

FMS

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Domain :

MES (Manufacturing Execution System).

Project Goal and Objectives :

Motivation :

In many of the Manufacturing industries, a product is manufactured either by man power or by machinery or both sometimes. Once I had an opportunity to visit manufacturing unit in my country, Where the major part of the work is done by the equipment's. There was a situation where any fault in the equipment, the maintenance is done manually. For Instance, if there was any failure in the equipment, the supervisor informs the maintenance team via phone/email. Then the maintenance team has a checklist which has steps for defect resolutions, which is time consuming process and un-trackable. This has triggered me the idea, which automates the whole process of maintenance system, which is called Factory Maintenance System(FMS).

Significance :

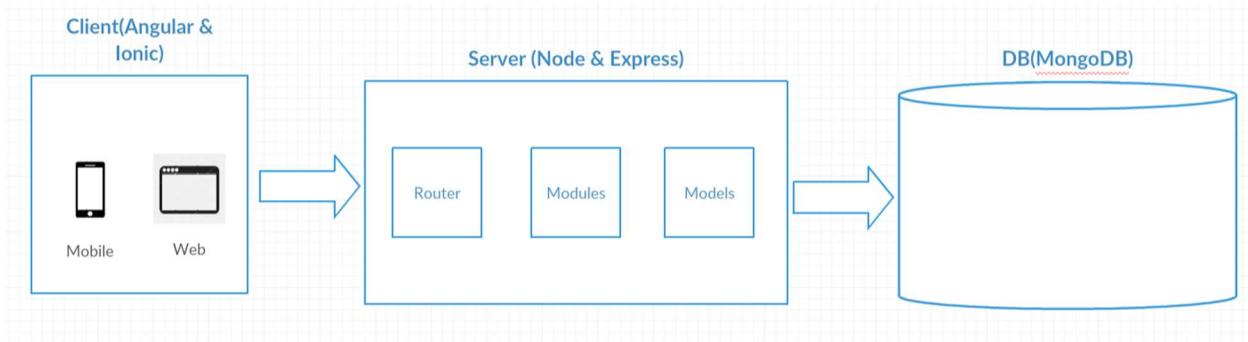
Importance of Factory Maintenance System:

1. Notify the defects or flaws in the machinery to the particular maintenance team , through a centralized ticketing system. Which reduces time consumption and man power.
2. Investigate the Root cause analysis of the failure and can derive solutions to avoid such failures in future.
3. Easy to guide the maintenance team.

Objectives:

To create a centralized maintenance system, which automates the maintenance process in a manufacturing unit and track their root cause.

Architecture diagram:



Modules List:

Web Modules:

1. Login.
2. User.
3. User Group.
4. Machine.
5. Machine Group.
6. Regular Maintenance.
7. Area.
8. Line.
9. Reasons.
10. Documents.
11. Parts.
12. Step group.
13. Template.
14. Settings.
15. Import.

Mobile Modules:

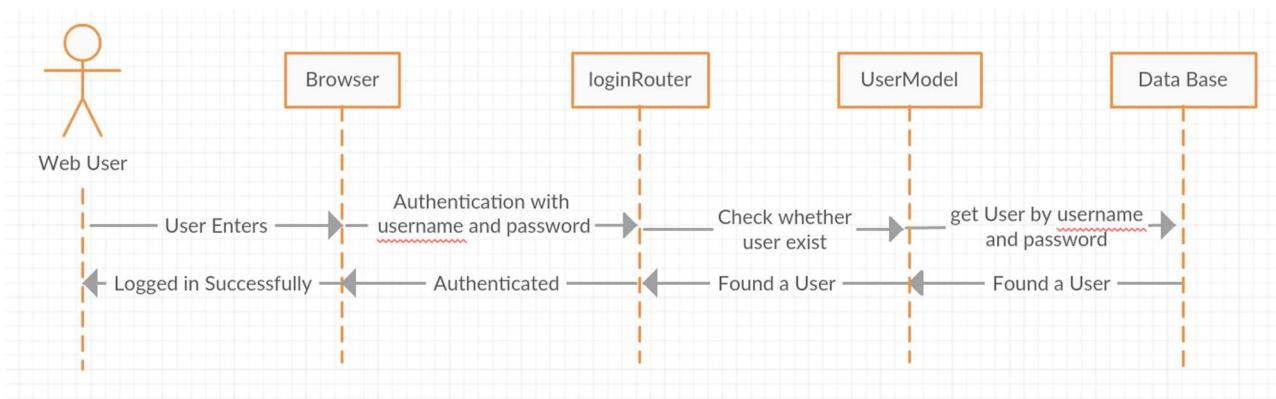
1. Login.
2. Alert.
3. Ticket.
4. Steps.

Login:

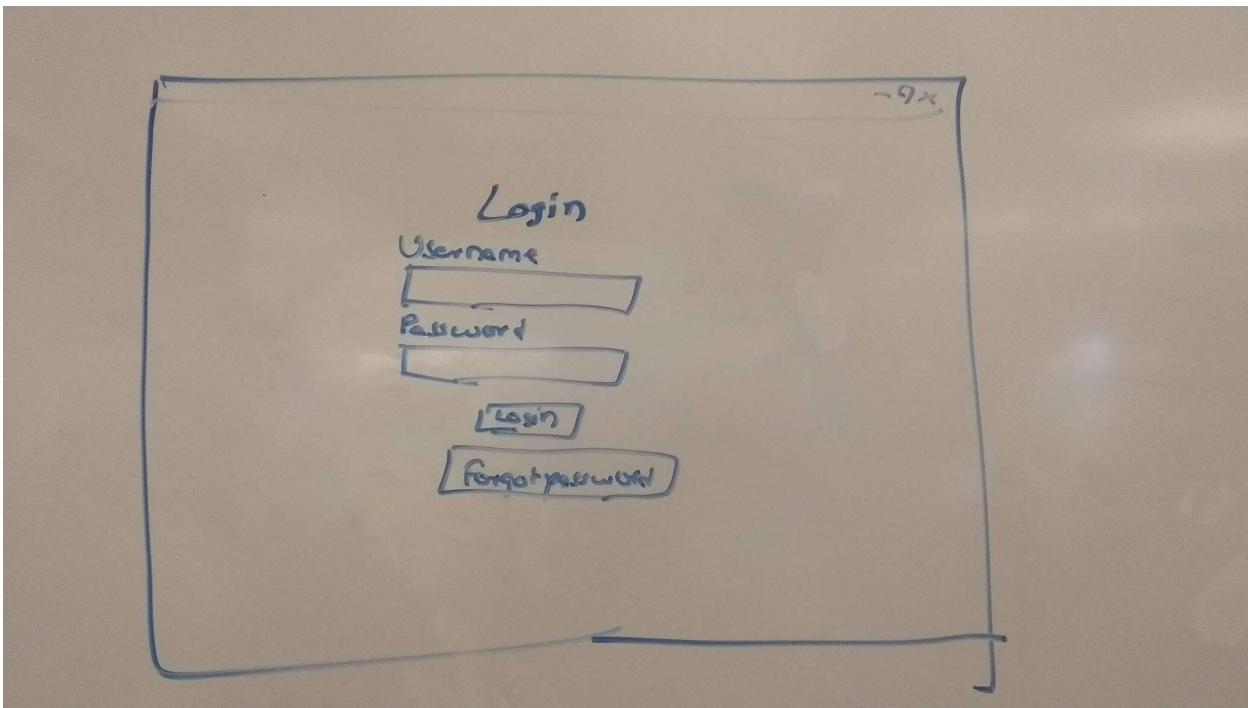
This is the login page. By default we are going to provide Admin user which will have all the permissions.

The screenshot shows a login interface. At the top, there is a blue header bar with some small icons. Below it is a white form area with a title "Login" and a lock icon. The form has two input fields: "Username" containing "admin" and "Password" containing ".....". Below the inputs are two buttons: "Login" and "Forgot Password".

Sequence diagram:



Wireframe:



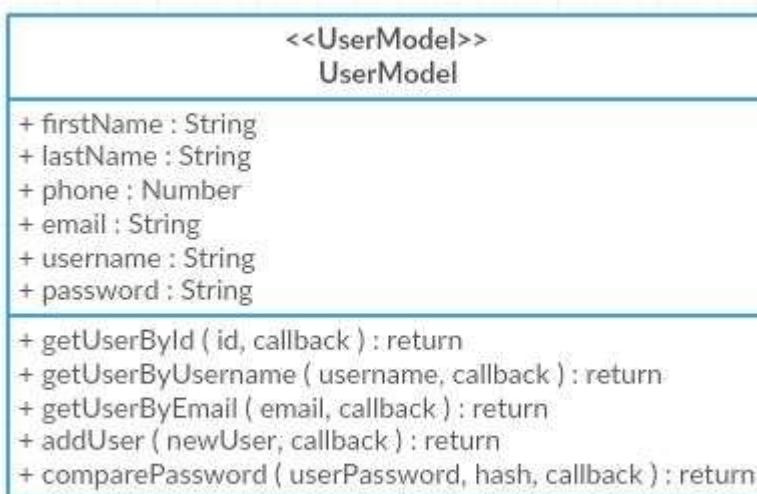
User:

This is the user page where we are going to create user in the factory. This user is created by admin or the user group who is having access to this page.

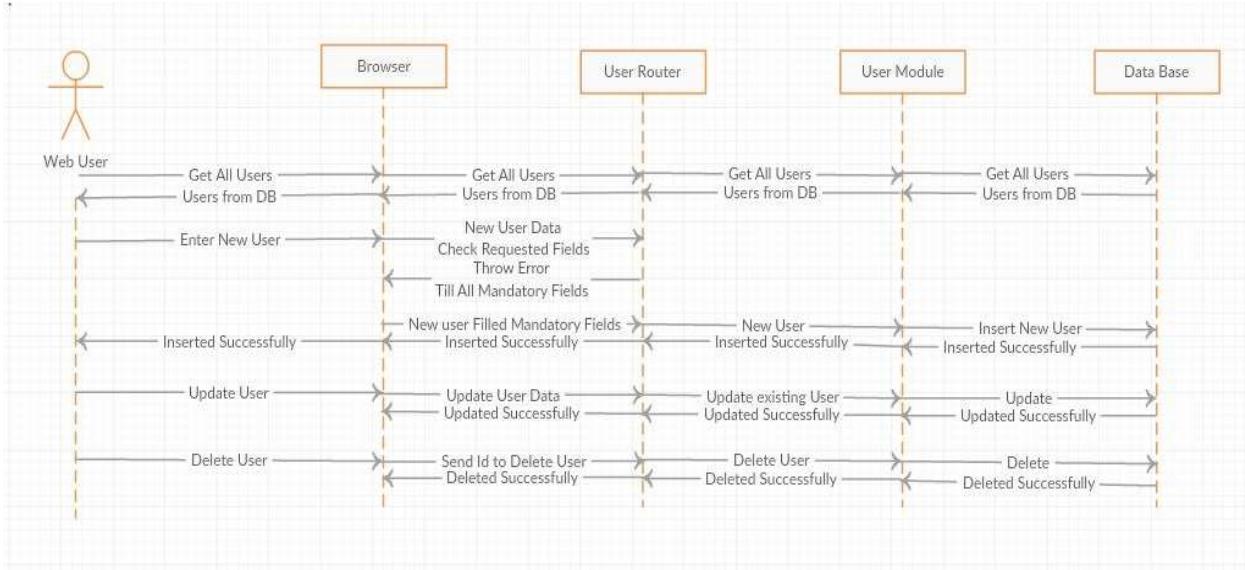
The screenshot shows a web-based application interface for managing users. At the top, there is a blue header bar with the FMS logo and navigation links for Home, User, Machine, and Settings. On the far right of the header is a Logout button. Below the header, the main content area has a left sidebar labeled 'User' and 'User group'. The main panel is titled 'User List' and displays three user entries in a grid format. Each entry contains the user's name, email, and date of join. A 'New' button is located in the top right corner of the main panel.

Name	Email	Date of Join
Name : Admin Admin	Email : momc5@mail.umkc.edu	Date of Join : 8/10/2018
Name : Bob B	Email : momc5@mail.umkc.edu	Date of Join : 12/24/2018
Name : Jhon J	Email : murali.24.4.91@gmail.com	Date of Join : 12/30/2018

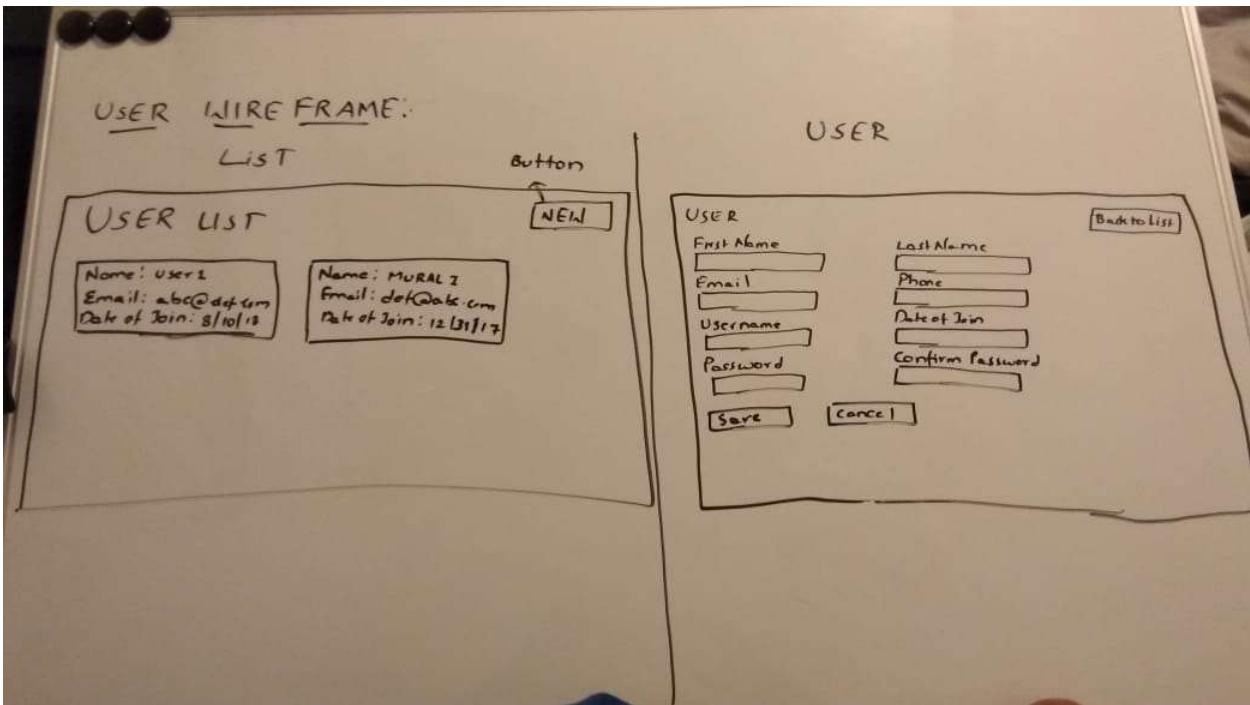
Class diagram:



Sequence Diagram:



Wireframe:



User Group:

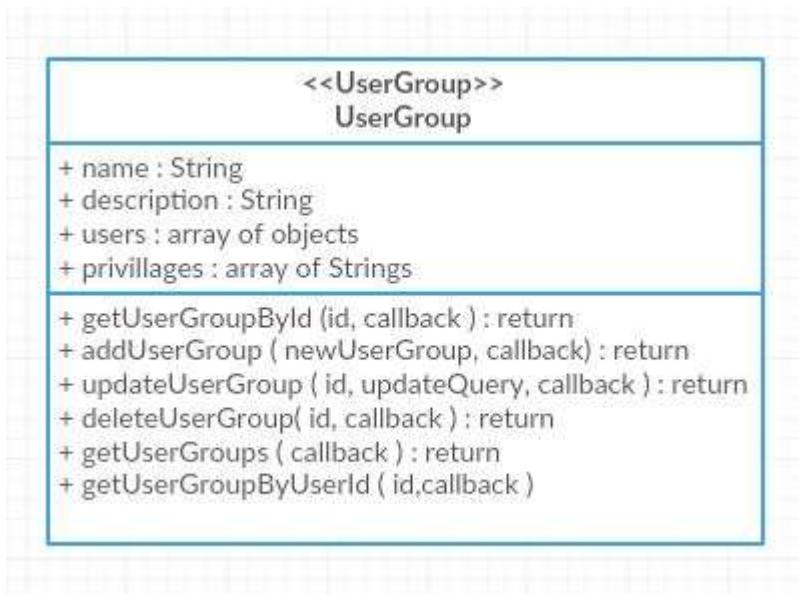
In this user group we can create different group and set privileges to each group. By default, Admin group will be given after deploying the application.

