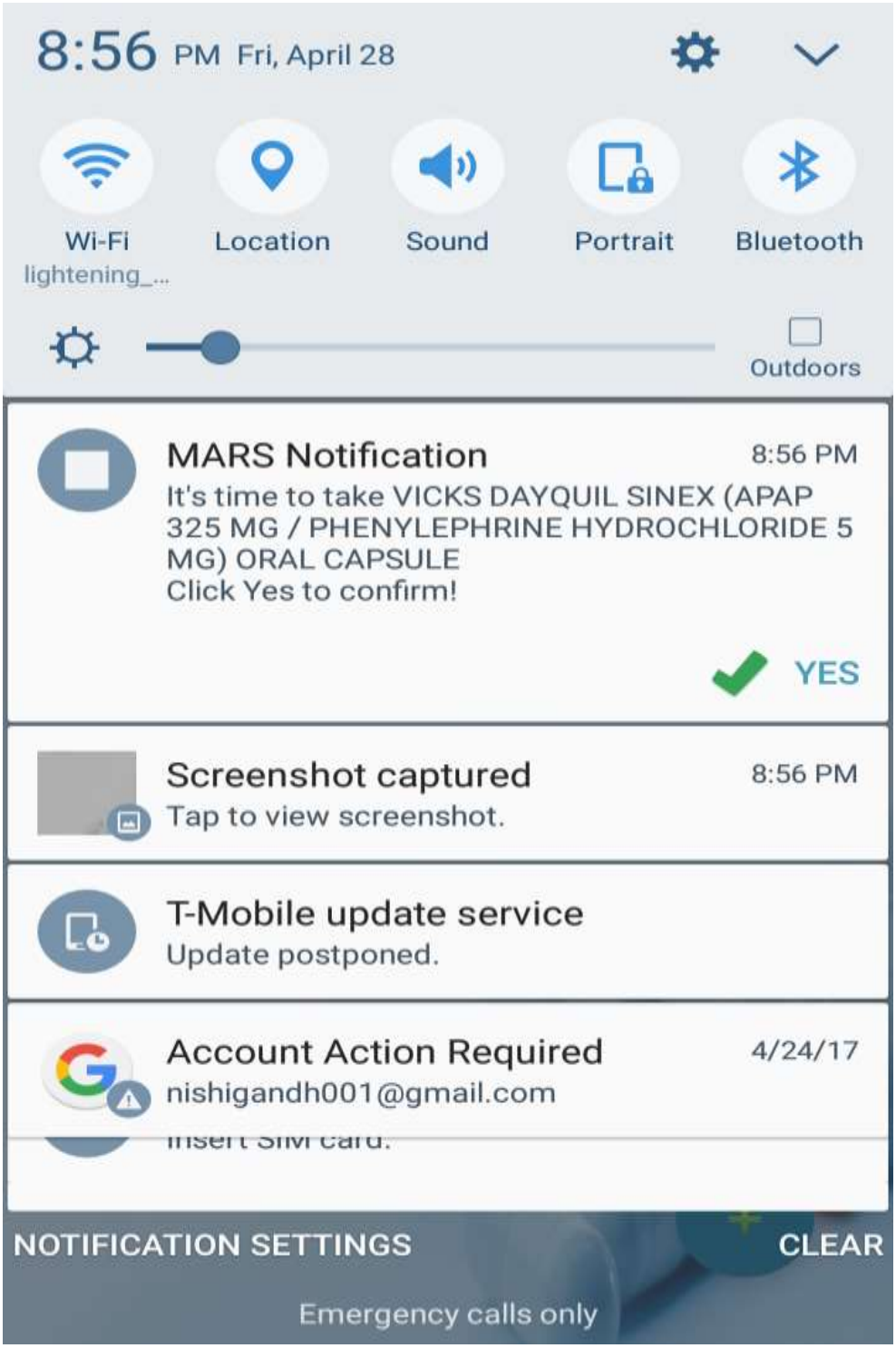

100% 8:56 PM
MARS
VICKS DAYQUIL SINEX (APAP 325 MG / PHENYLEPHRINE HYDROCHLORIDE 5 MG) ORAL CAPSULE
Crocin
Medicine Updated!


100% 8:56 PM
MARS
Medicine Name:
Crocin
Current Dosage: 150 New Dosage: Qty
Set Time:
09 05 pm
Choose Days:
Sun
Mon
Tue
Wed
Thu
Fri
Sat
Update
Delete

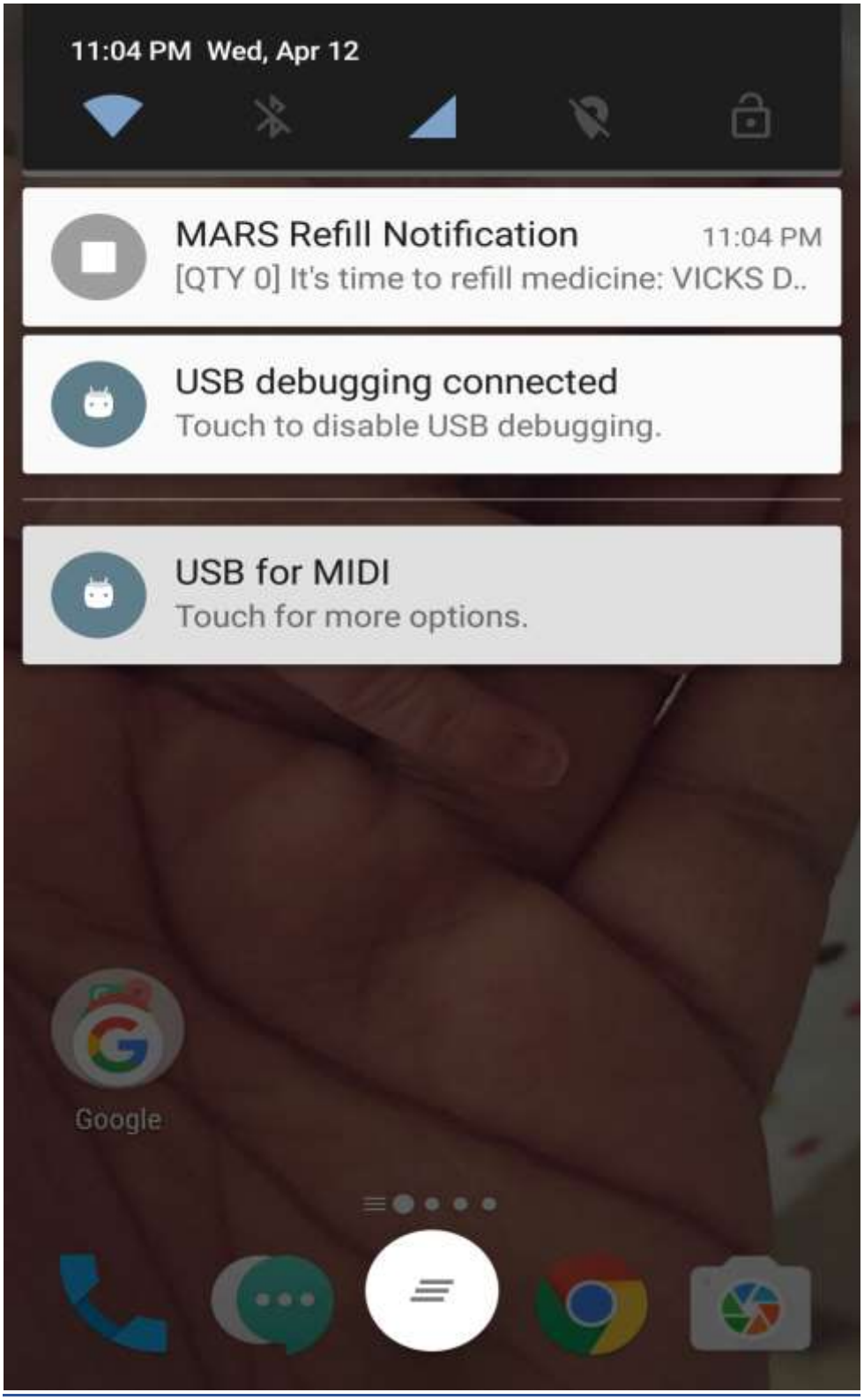

100% 8:56 PM
MARS
Medicine Name:
Crocin
Current Dosage: 150 New Dosage: Qty
Deleting Medicine
Are you sure you want to delete Medicine?
NO
YES
Wed
Thu
Fri
Sat
Update
Delete

Notification Activity Screen in Android:

This activity will retrieve the medicine information from the Main Activity and will create a notification according to the time mentioned in the user file of a medicine as shown below. By clicking on "YES" the user will be confirming that the medicine is taken.

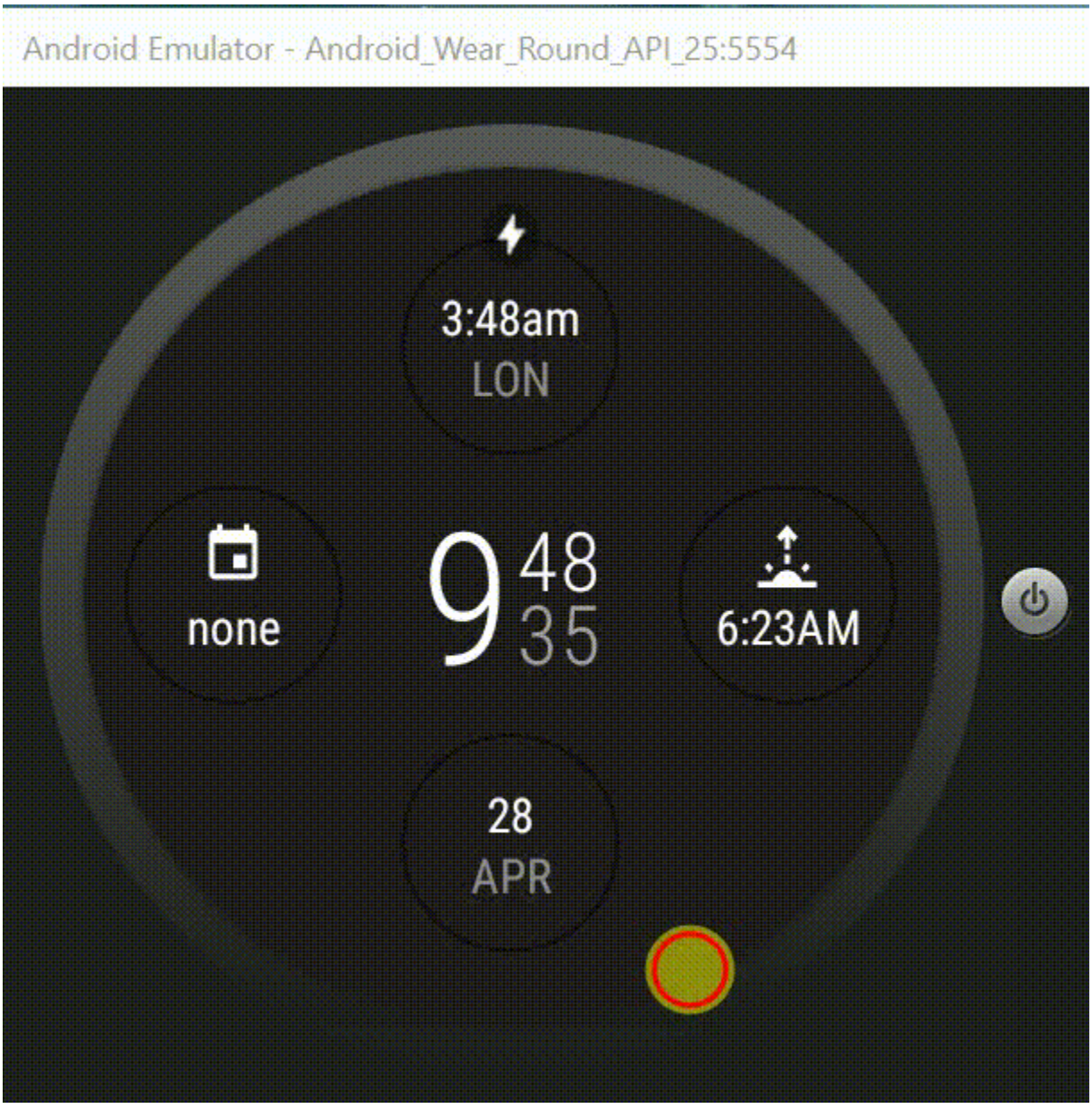


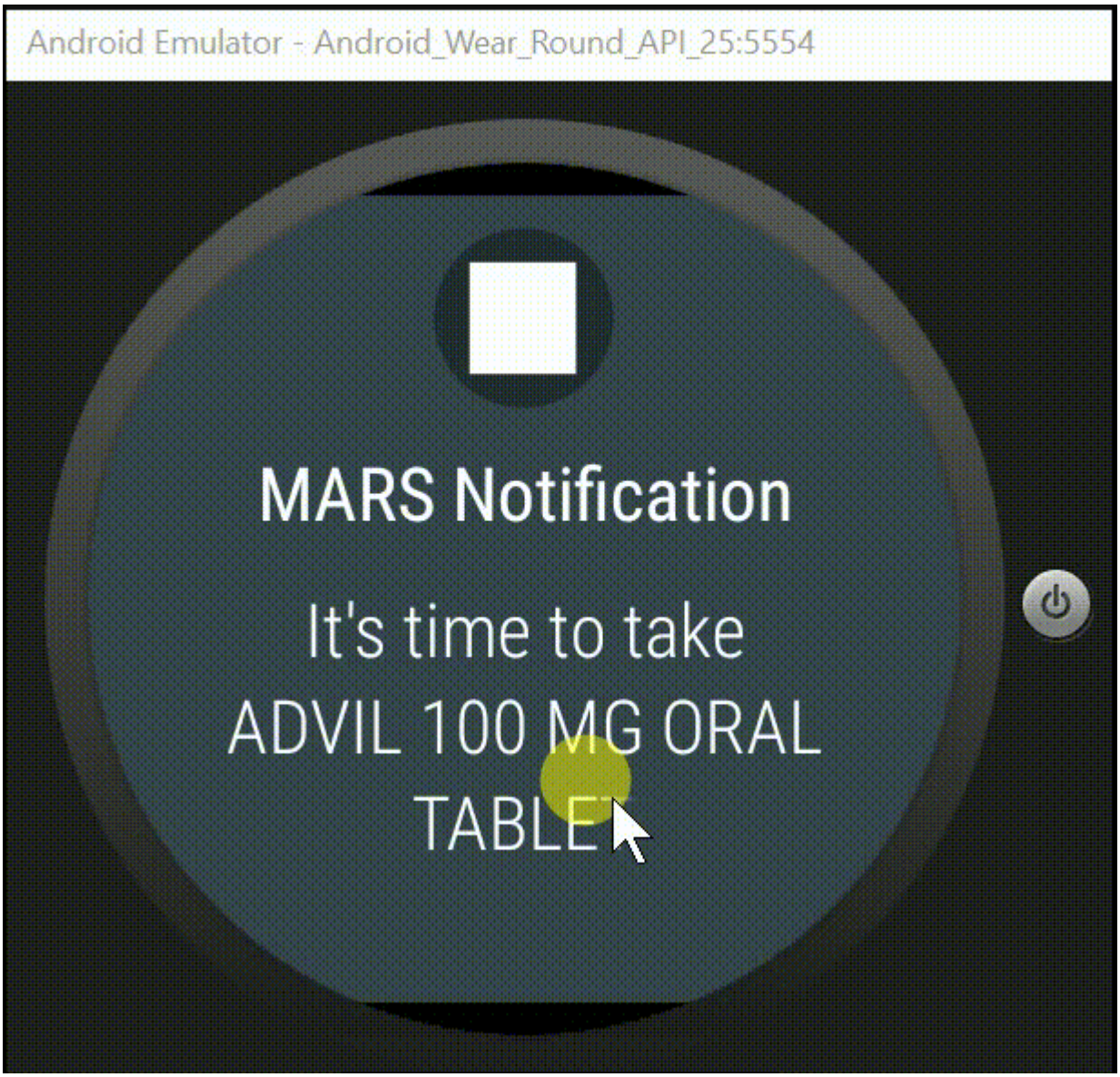
When a particular medicine is shortage application will generate Refill Notification in order to alert the user so that he can refill them.