The screenshot shows a web application interface for managing user groups. At the top, there is a blue header bar with the FMS logo and navigation links for Home, User, Machine, and Settings. On the far right of the header is a Logout link. Below the header, the main content area has a left sidebar with a dark grey background labeled 'User' at the top and 'User group' below it. The main content area is titled 'User group List'. It displays three user group entries in a grid format:

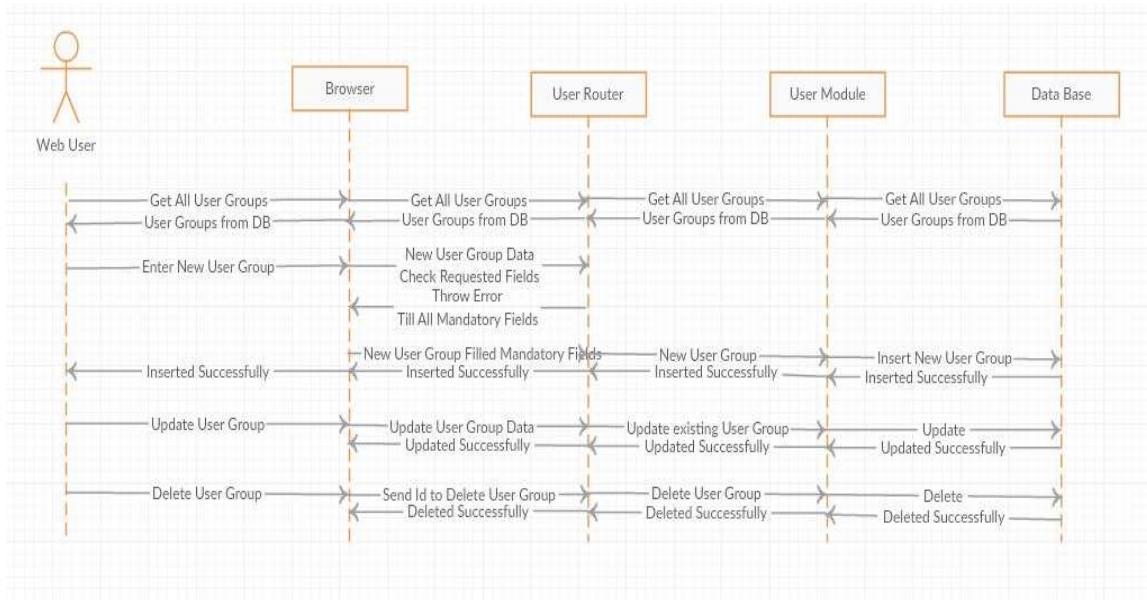
Name	Description
Name : Admin group	Description: Admin Group
Name : Maintenance group	Description: Maintenance group
Name : Supervisor group	Description: Supervisor group

A blue 'New' button is located in the top right corner of the content area.

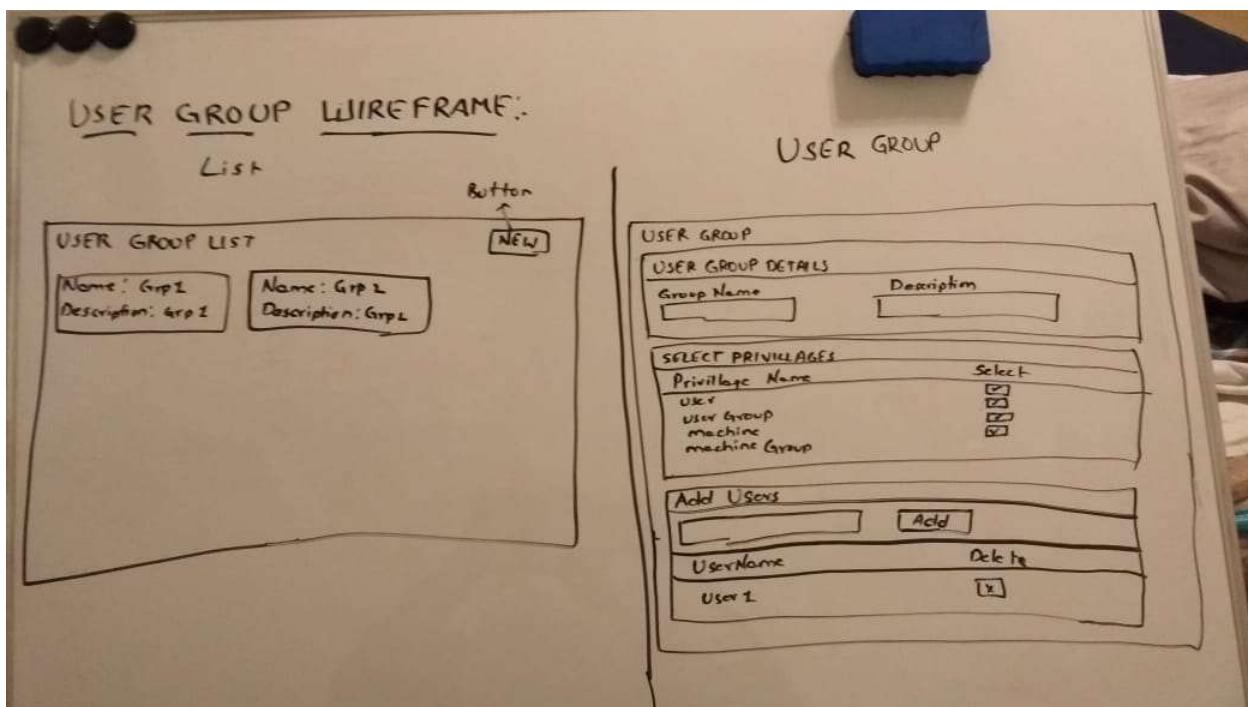
Class diagram:



Sequence Diagram:



Wireframe:



Machine:

In this page we can create the all machine present in the factory. We can create machine either manually or by importing via excel.

The screenshot shows a 'Machine List' page with a sidebar on the left containing links: Home, User, Machine (which is selected), and Settings. The main area displays three machines with their details in separate boxes:

- Name : Machine 1
Area: Area 1
Line: Line 1
- Name : Machine 2
Area: Area 1
Line: Line 1
- Name : Machine 3
Area: Area 1
Line: Line 1

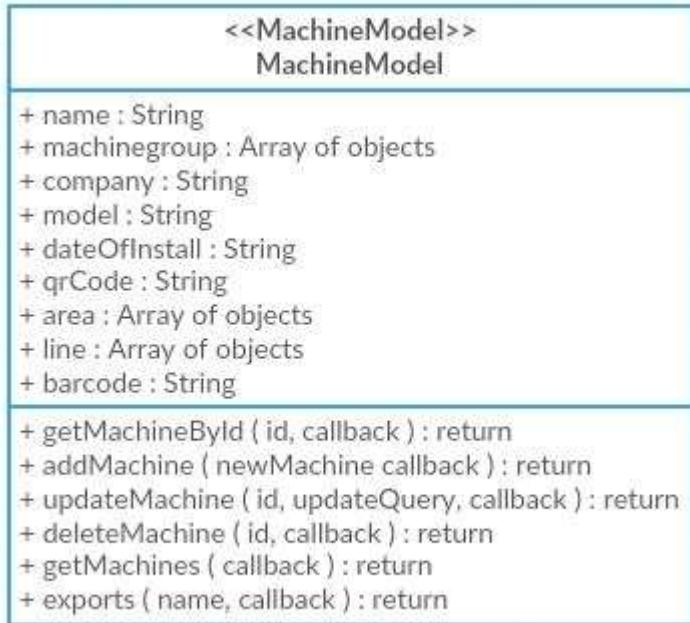
A 'New' button is located in the top right corner of the main area.

The screenshot shows a 'Machine' creation form with a sidebar on the left containing links: Home, User, Machine (selected), and Settings. The main area has the following fields:

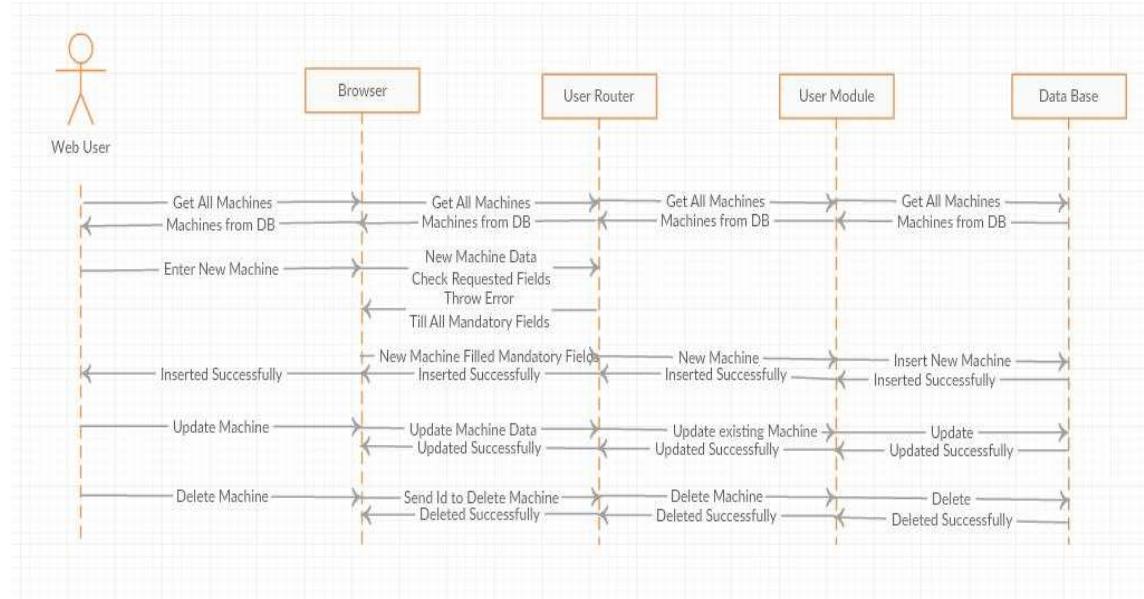
Name	Machine group	Company Name
<input type="text"/>	<input type="text" value="--Select Machine Group--"/>	<input type="text"/>
Date Of Install	Area	Line
<input type="text" value="Datepicker"/>	<input type="text"/>	<input type="text"/>
Barcode	Model	
<input type="text"/>	<input type="text"/>	

At the bottom are three buttons: 'Save' (blue), 'Cancel' (blue), and 'Show QR' (blue).

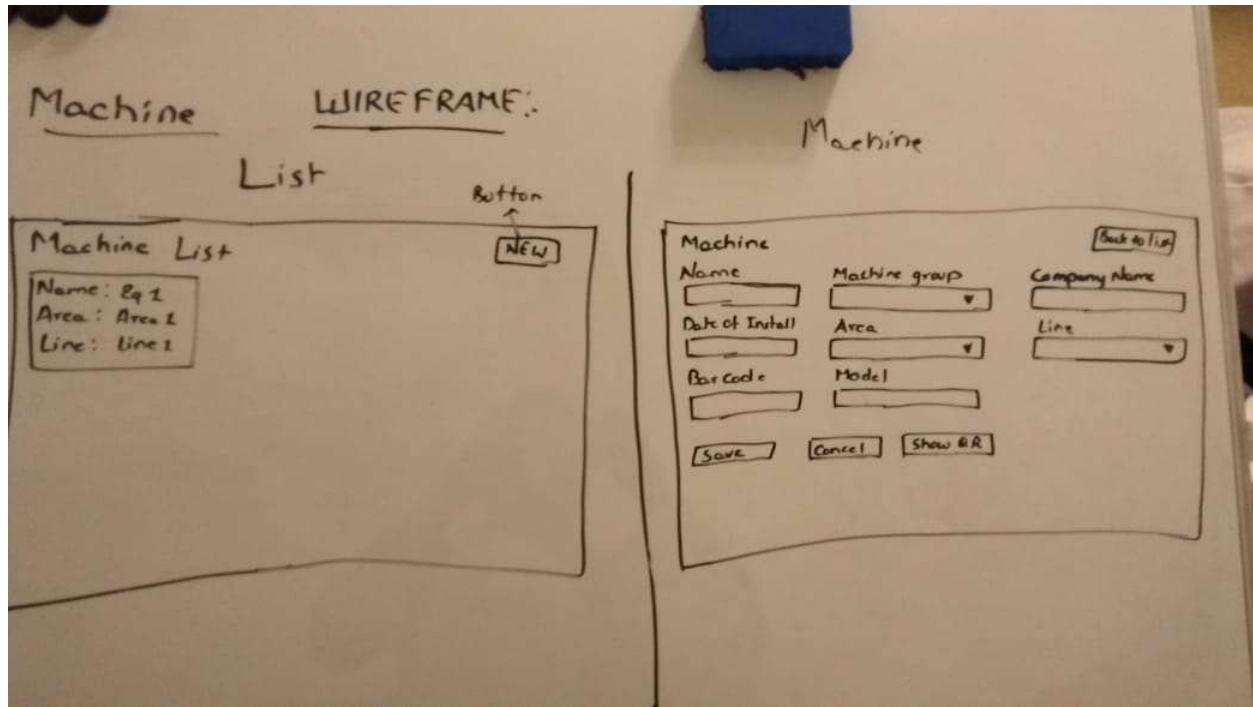
Class diagram:



Sequence diagram:

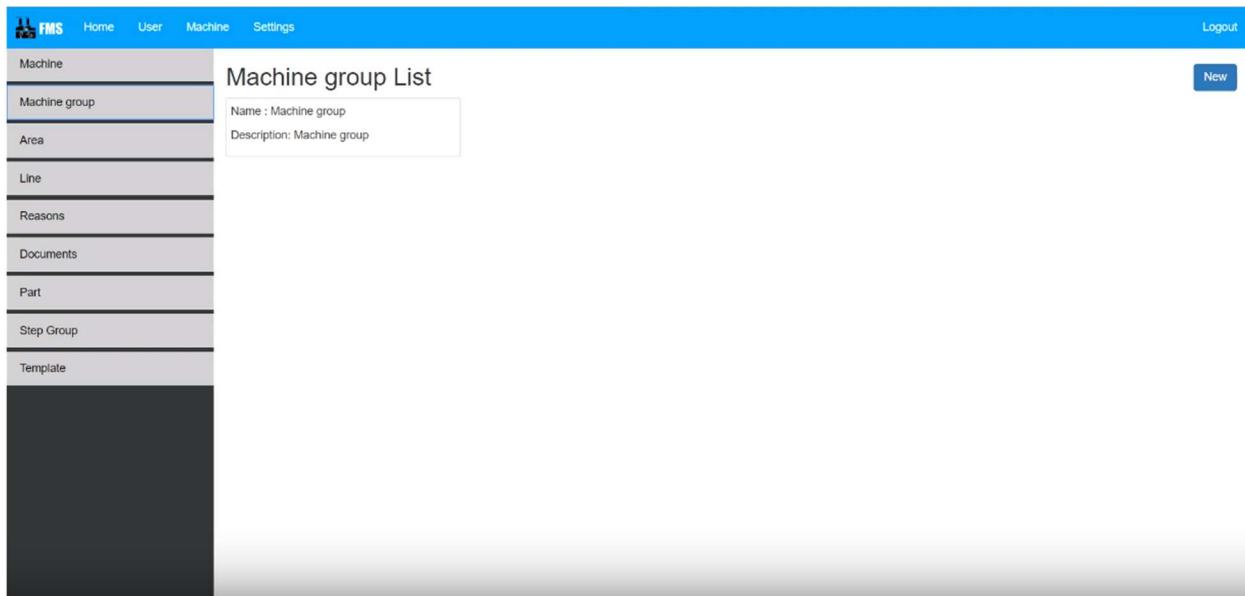


Wireframe:

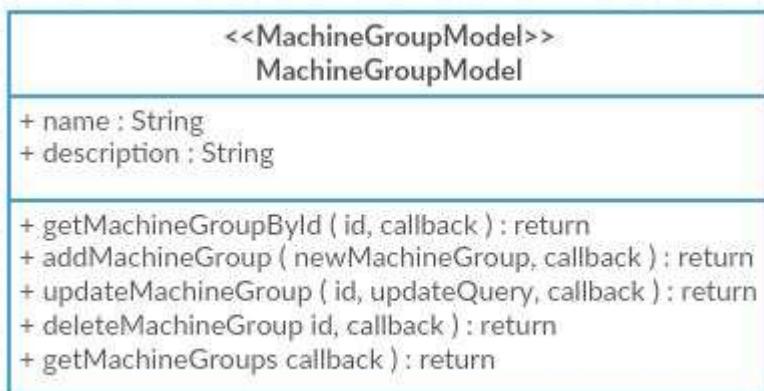


Machine Group:

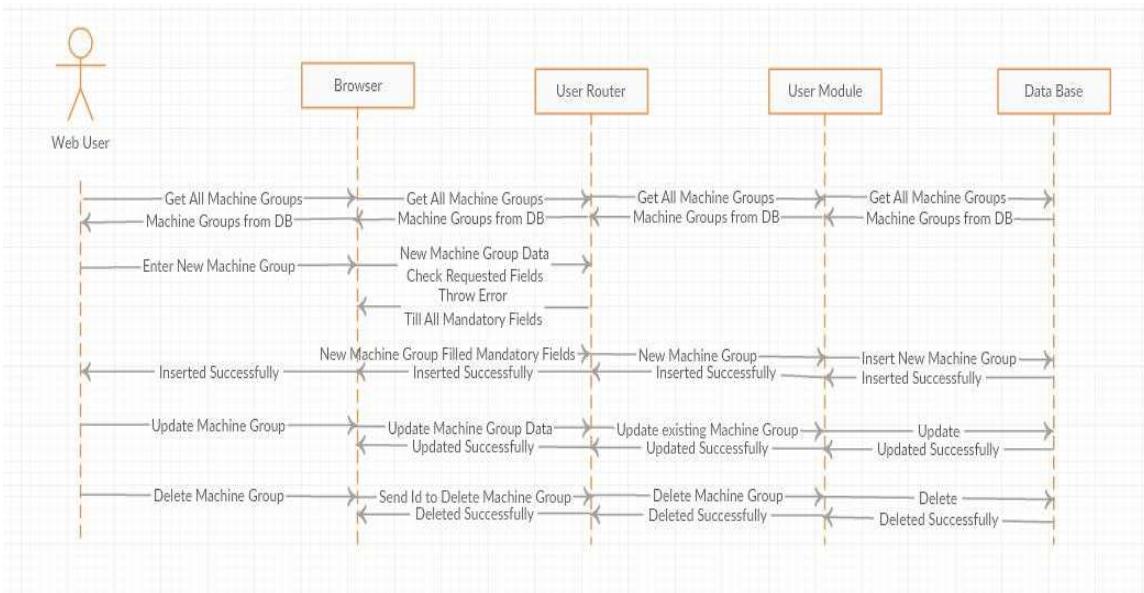
We can group the machines by its category. We can add this machine group inside the machine page.



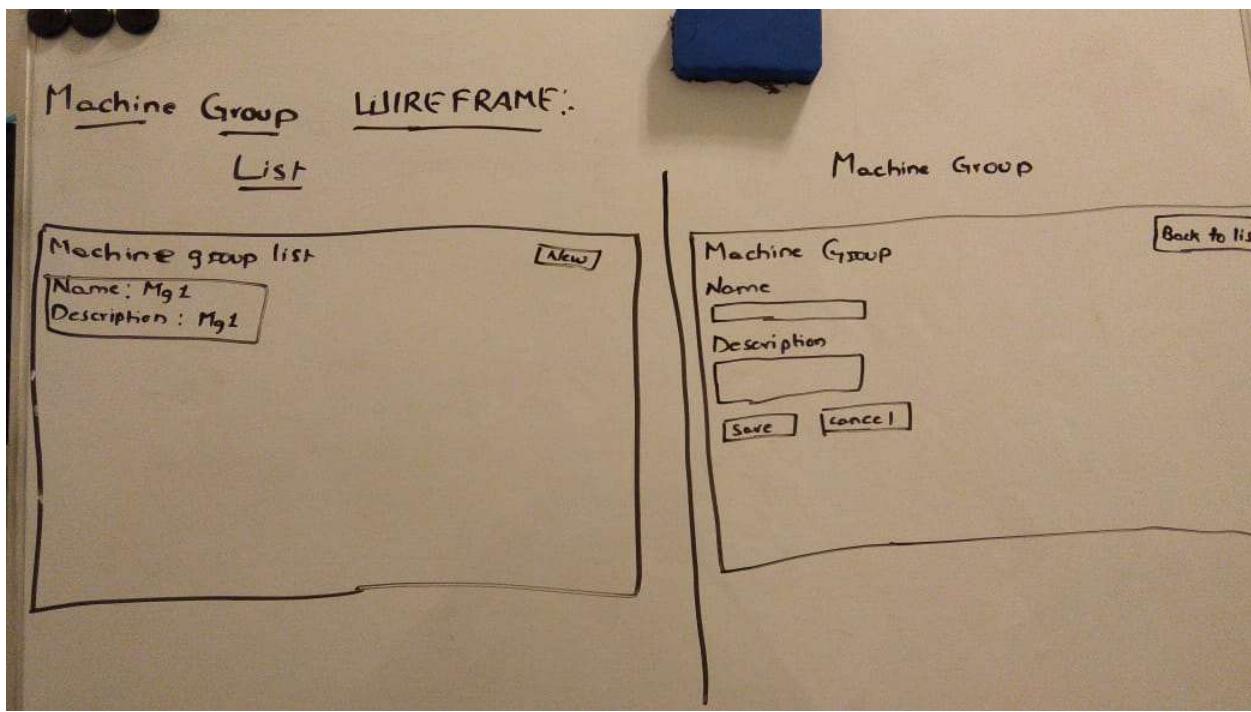
Class diagram:



Sequence diagram:

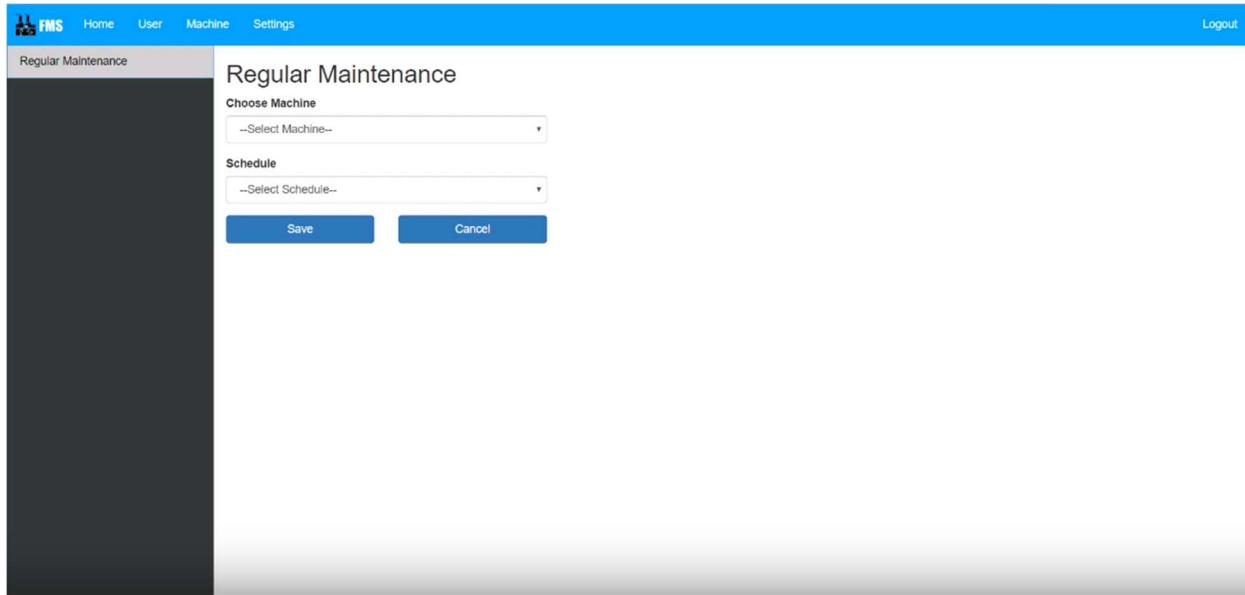


Wireframe:

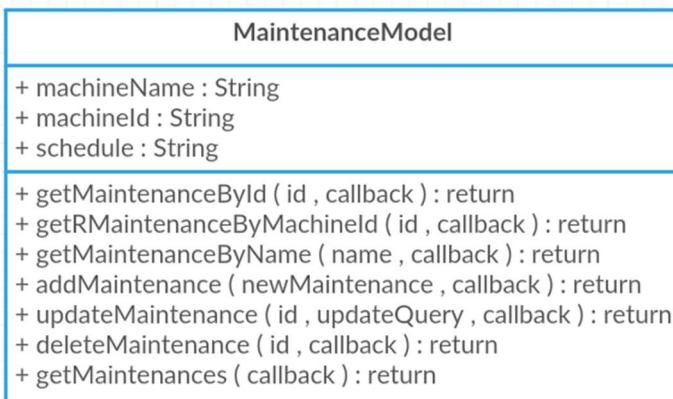


Regular Maintenance:

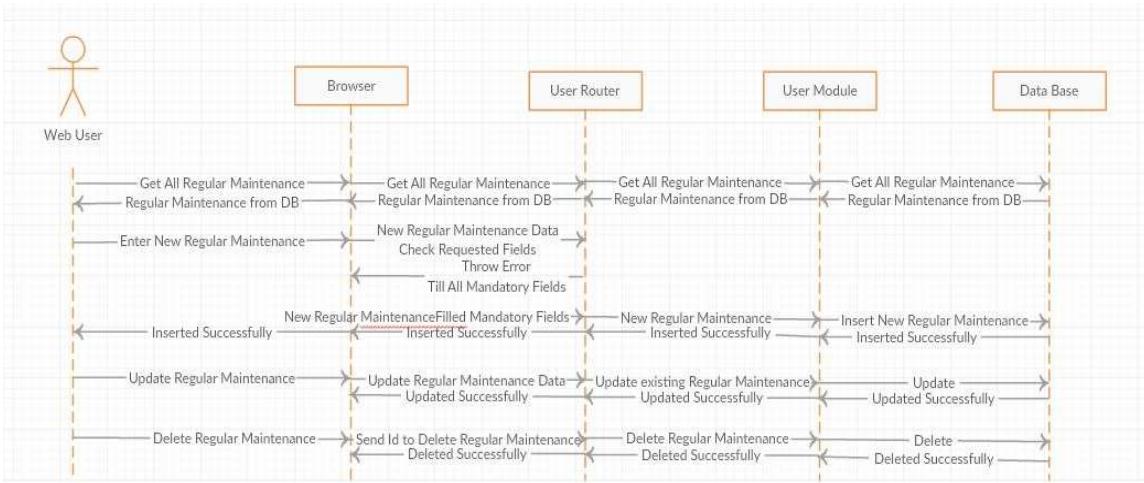
Every machine we need to do maintenance regularly otherwise it will fail during the production which will affect the profit. In this page we can schedule regular maintenance which will create maintenance ticket automatically.