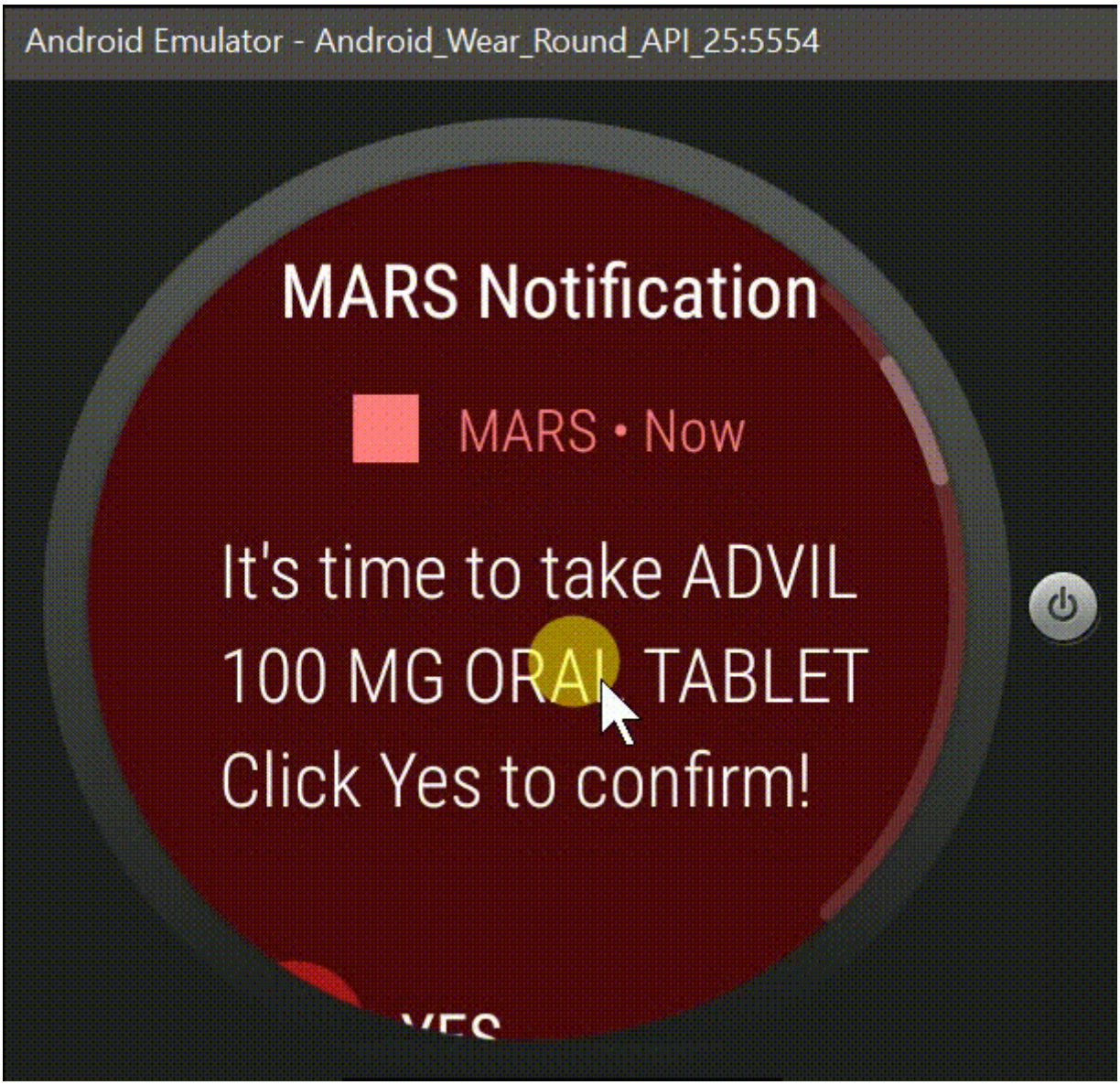


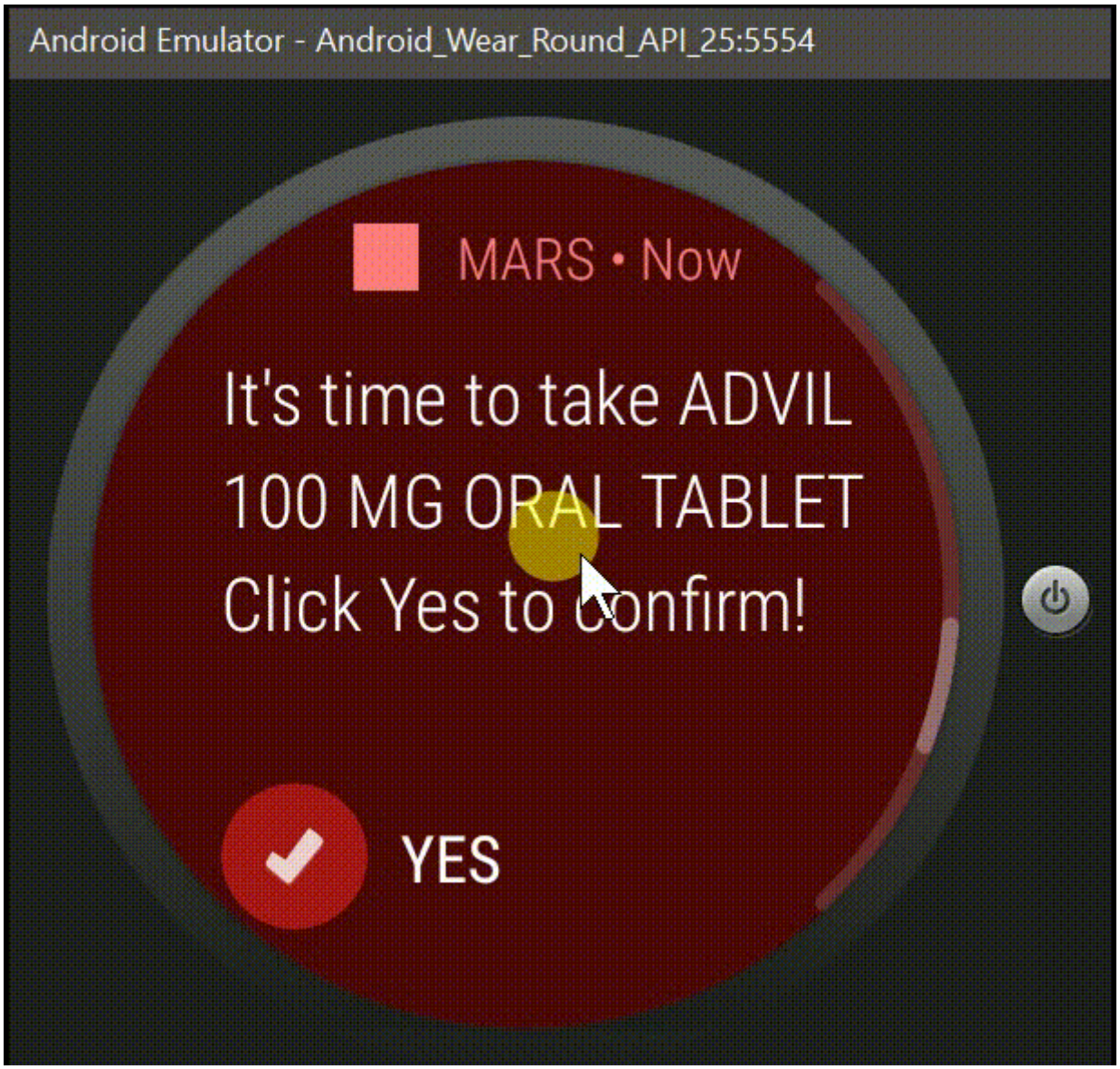
Smart Watch Deployment:

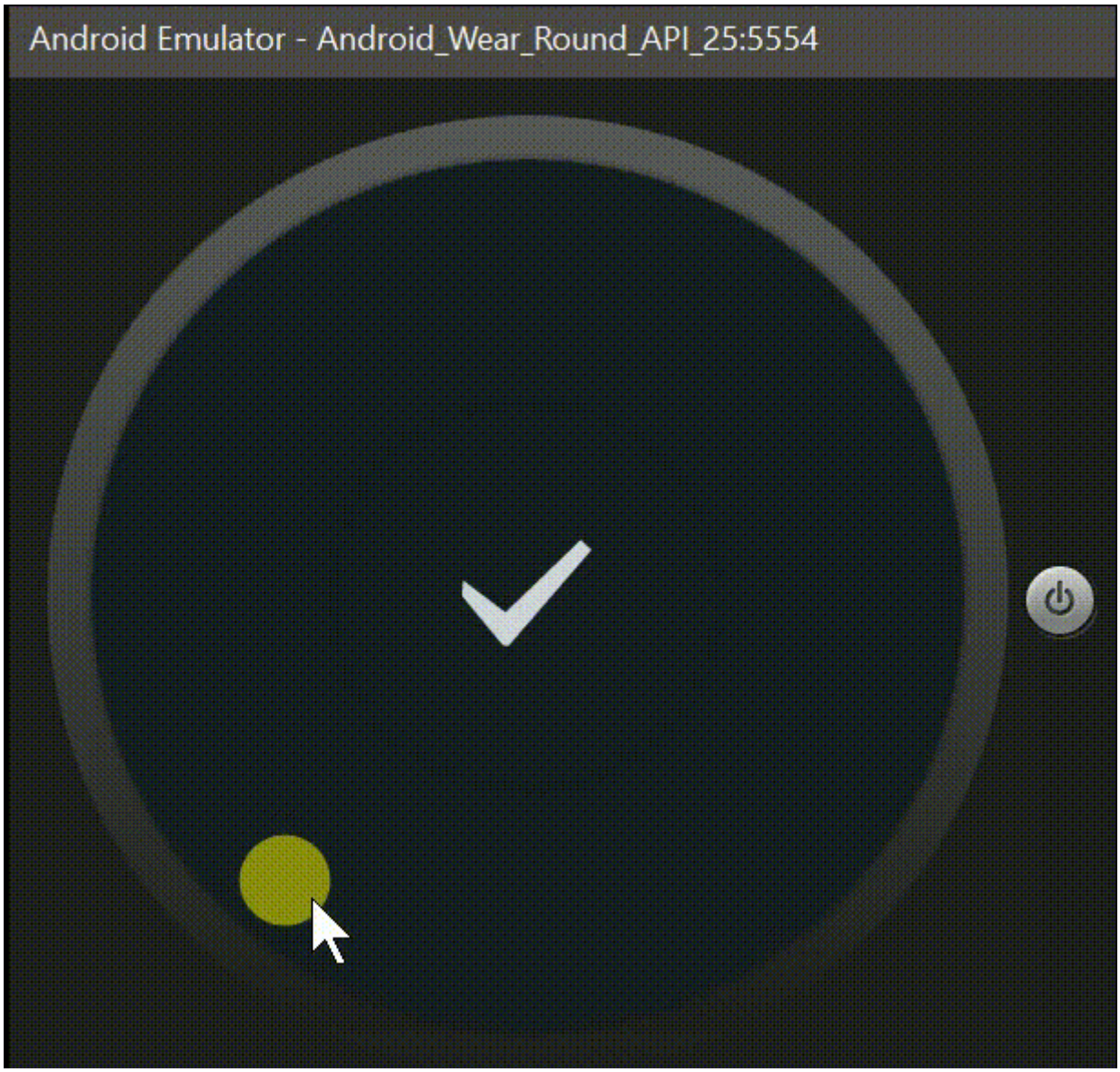
We deployed our Application to Smart Watch so that users can get notifications to their own watches when their Android devices are out of reach.