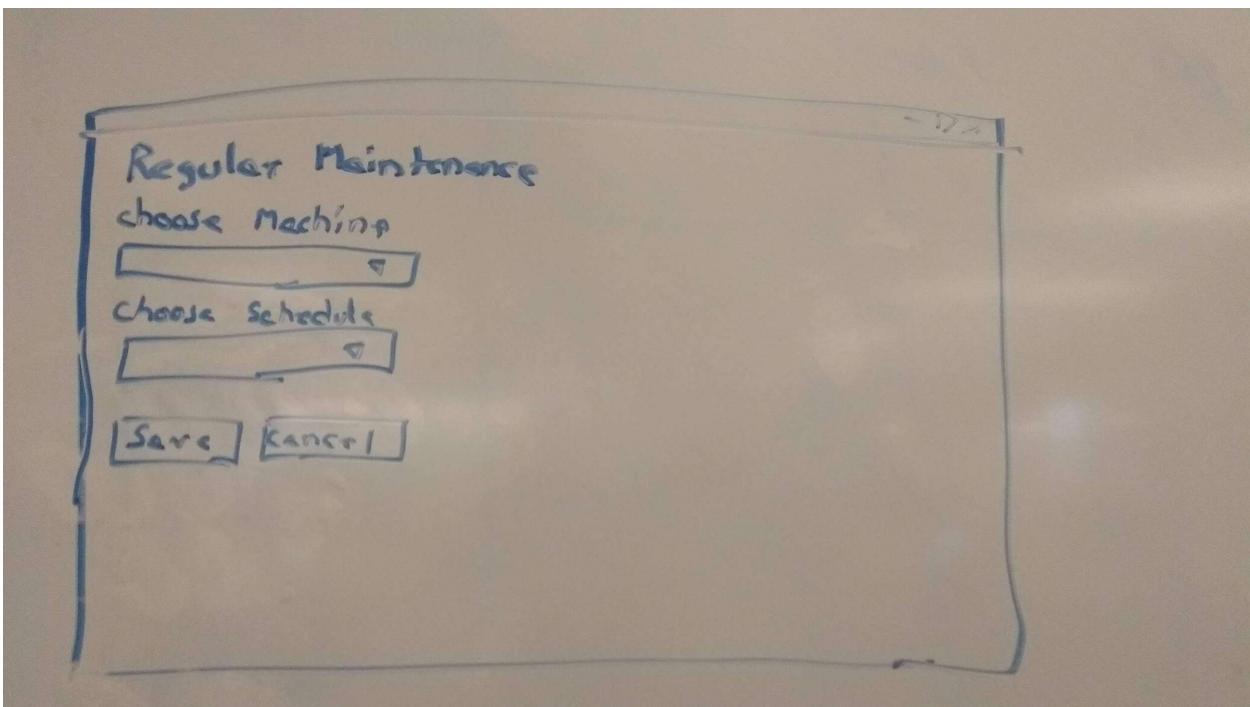
Class diagram:



Sequence diagram:



Wireframe:

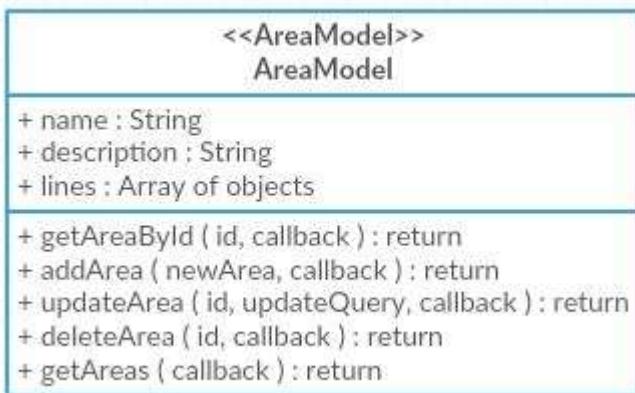


Area:

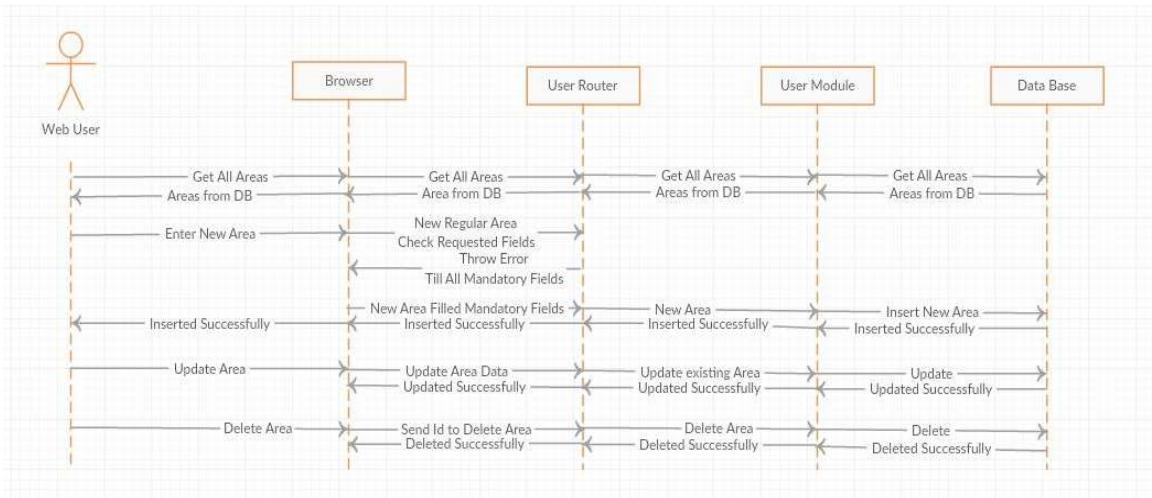
The factory will be divided into areas. Every area will contain lines. In the line machine will be place. In this page we can create the areas in the factory.

The screenshot shows the FMS application interface. At the top, there is a blue header bar with the FMS logo, navigation links for Home, User, Machine, and Settings, and a Logout button. Below the header is a sidebar on the left containing links for Machine, Machine group, Area, Line, Reasons, Documents, Part, Step Group, and Template. The main content area is titled "Area List" and displays a single entry: "Name : Area 1" and "Description: Area 1". In the top right corner of the content area, there is a "New" button.

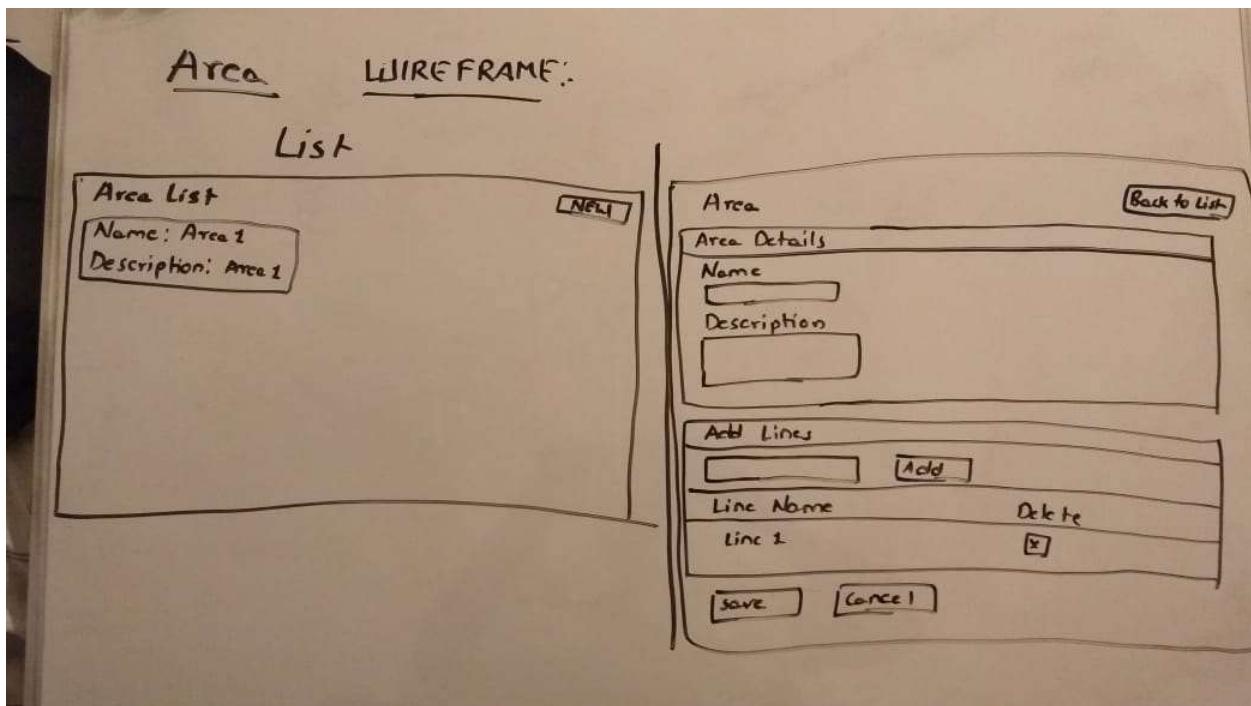
Class diagram:



Sequence diagram:



Wireframe:

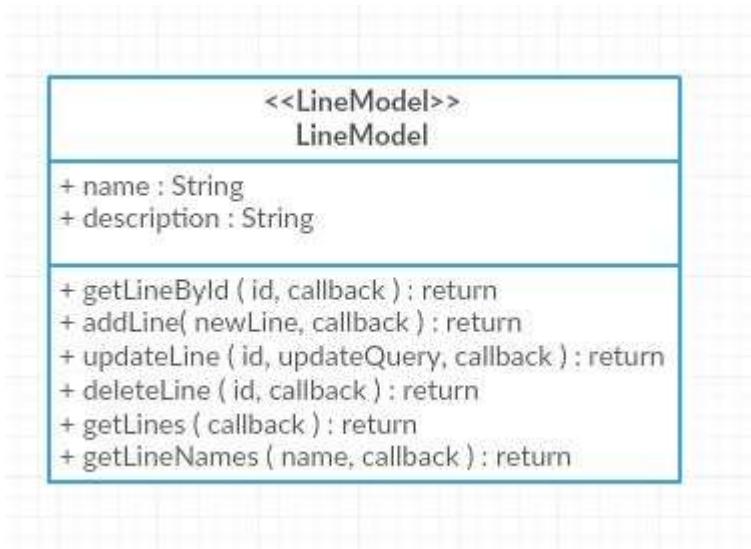


Line:

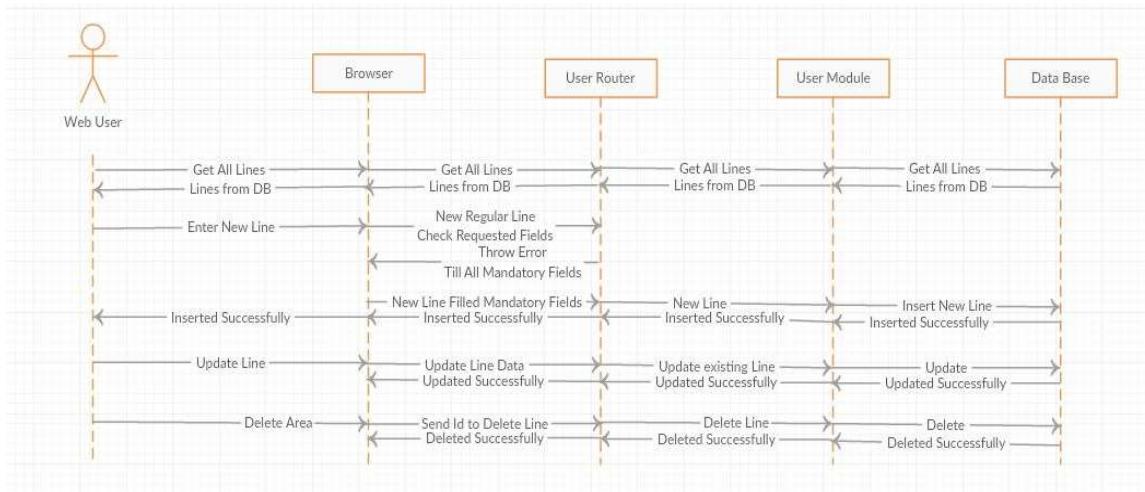
In this page we can create line in the factory. In the machine creation this lines are mentioned so that the maintenance guy will understand where the machine exactly placed.

The screenshot shows a web-based application interface for managing factory assets. The top navigation bar includes icons for Home, User, Machine, and Settings, along with a Logout button. On the left, a vertical sidebar menu lists categories: Machine, Machine group, Area, Line (which is currently selected and highlighted in blue), Reasons, Documents, Part, Step Group, and Template. The main content area is titled "Line List" and displays a single entry: "Name : Line 1" and "Description: Line 1". A "New" button is located in the top right corner of this section.

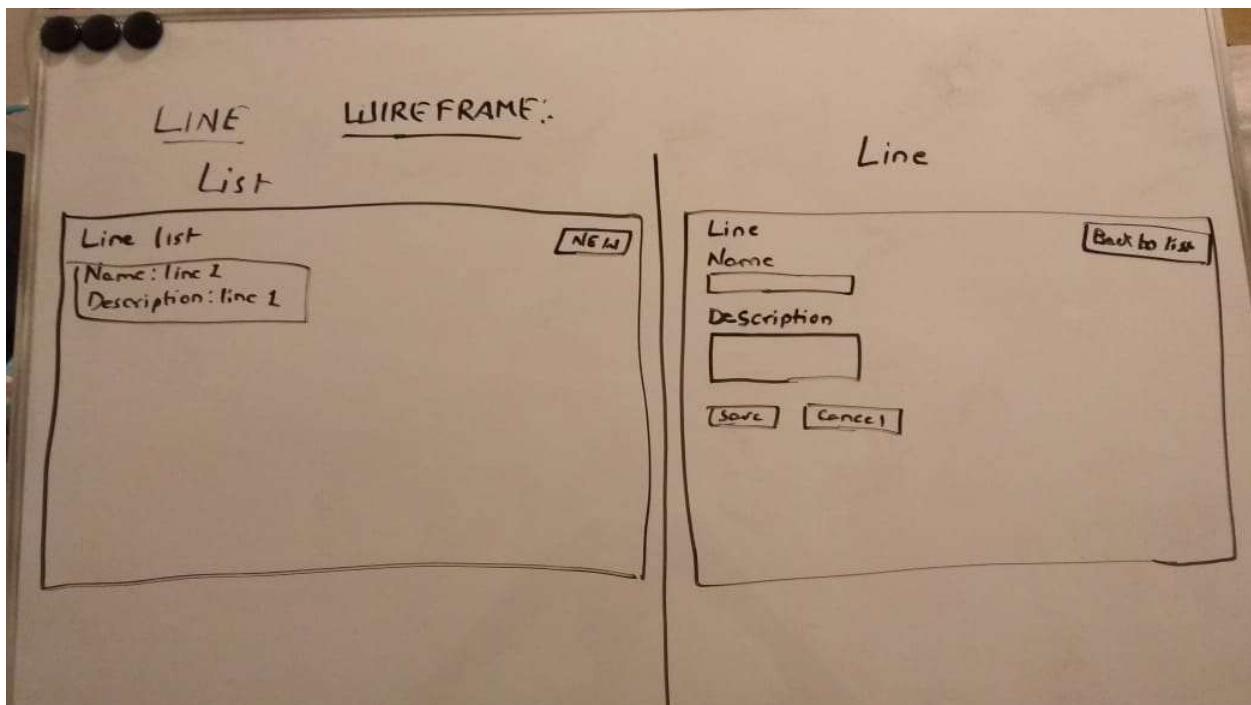
Class diagram:



Sequence diagram:



Wireframe:



Reasons:

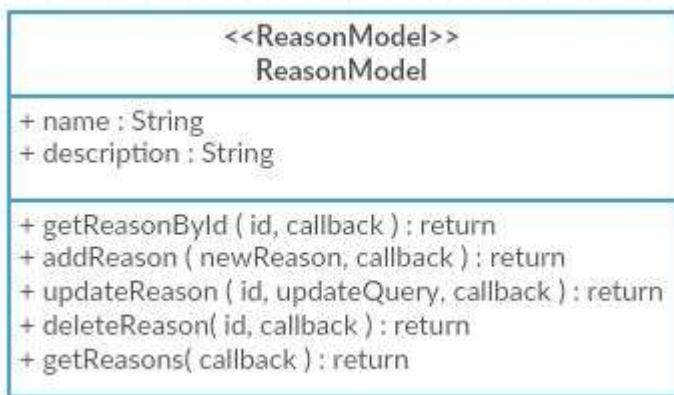
Machine will fail because of reason. In this page we can create the reason for machine failure.