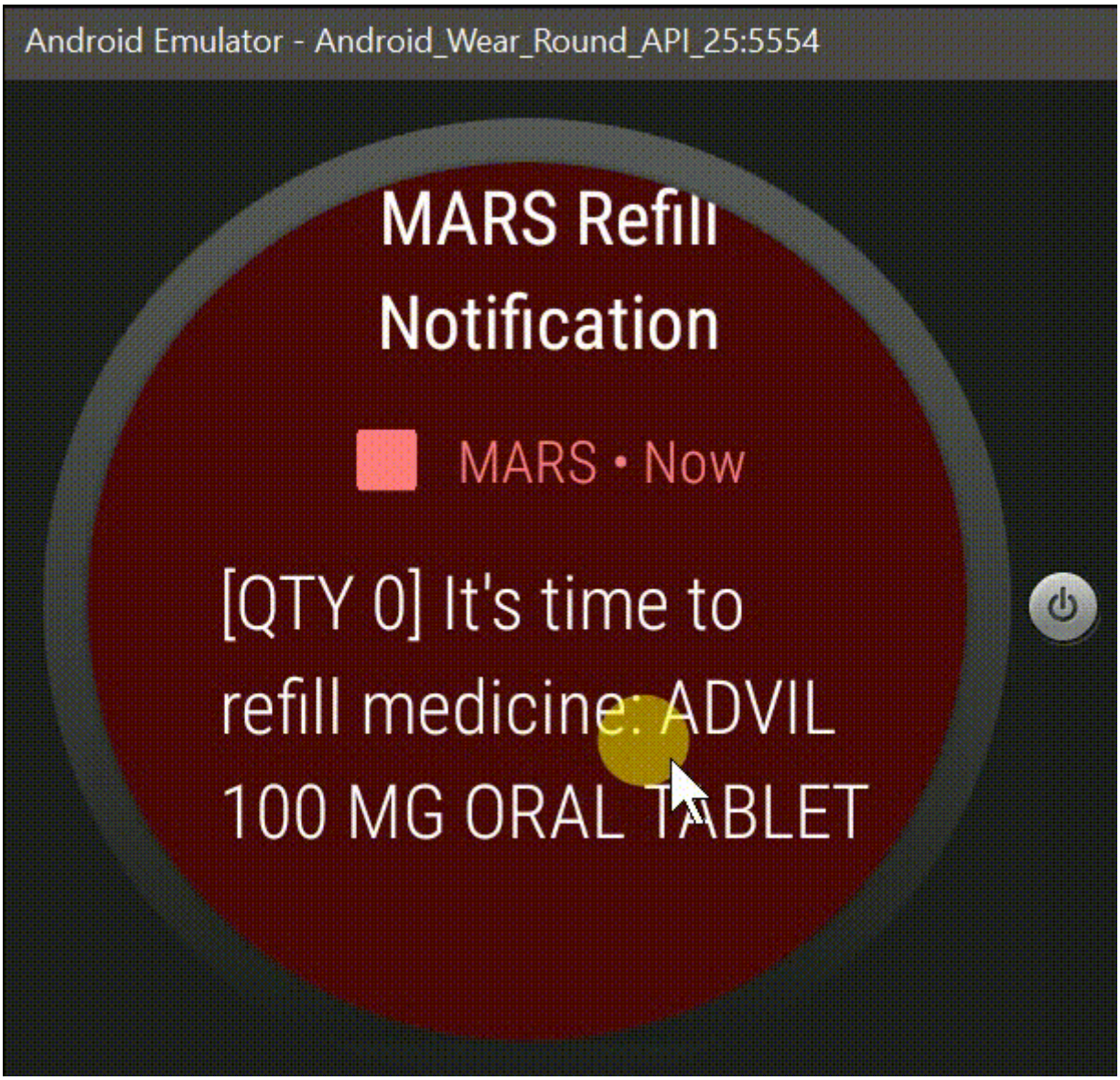

Android Emulator - Android_Wear_Round_API_25:5554
MARS Notification
It's time to take
ADVIL 100 MG ORAL
TABLET

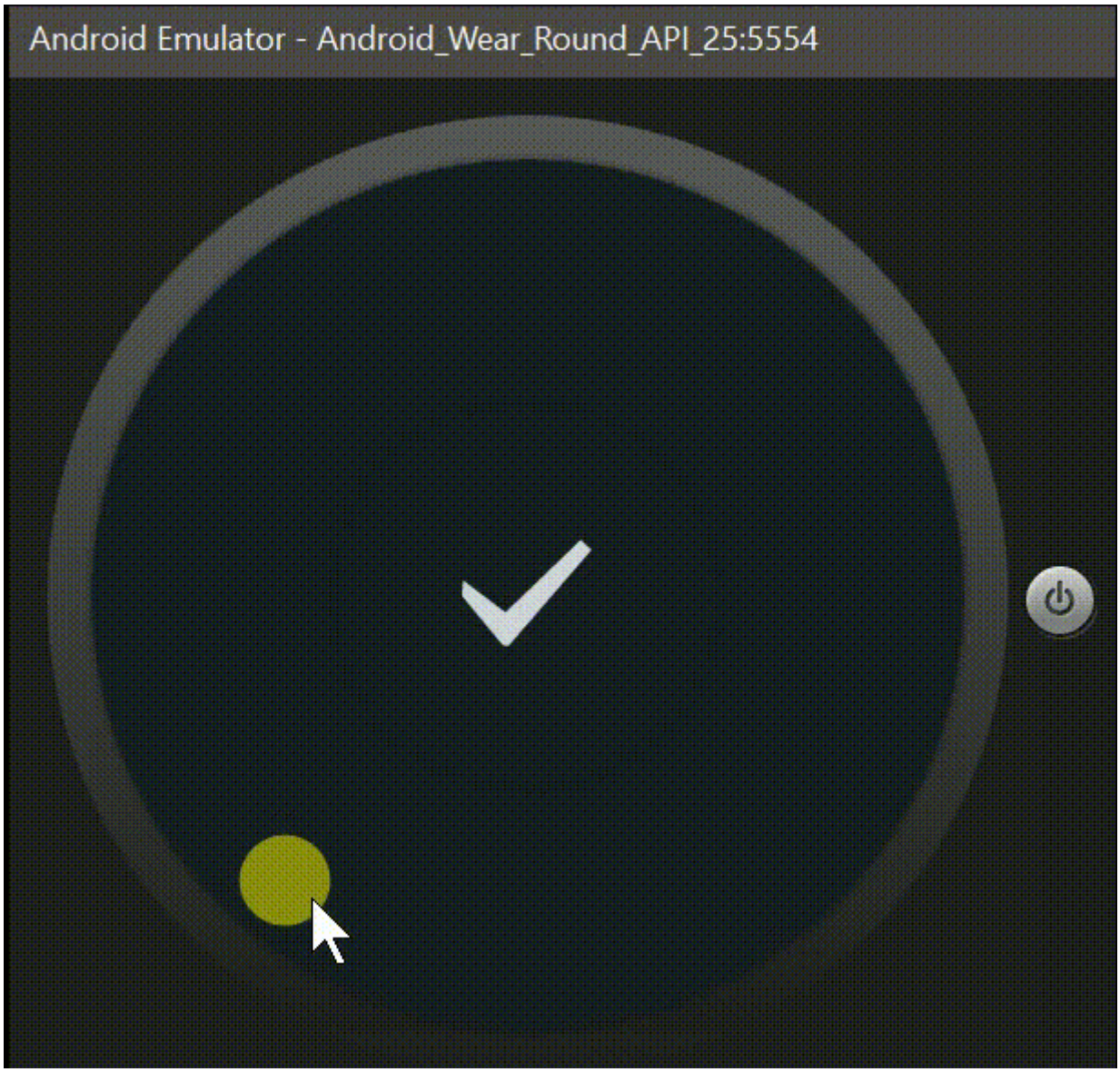

Android Emulator - Android_Wear_Round_API_25:5554
MARS Notification
MARS • Now
It's time to take ADVIL
100 MG ORAL TABLET
Click Yes to confirm!


Android Emulator - Android_Wear_Round_API_25:5554
MARS • Now
It's time to take ADVIL
100 MG ORAL TABLET
Click Yes to confirm!
YES


Android Emulator - Android_Wear_Round_API_25:5554

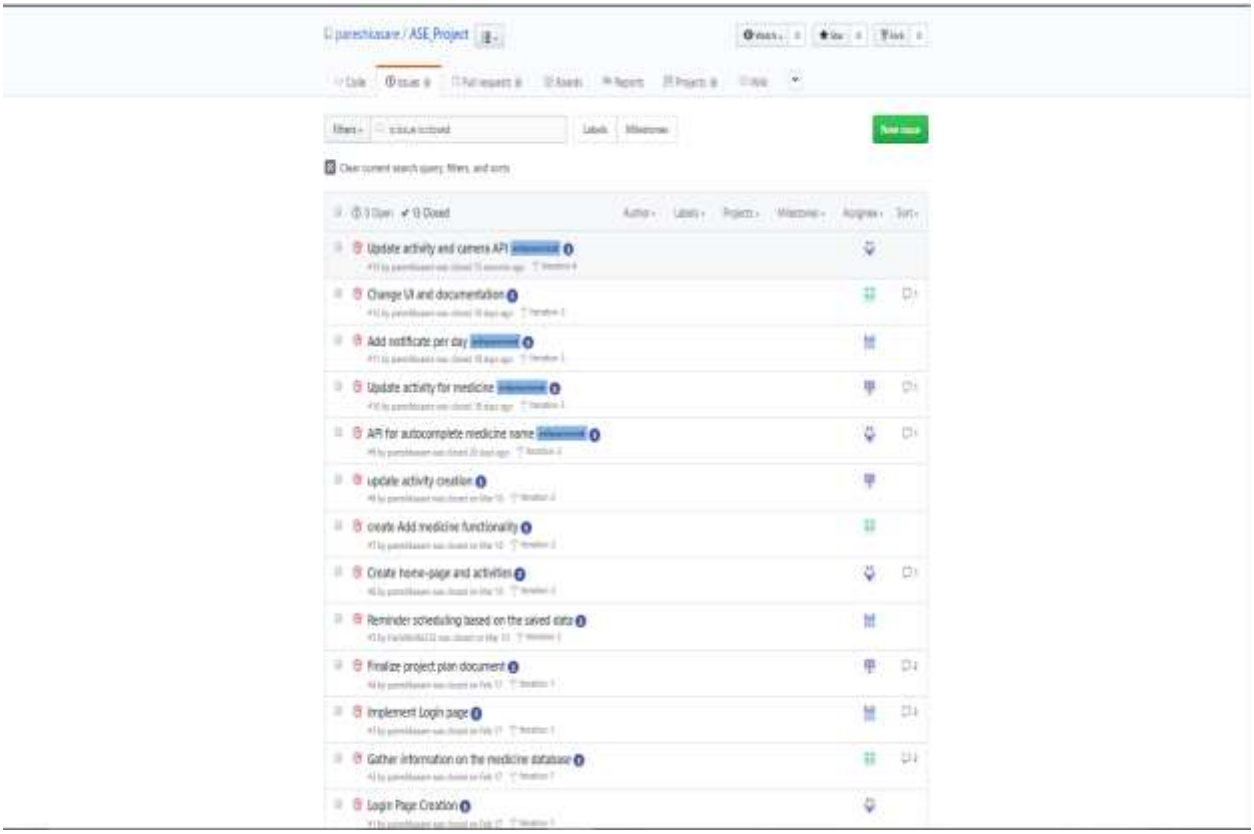

Android Emulator - Android_Wear_Round_API_25:5554
MARS Refill Notification
[QTY 0] It's time to refill medicine


Android Emulator - Android_Wear_Round_API_25:5554
MARS Refill Notification
MARS • Now
[QTY 0] It's time to refill medicine: ADVIL 100 MG ORAL TABLET

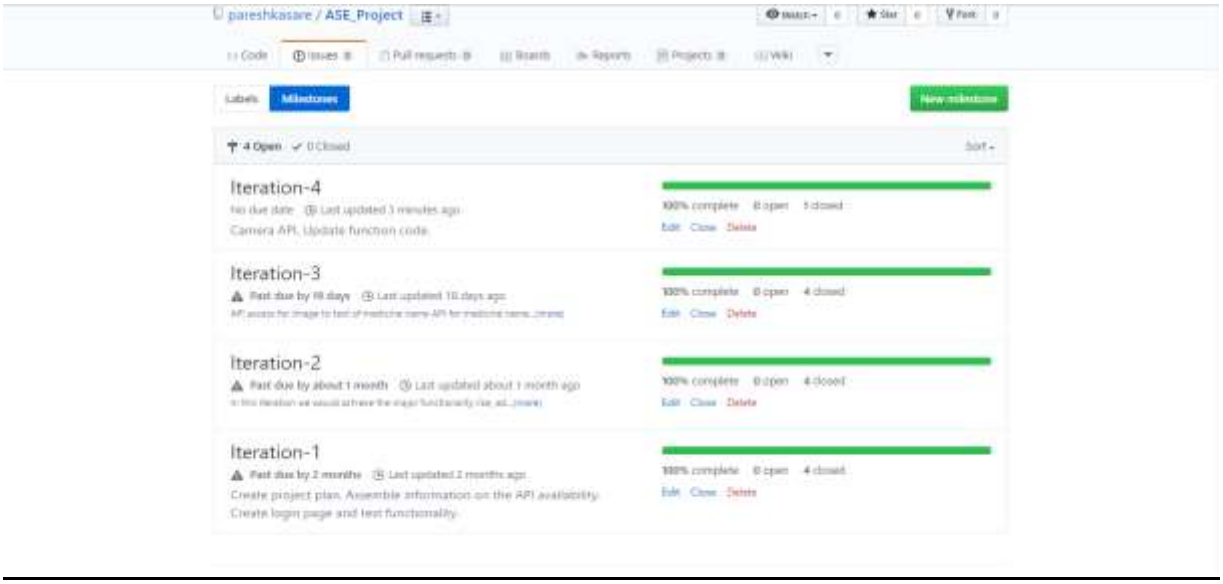

Android Emulator - Android_Wear_Round_API_25:5554

Project Management

Issues:



Milestones:



Burndown Chart:

Final Project Evaluation:

At this point when we look back at conceptualizing the application, we felt agile methodology provided good platform in developing the application from ground up in small increments so we could concentrate on each activity in application with detail and fulfilled all the expected functionality of the application.

Initially, things were not clear but by the end of increment three we took major design decisions to avoid redundant coding such as removing start and end date on the view, out rationale was to let alarm be active until we run out of medicines and that is what doctors recommend to finish prescribed dosage even if you feel good before medicines are over.

The collaboration provided by the github and tools such as creatly helped in creating better UI and conceptualize the idea in writing and drawing.

At the end of this project we are satisfied having built a complete medicine management system for a personal use and we are happy that we could deliver working project on time.

Project Proposal

Project Goal:

The main aim of this application is to provide the user the ability to schedule and notify about the medicine/pill to be taken at appropriate times through android device and smart watch.

Objectives:

We have following objectives for **MARS** system to be able to function as all-inclusive system to manage medicine schedules:

- Develop an android application which will be able to record medicine consumption date, time and accordingly manage inventory.
- Develop an application which will alert the medicines to be taken by creating notifications.
- Develop an application which can manage the medicine quantities and alert users about medicine refill.

Features:

Features we are deploying are:

- Login and Registration for Application
- Add medicine information
- Display medicine's scheduled
- Auto-Complete API for medicine search
- Update the medicine information
- Delete medicine
- Deploying the application on Smart Watch
- Medicine alerts
- Refill alerts

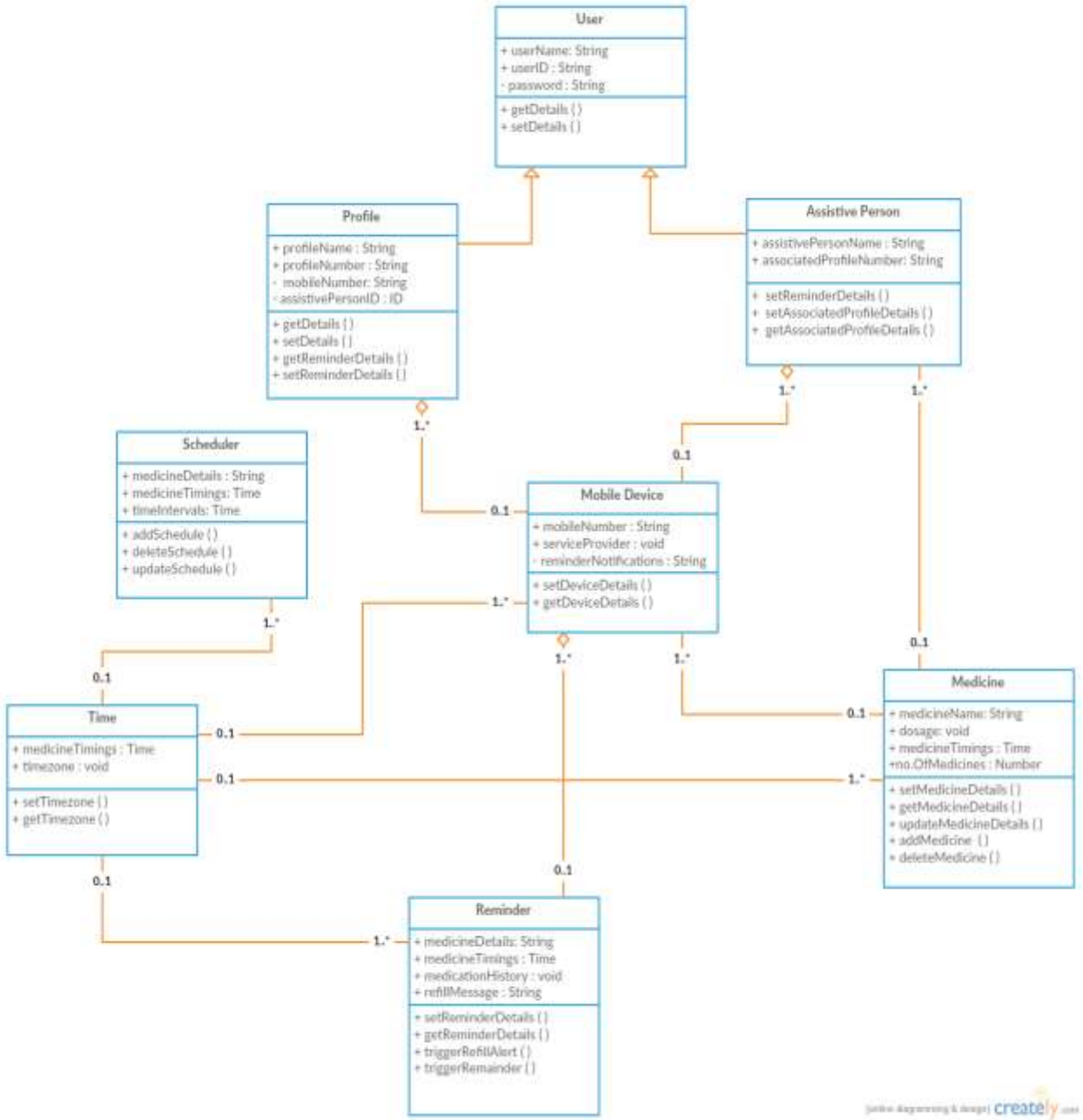
Significance:

As per FDA.gov website, Centers for Disease Control and Prevention (CDC) estimates that nonadherence to taking medicines on time and at prescribed schedule could result in chronic disease treatment failure and in worst case it could lead to death of a person.