The screenshot shows a web-based application interface for managing machine reasons. At the top, there is a blue header bar with the FMS logo and navigation links for Home, User, Machine, and Settings. On the far right of the header is a Logout button. Below the header is a sidebar on the left containing a vertical list of categories: Machine, Machine group, Area, Line, Reasons (which is currently selected and highlighted in blue), Documents, Part, Step Group, and Template. The main content area is titled "Reasons List". It displays two items in a grid format:

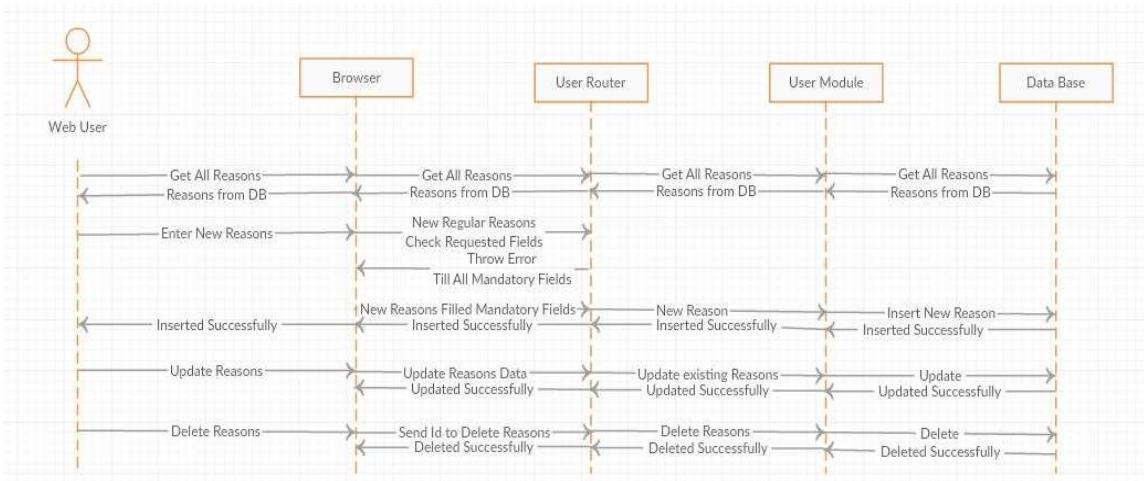
Name	Description
Name : Oil leaking	Description: Oil leaking
Name : Regular Maintenance	Description: Regular Maintenance
Name : Belt failure	Description: Belt failure

A blue "New" button is located in the top right corner of the main content area.

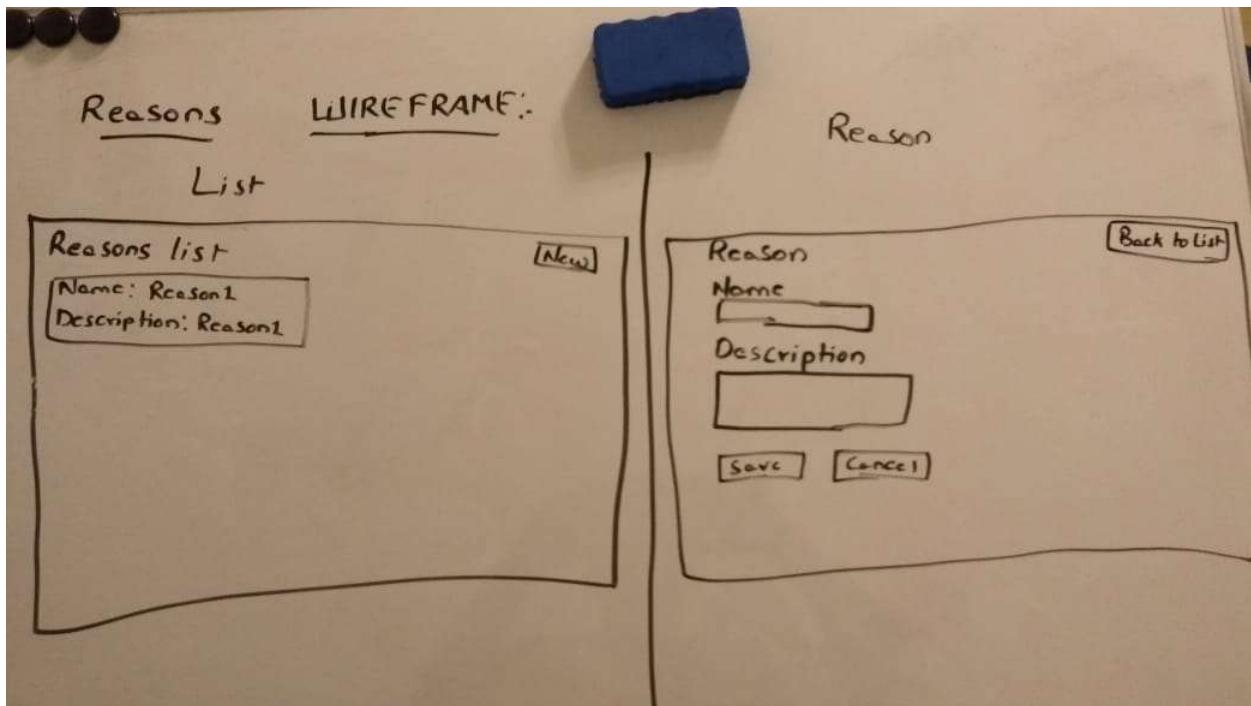
Class diagram:



Sequence diagram:



Wireframe:



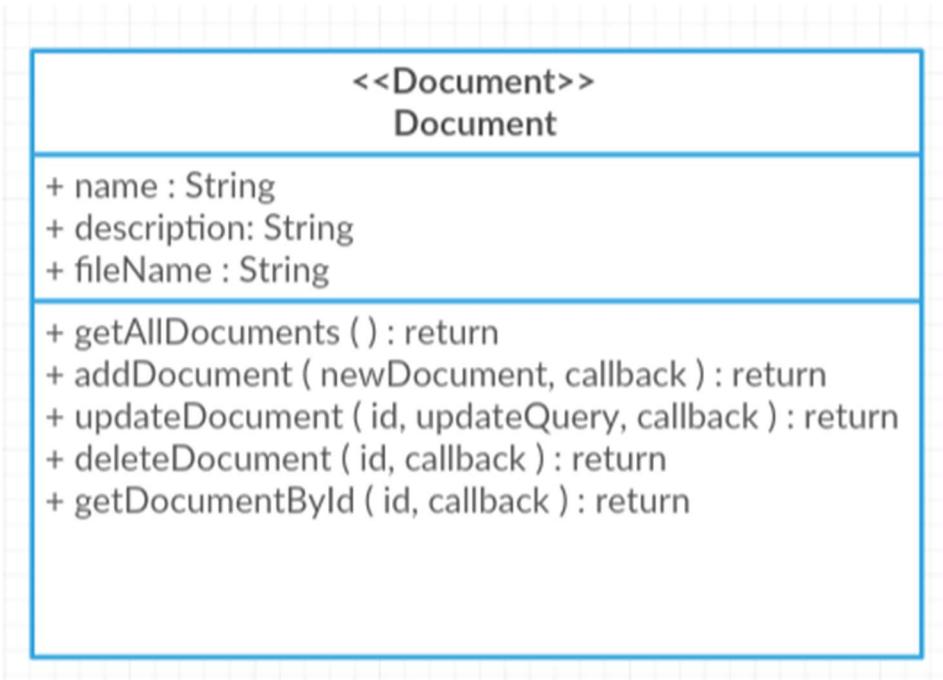
Documents:

During the maintenance, the maintenance people need some references for referring. In this page we can create the documents and we can refer them in each step of maintenance.

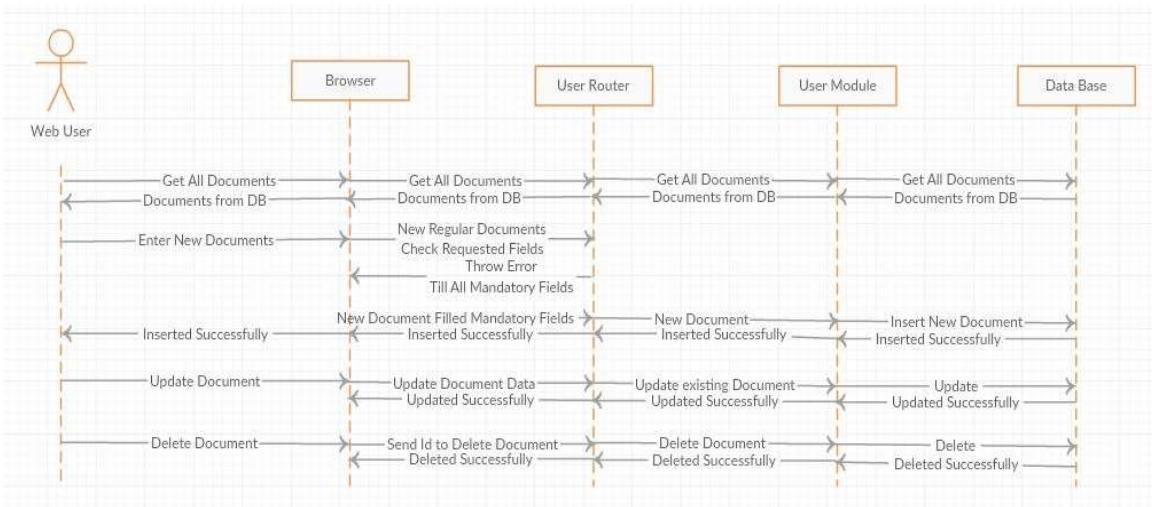
The screenshot shows a 'Document List' page with a sidebar on the left containing links: Machine, Machine group, Area, Line, Reasons, Documents (which is highlighted in blue), Part, Step Group, and Template. The main area displays a single document entry with two columns. The left column contains 'Name : Cleaning machine' and 'Description: Cleaning machine'. The right column contains 'Name : Belt fixing' and 'Description: Belt fixing'. A 'New' button is located in the top right corner of the main area.

The screenshot shows a 'Document' creation/editing page with a sidebar on the left containing the same links as the previous page. The main area has fields for 'Name' (Belt fixing) and 'Description' (Belt fixing). Below these is an 'Upload file' section with a 'Choose File' input field containing 'hackton.mp4', a progress bar showing the file is being uploaded, and a 'Upload' button. At the bottom are 'Update' and 'Delete' buttons. A 'Back to List' button is in the top right.

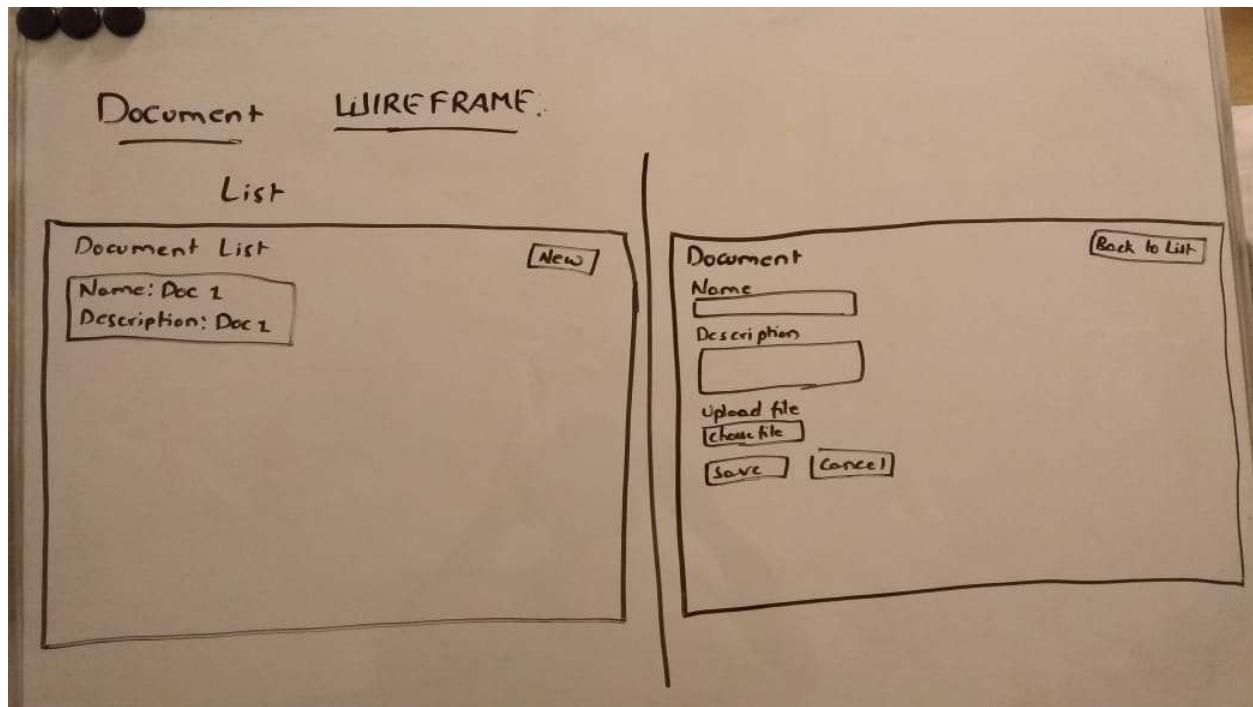
Class diagram:



Sequence diagram:



Wireframe:

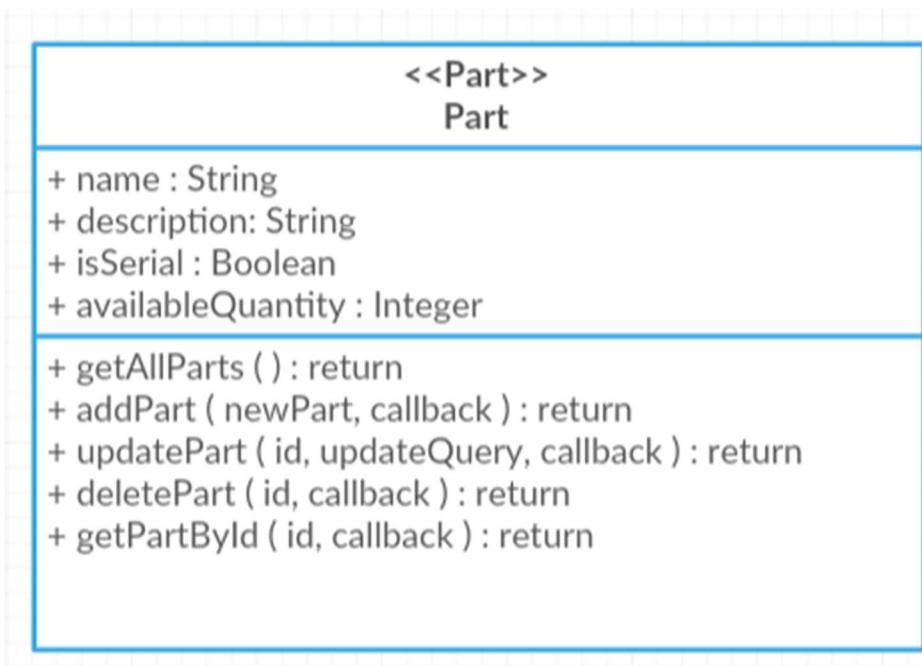


Parts:

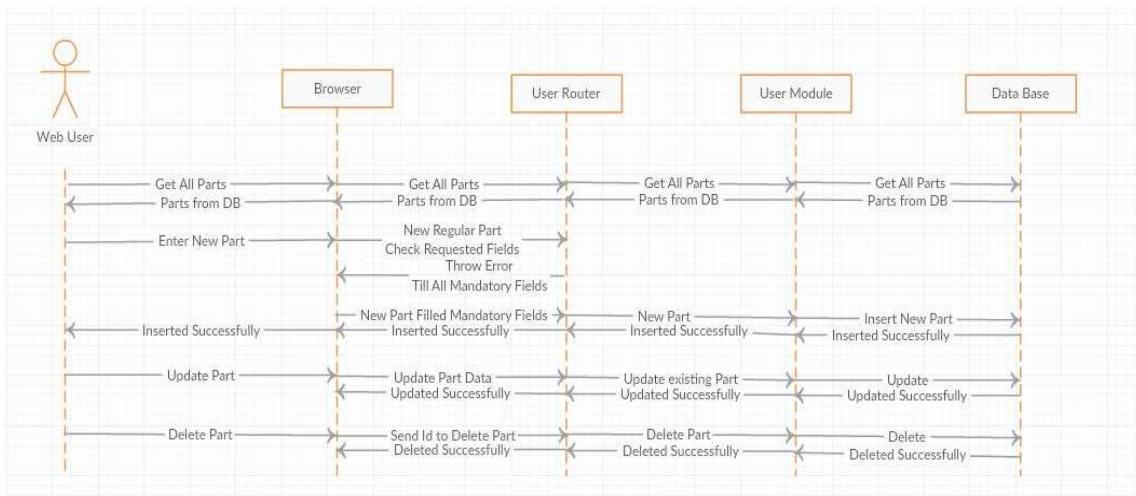
Every time we need some part to do maintenance. In this page we can create the parts and refer them in each step of maintenance.

The screenshot shows a web-based application interface for FMS. At the top, there is a navigation bar with icons for Home, User, Machine, and Settings, along with Logout and New buttons. On the left, a sidebar menu lists categories: Machine, Machine group, Area, Line, Reasons, Documents, Part (which is selected and highlighted in blue), Step Group, and Template. The main content area is titled "Part List" and displays a single entry: "Name : Part 1" and "Description: Part 1".

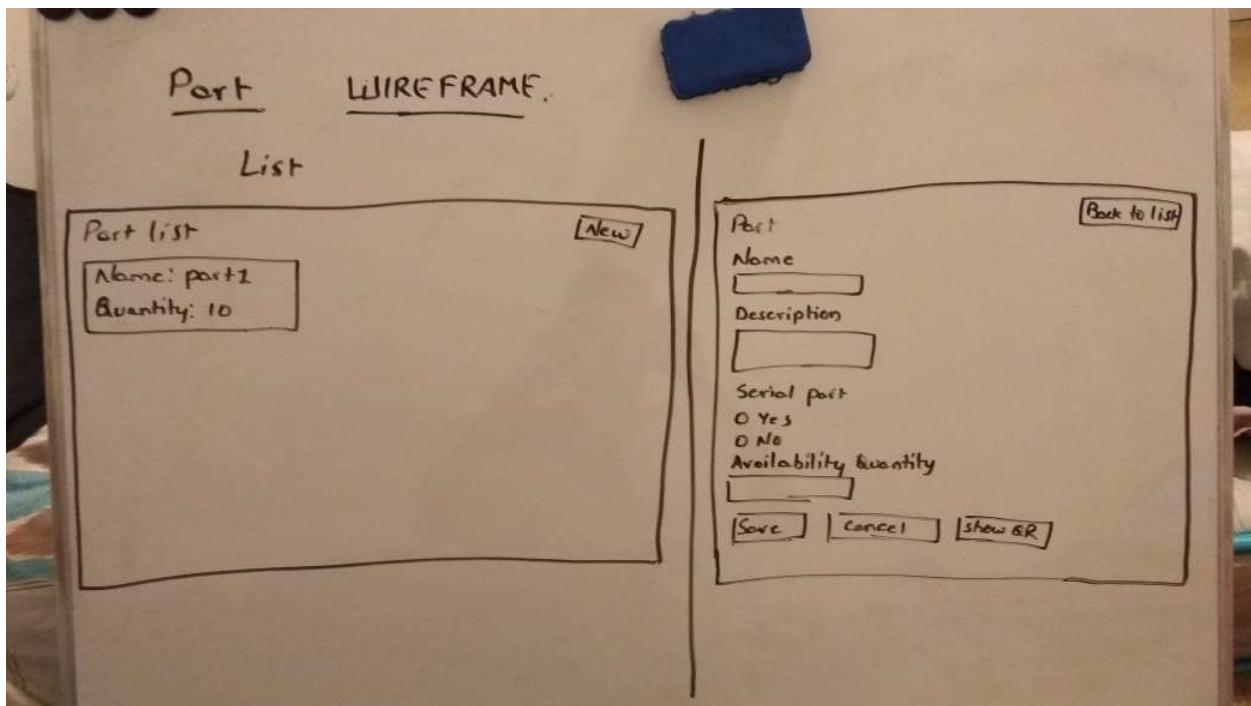
Class diagram:



Sequence diagram:



Wireframe:



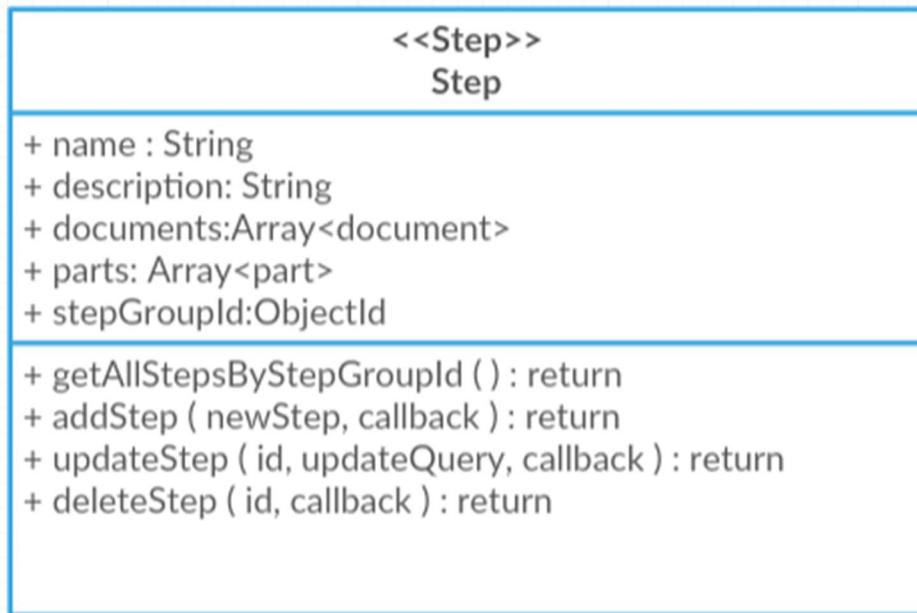
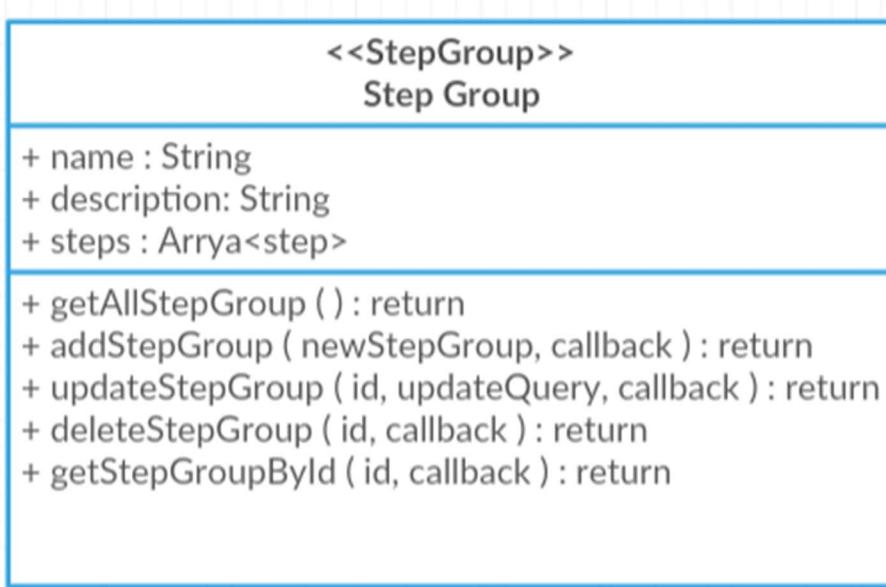
Step Group:

Every maintenance contains different steps to perform. Here we can configure the steps and we can also configure the documents and parts in each step.

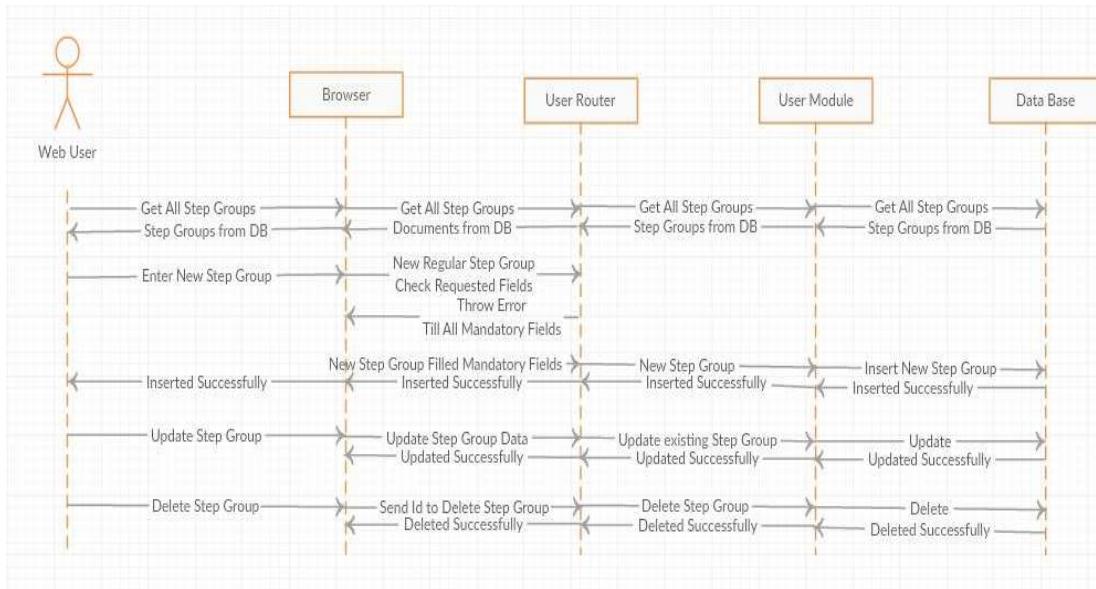
The screenshot shows the 'Step Group' configuration page. On the left is a sidebar with navigation links: Machine, Machine group, Area, Line, Reasons, Documents, Part, Step Group (which is selected and highlighted in blue), and Template. The main area has a title 'Step Group' and fields for 'Step Group Name' (set to 'Oil leaking steps') and 'Description' (set to 'Oil leaking steps'). A large text area is present below the description. A blue 'Add Step' button is located below the description field. Below this, there is a table with columns 'Step Name', 'Edit', and 'Delete'. Two rows are listed: 'Open the lid' and 'Clean the machine'. Each row has edit and delete icons. At the bottom are 'Update' and 'Delete' buttons.

The screenshot shows a modal dialog titled 'Add Step to Step group'. It contains fields for 'Step Name' (set to 'Clean the machine') and 'Description' (set to 'Clean the machine'). Below these are sections for 'Add Document' (with a 'Document Name' field set to 'Cleaning machine' and an 'Add' button) and 'Add Part' (with a 'Part Name' field and an 'Add' button). To the right of the modal, the background page shows the same 'Step Group' configuration interface with the 'Step Group' section selected. The 'Update' and 'Delete' buttons are visible at the bottom of the main page.