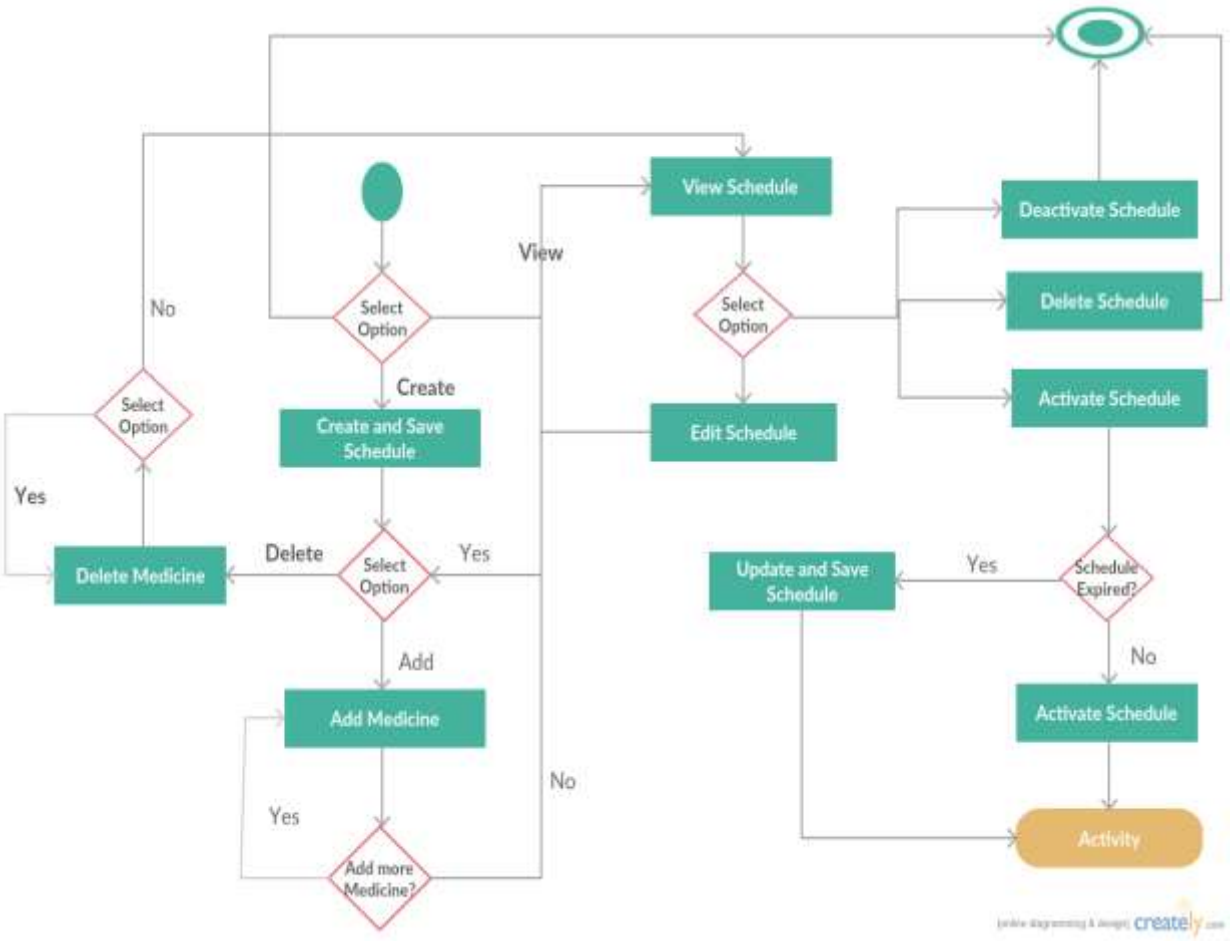
MARS would be helpful to avoid such circumstances which has importance in user's life. There are applications which remind people their medicine consumption times, MARS has multiple functions like Medicine reminder, Medicine refill reminder, Autocomplete for medicine search and also Smart Watch Notifications. All these functionalities make MARS system more relevant for medicine management not just for reminding prescription medication but also over the counter medicines and vitamins that are consumed daily.

Project Plan

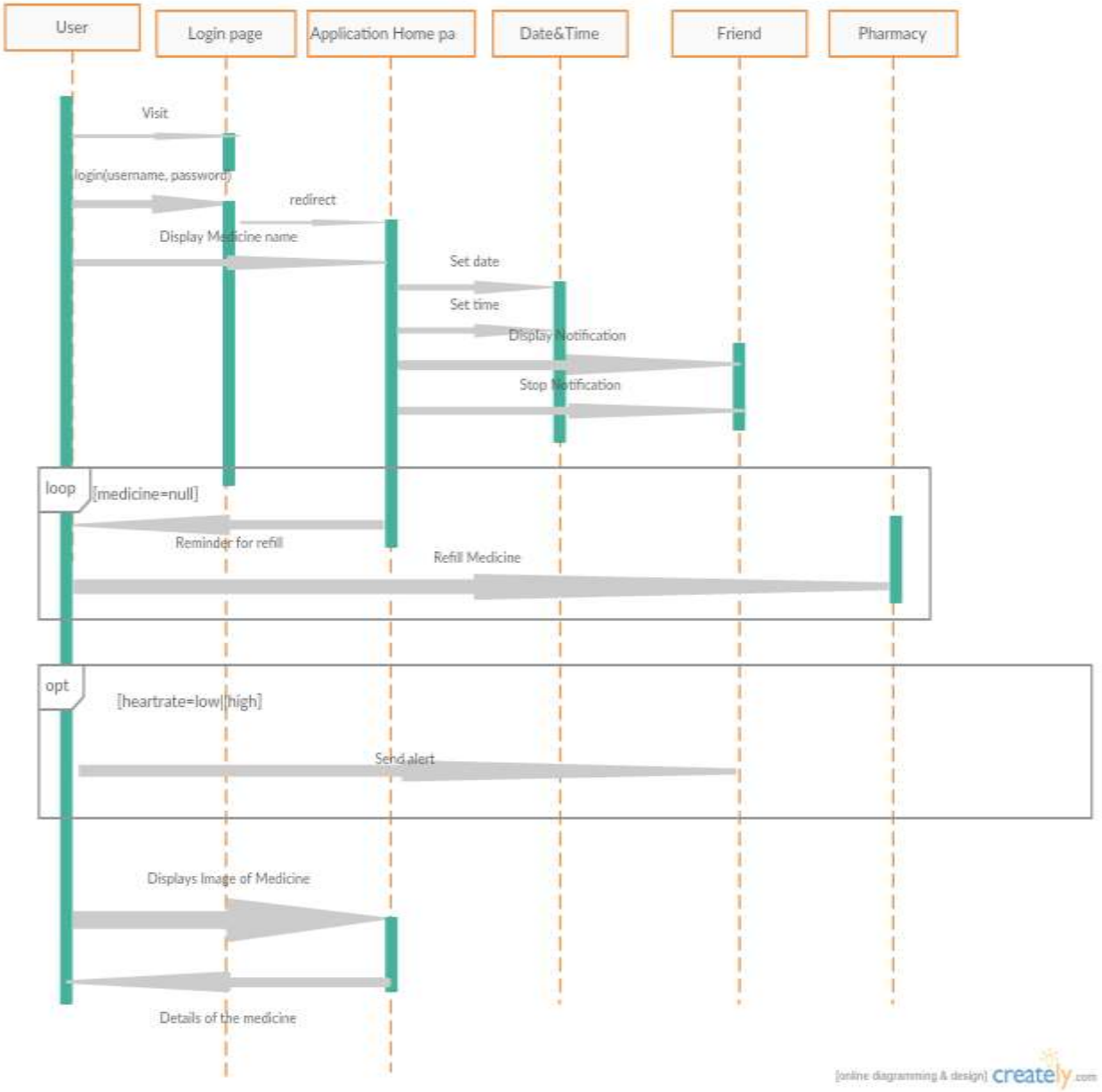
Class Diagram:



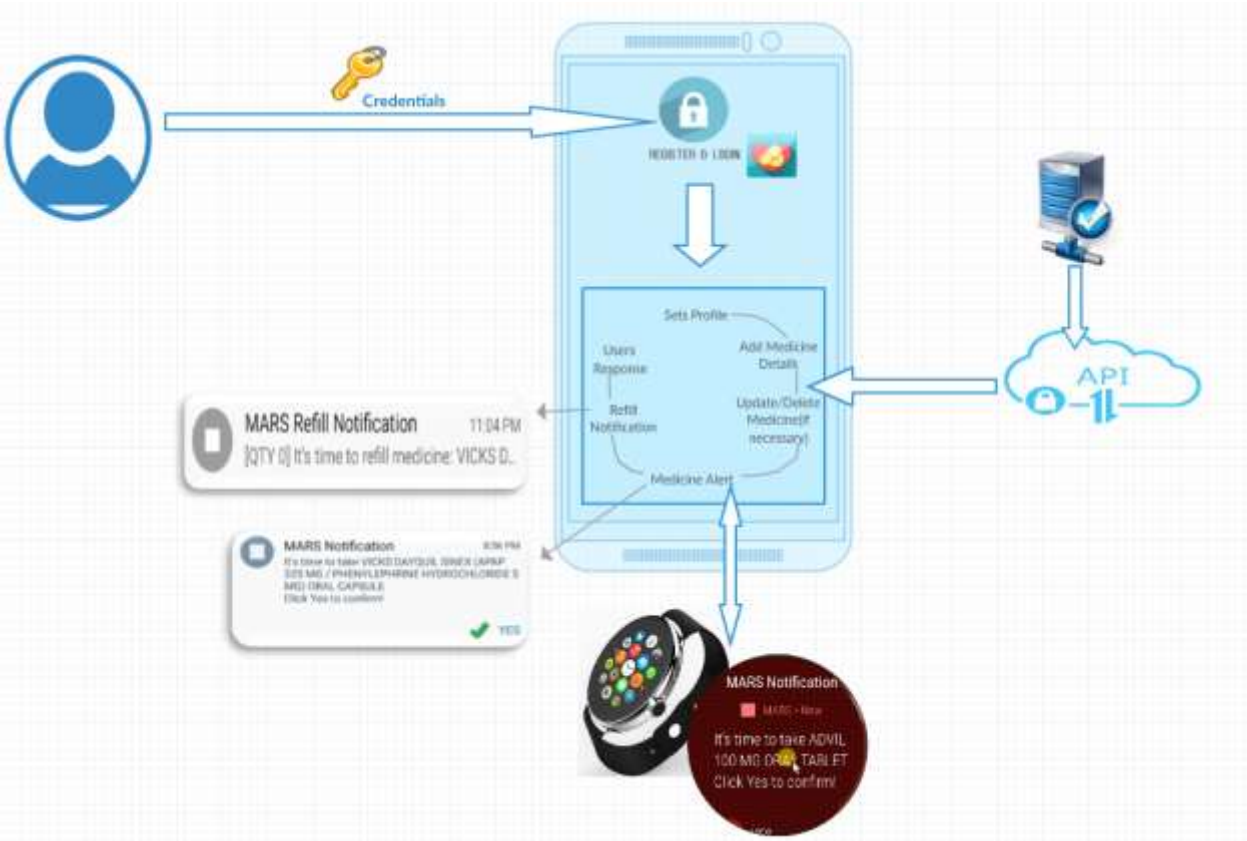
Activity Diagram:



Sequence Diagram:



Architecture Diagram:



First Increment Report

Implementation

In First Increment we have implemented following features:

- Login
- Registration

First Increment Report:

https://github.com/pareshkasare/ASE_Project/blob/master/Documentation/Increament-1%20Report.pdf

Second Increment Report

Implementation

In Second Increment we have implemented following features:

- Main Activity
- Add Medicine Activity
- Medicine Alert

Second Increment Report:

https://github.com/pareshkasare/ASE_Project/blob/master/Documentation/Increament-2%20Report.docx

Third Increment Report

Implementation

In Third Increment we have implemented following features:

- Add notifications per day
- Display medicines
- Delete alarm manager in update activity
- Delete medicine
- Change medicine schedule
- Increase/Decrease medicine quantity

Third Increment Report:

https://github.com/pareshkasare/ASE_Project/blob/master/Documentation/Increment-3/finalincrementreport3.pdf

Fourth Increment Report

Implementation

In Fourth Increment we have implemented following features:

- Update the medicine information
- Delete medicine
- Display the medicines scheduled
- Extending notifications on Smart Watch and record user actions
- Medicine alerts as notification with action button.

Fourth Increment Report:

https://github.com/pareshkasare/ASE_Project/blob/master/Documentation/Increment-4/finalincrement-4.pdf

Testing

Sr. No	Test Case	Description	Expected Output	Result
1.	Successful User Authentication	The user should login with username and password.	Successful Login	Pass
2.	Unsuccessful User Authentication	The user logs in with wrong username or password	Login unsuccessful with error-Invalid username or password	Pass
3.	Registration by new user	Admin accepts registration details from the user	Successful registration and transition to Login page	Pass
4.	Invalid Email ID	Invalid Email Id alert.	Error- Enter valid email address	Pass
5.	Inserting the data into AddActivity.	Details are stored in a separate file.	Data is saved and is redirected to MainActivity.	Pass
6.	Details stored in file are displayed on the MainActivity.	On click of the medicine icon displays all the details of the medicine entered in AddActivity.	On click redirects to UpdateActivity.	Pass
7.	Displays all the details stored previously in the AddActivity.	Medicine Information can be edited or the medicine can be	Updated details are again stored in the same file and if any medicine is	Pass

		deleted once it's course is done.	deleted then file related to that particular medicine is also deleted.	
8.	Medicine Alert notification creation.	Takes data from the file and alerts user/admin to take the pill.	On click of the 'YES' button sets the alarm off for that day.	Pass
9.	Medicine Refill Notification.	When a particular medicine is finished,then a Refill notification is created.	On click of the 'YES' button sets the alarm off for that day.	Pass
10.	Smart Watch Deployment.	The Medicine Alert and Refill Notifications are displayed on Smart Watch.	On click of the 'YES' button sets the alarm off for that day.	Pass

Technologies Used

Implementation of Mobile App - Technologies Used:

- XML
- Java
- REST API

Tools Used:

- www.Creately.com
- Android SDK

Project Management

Work Completed:

- Design and Architecture of the Application
- Login and Registration.
- Gather Information on Medicine Database.
- Home Page Creation.
- Add Medicine Functionality.
- Update Medicine Information.
- API for AutoComplete medicine name enhancement.
- Notification Receiver and Read Notification Activities.
- Deploying the application on Smart Watch.
- Improving the User Interface of the application.

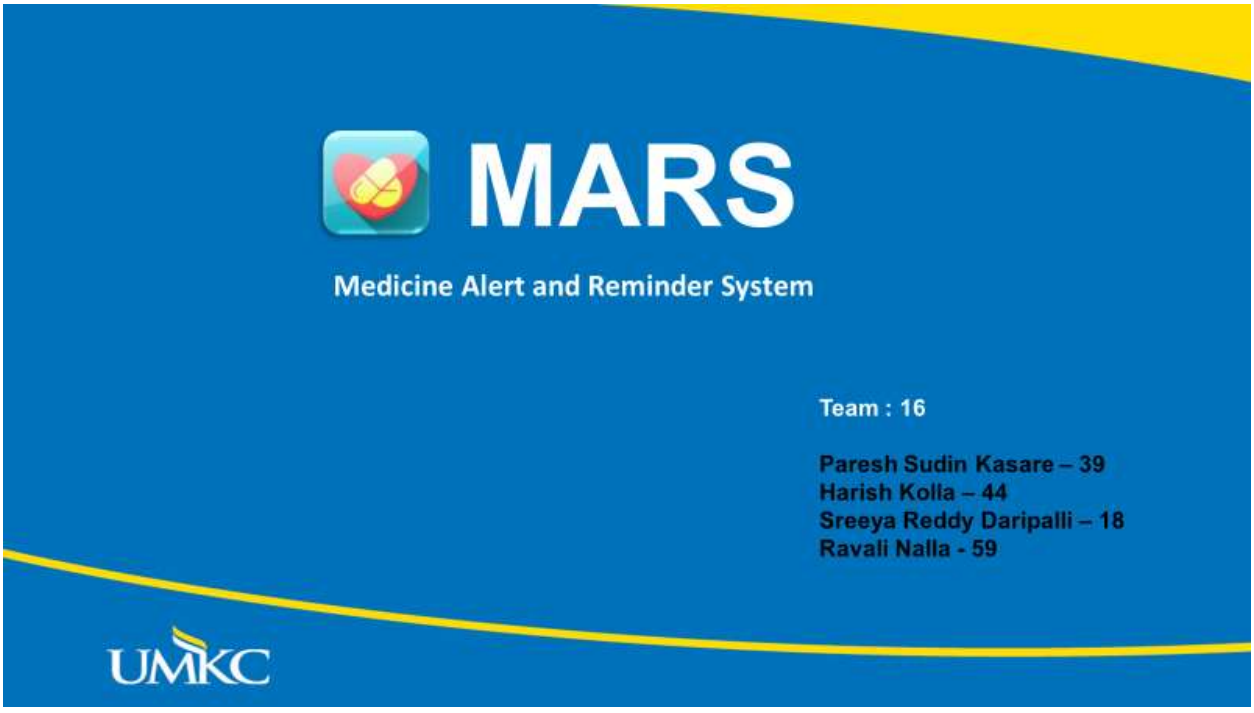
Contributions:

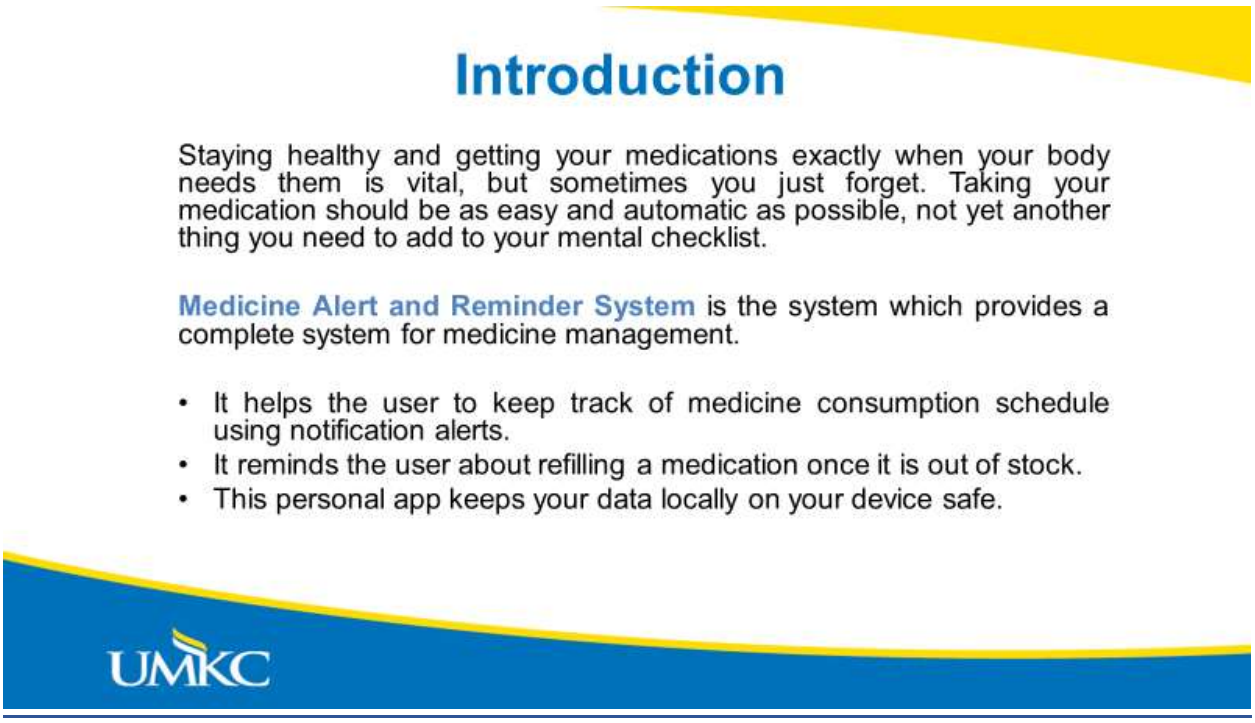
Paresh Sudin Kasare	Harish Kolla	Sreeya Reddy Daripalli	Ravali Nalla
Login and Registration Page Creation	Wireframes and UML	Gather medicine information and API's and UML	Project Plan Documentation
Create home page and activities	Reminder Scheduling based on saved data	Add medicine functionality	Update Activity creation
API for Autocomplete medicine name and Notification Activity	Worked on Notification Activity	UI and Documentation	Worked on Update Activity
Update Activity and Smart Watch Deployment	Documentation and Test Cases	Entire GUI for Application	Documentation and Test Cases