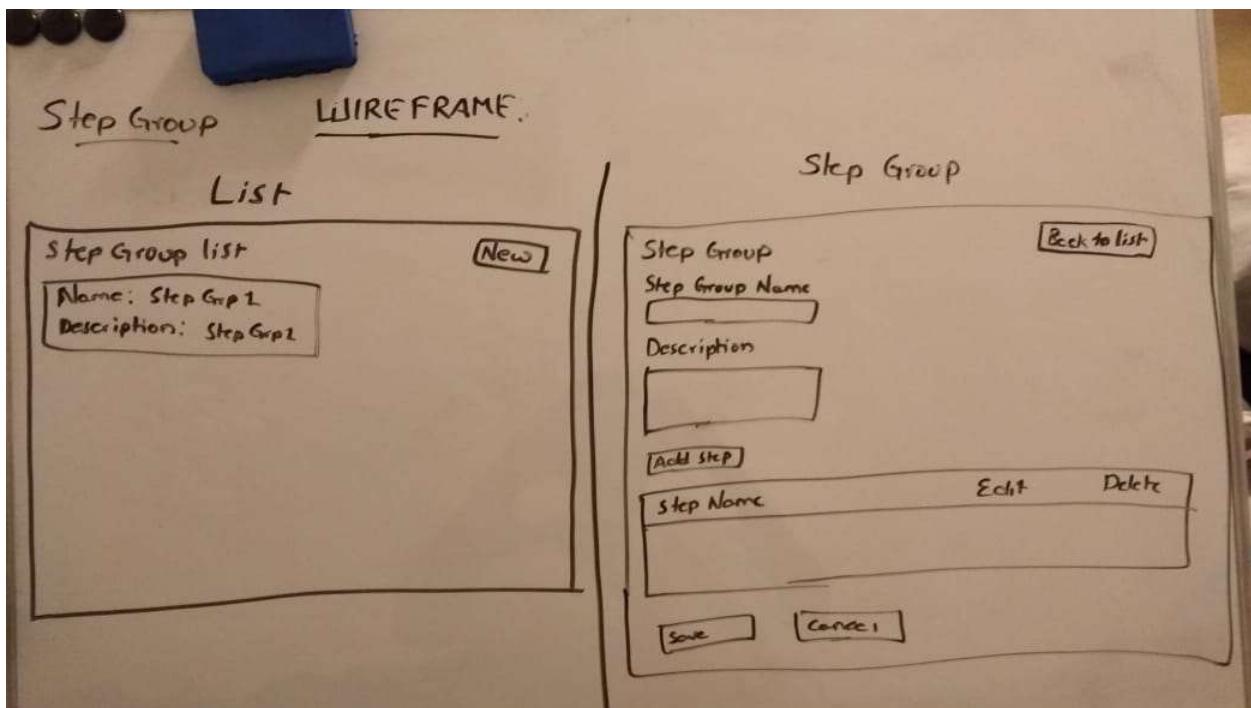
Class diagram:

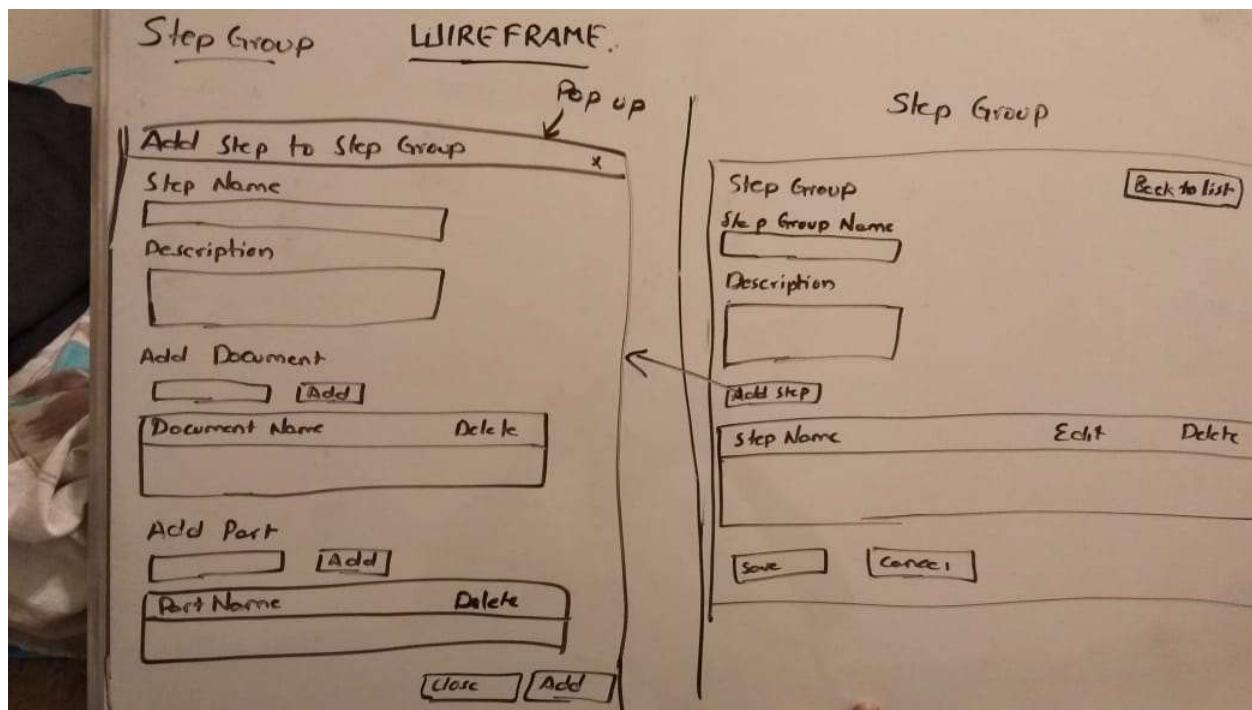


Sequence diagram:



Wireframe:





Template:

Once the ticket is created the system need to fetch the steps to perform maintenance. In this template page we will configure the steps for machine and that reason.

The screenshot shows a 'Template List' page with a sidebar on the left containing links: Machine, Machine group, Area, Line, Reasons, Documents, Part, Step Group, and Template. The 'Template' link is highlighted. The main area displays four template entries in a grid:

Name	Description
Name : Temp 1	Description: Temp 1
Name : Temp 2	Description: Temp 2
Name : Temp 3	Description: Temp 3
Name : Temp 4	Description: Temp 4

A blue 'New' button is located in the top right corner of the main area.

The screenshot shows a 'Template' edit page with a sidebar on the left containing links: Machine, Machine group, Area, Line, Reasons, Documents, Part, Step Group, and Template. The 'Template' link is highlighted. The main area displays form fields for editing a template:

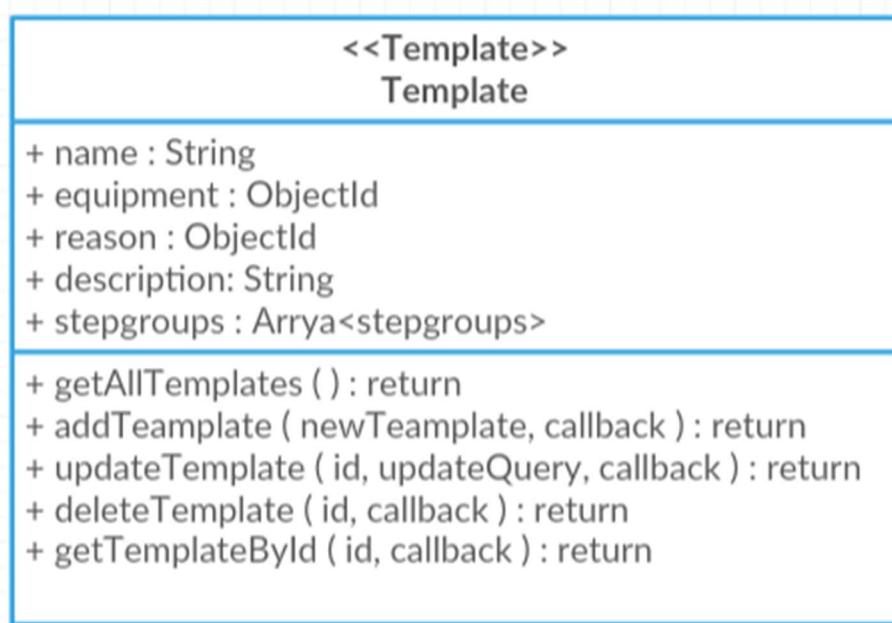
Name	<input type="text" value="Temp 1"/>	Back to List
Equipment	<input type="text" value="Machine 1"/>	
Reason	<input type="text" value="Oil leaking"/>	
Description	<input type="text" value="Temp 1"/>	

Below the form is a section titled 'Add Step Group' with a text input field and an 'Add' button. A table lists a single step group entry:

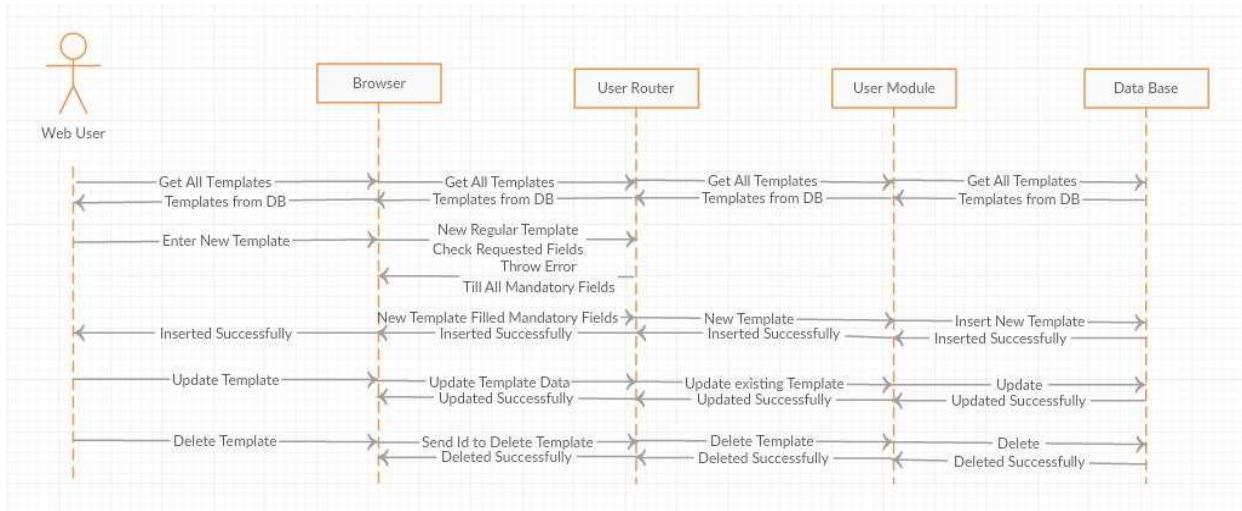
Step Group Name	Delete
Oil leaking steps	<input type="button" value="x"/>

At the bottom are 'Update' and 'Delete' buttons.

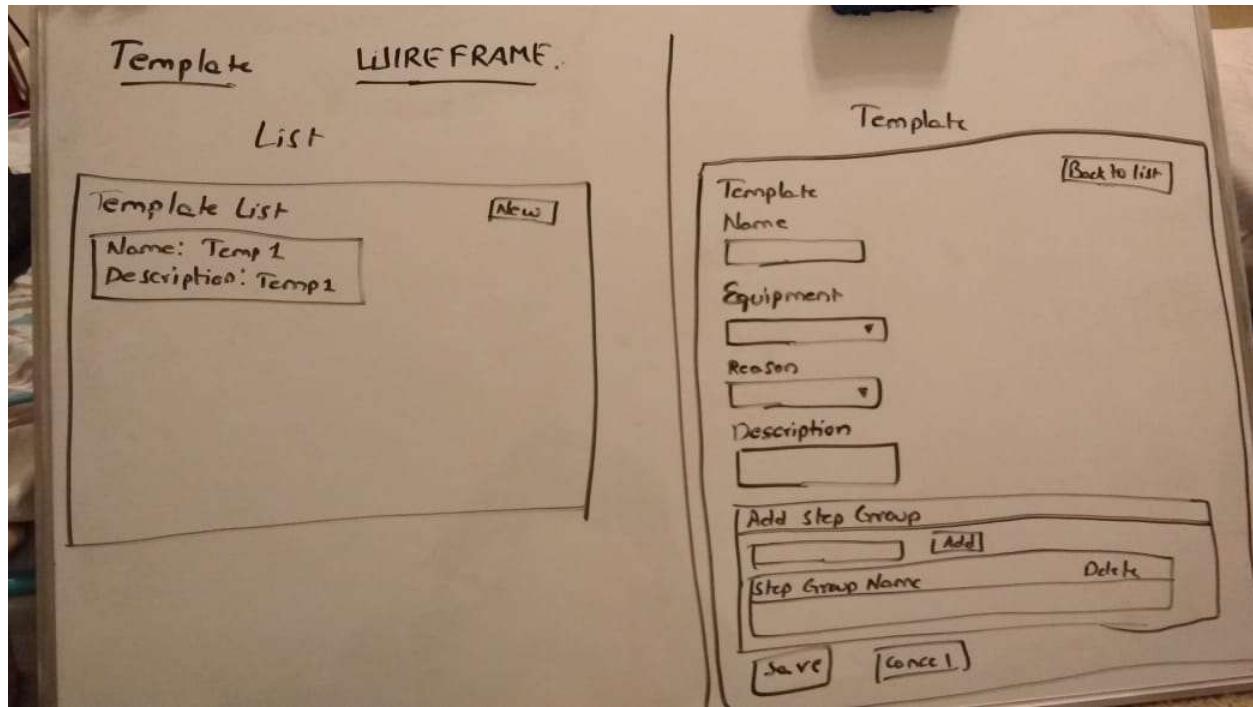
Class diagram:



Sequence diagram:



Wireframe:

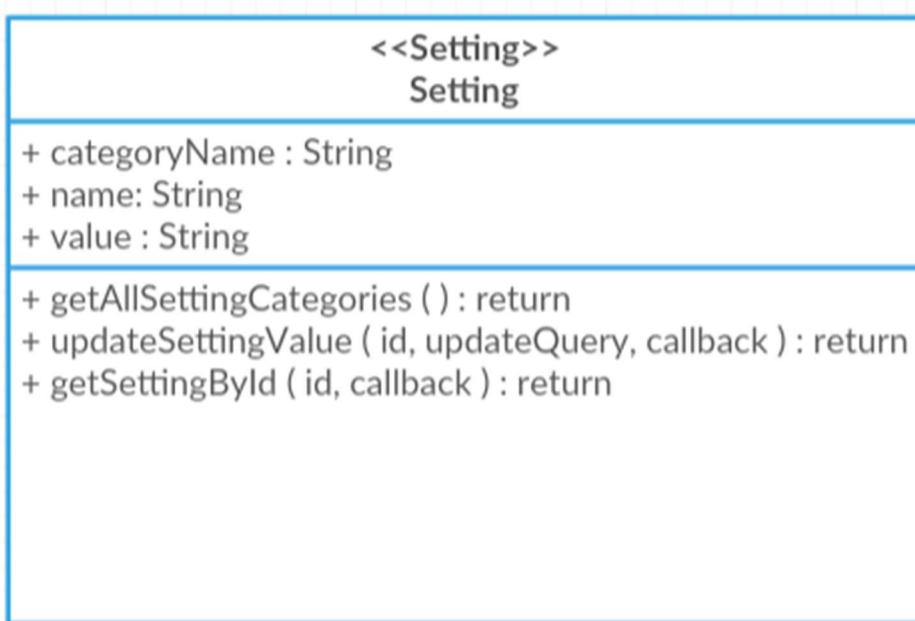


Settings:

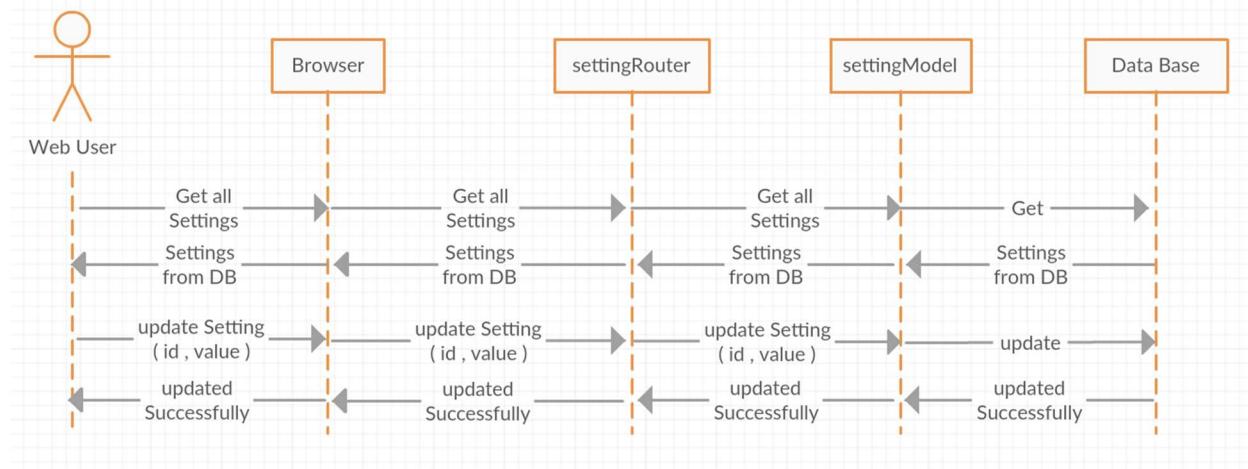
In this settings page we can configure the application settings.