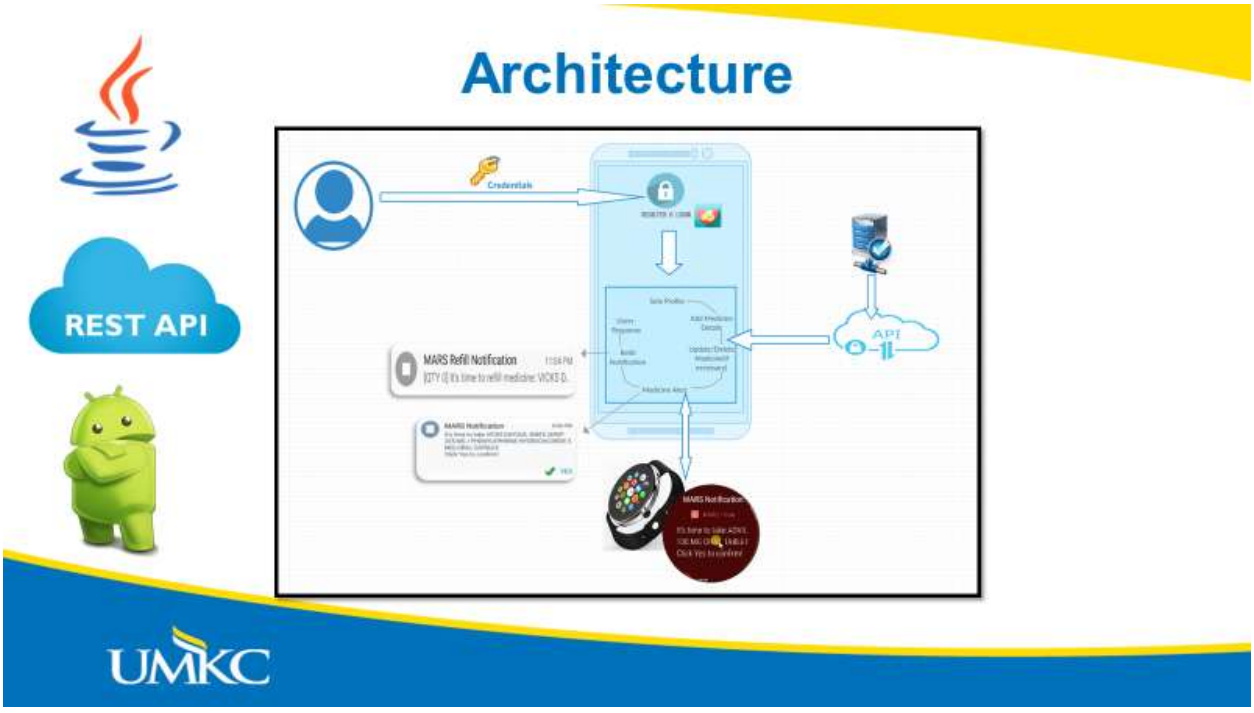
Future Work

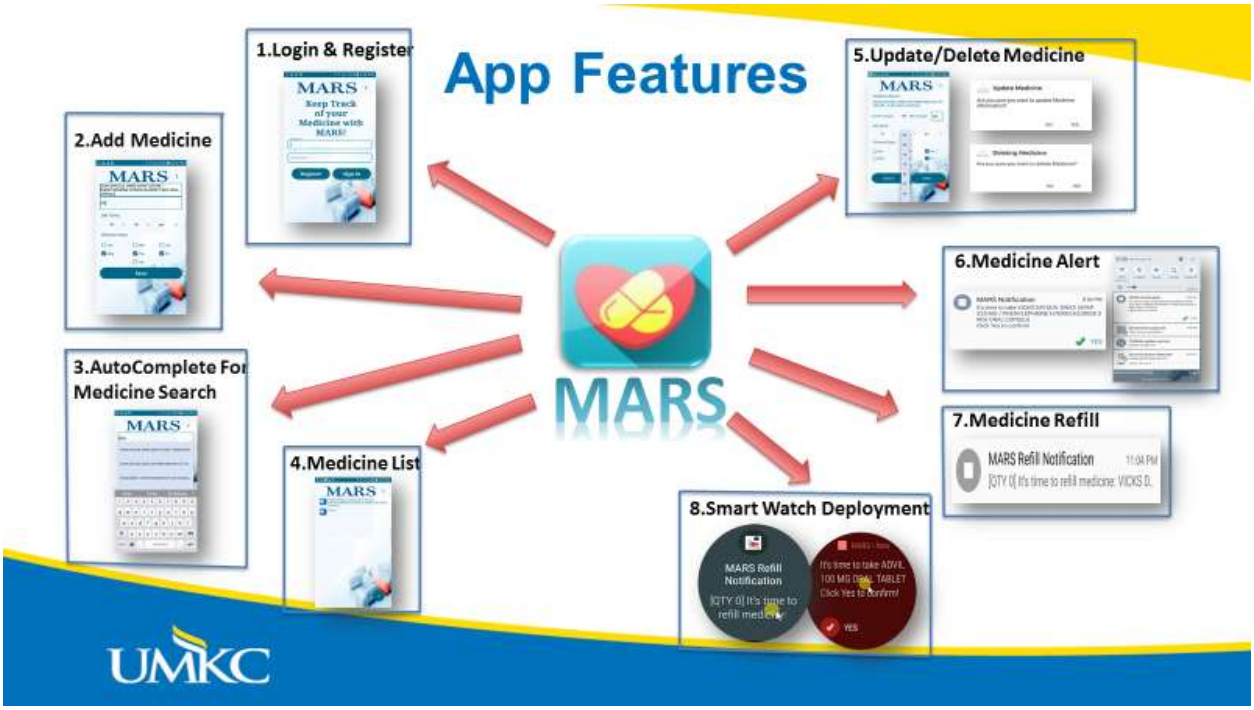
- In future, we could add features to let caregiver to manage medicine of patient.
- We can also provide analytics/reporting tool to provide how user has been keeping up with the schedule and are there any missing dosage information to discuss with doctor on next visit.
- We could also have a feature to allow setup of medicine for multiple times of the day on same screen. Currently we can setup only one time and multiple days.

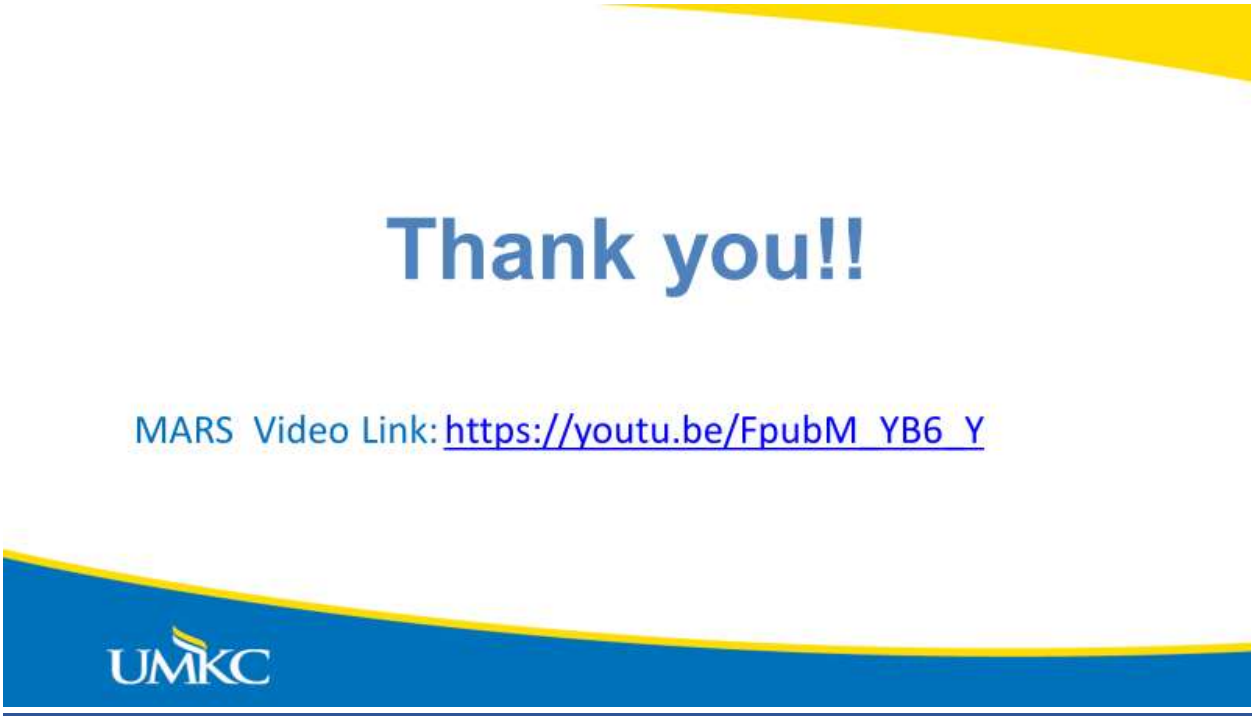
Presentation Slides






Architecture
REST API
Credentials
MARS Refill Notification
API
UMKC


App Features
1.Login & Register
2.Add Medicine
3.AutoComplete For Medicine Search
4.Medicine List
5.Update/Delete Medicine
6.Medicine Alert
7.Medicine Refill
8.Smart Watch Deployment
MARS
UMKC



GitHub Link of project repository

https://github.com/pareshkasare/ASE_Project

YouTube Video Link of application

https://www.youtube.com/watch?v=FpubM_YB6_Y

Bibliography

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