The screenshot shows a web-based application interface for managing settings. At the top, there is a navigation bar with icons for Home, User, Machine, and Settings, and a Logout link on the right. Below the navigation bar, the main content area has a sidebar on the left labeled 'Settings' which contains an 'Import' section. The main panel is titled 'Settings' and contains a 'Choose Category' dropdown set to 'Admin Email', a 'Value' input field containing 'testlms32@gmail.com', and two buttons at the bottom: 'Save' and 'Cancel'. The background of the main panel is light gray, while the sidebar and header are white.

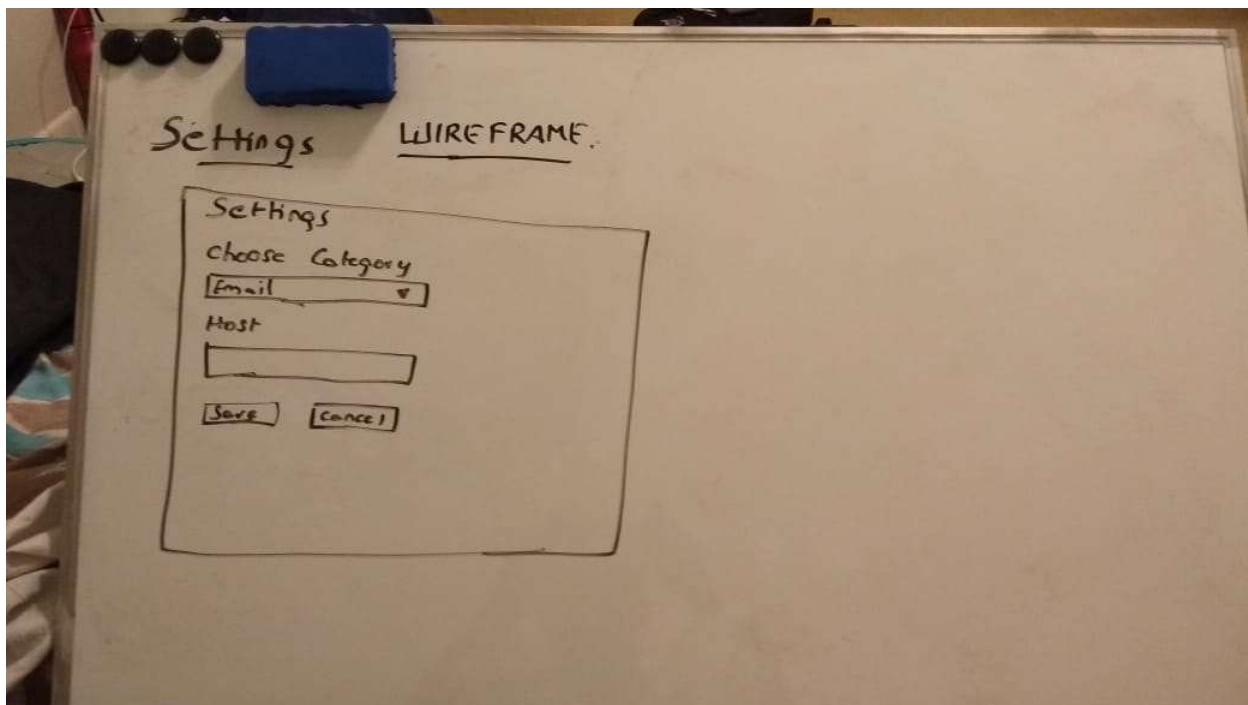
Class diagram:



Sequence diagram:

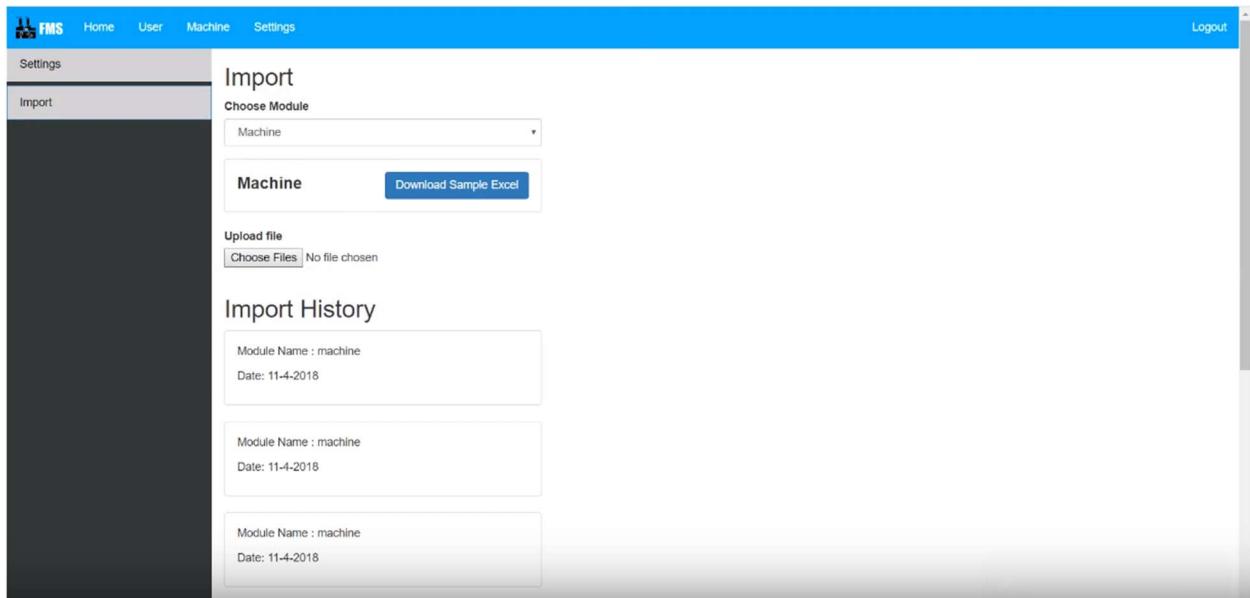


Wireframe:

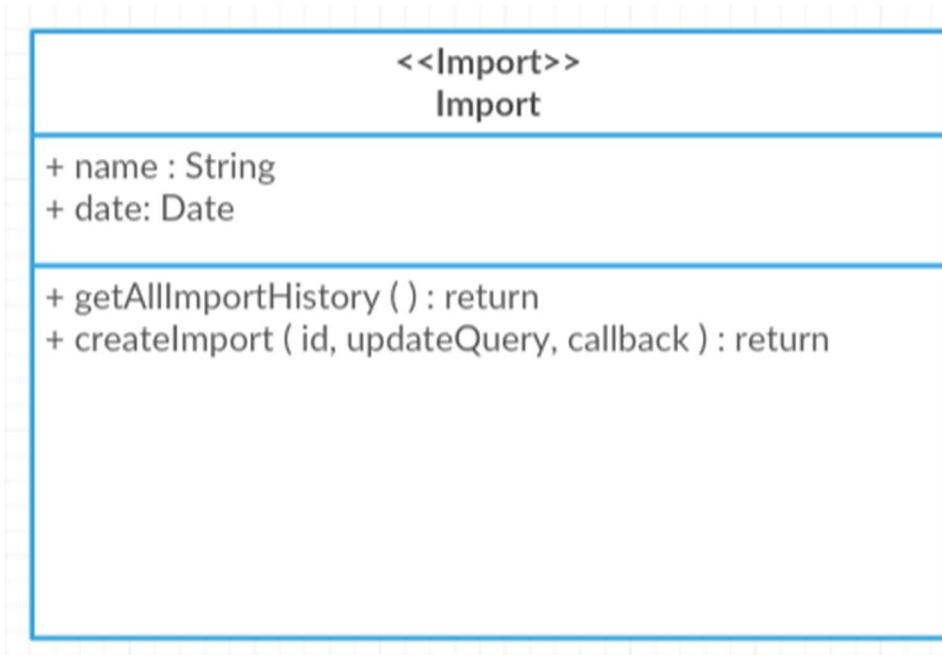


Import:

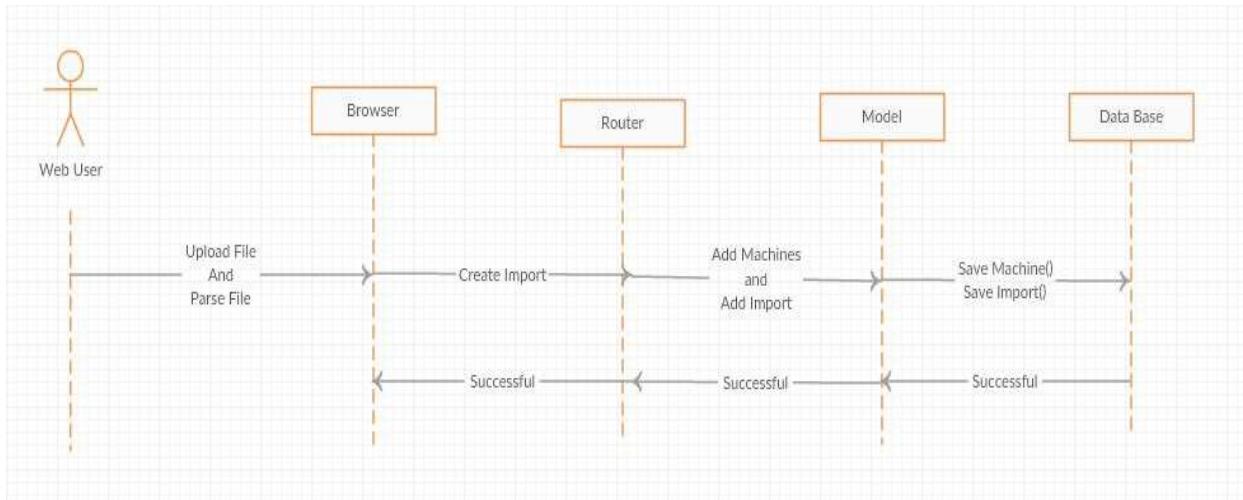
In this import page we can import machine for excel documents.



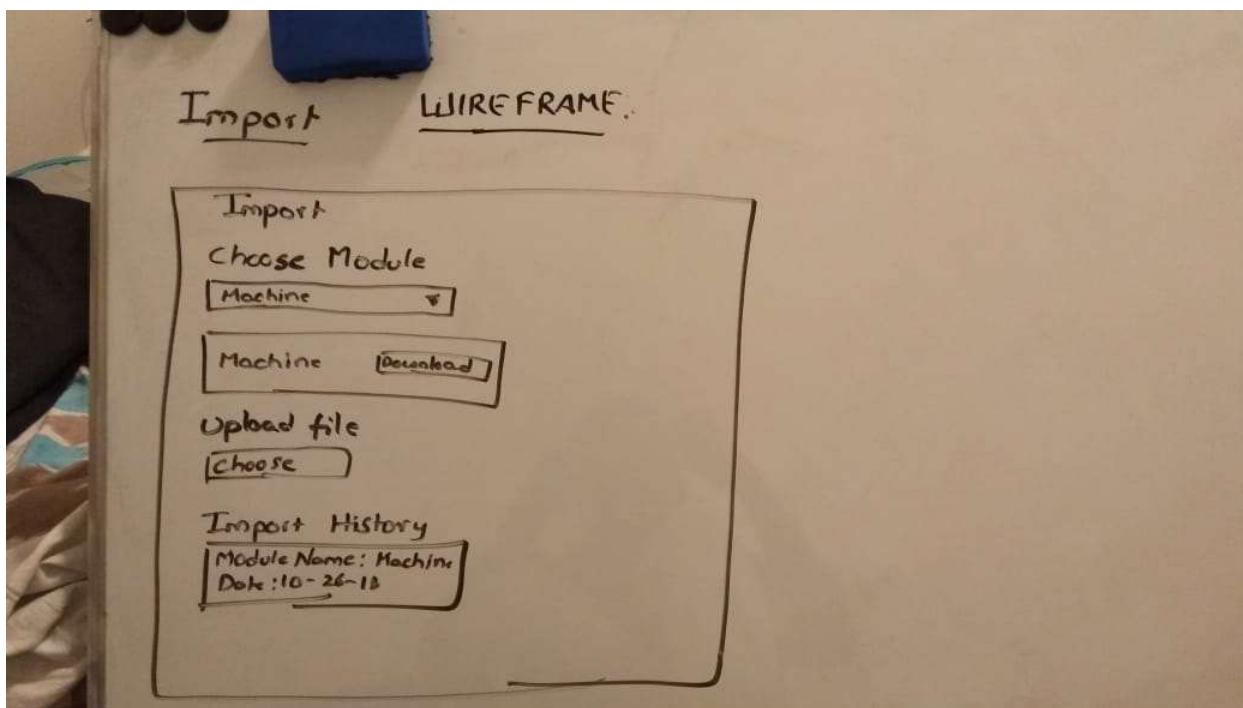
Class diagram:



Sequence diagram:



Wireframe:

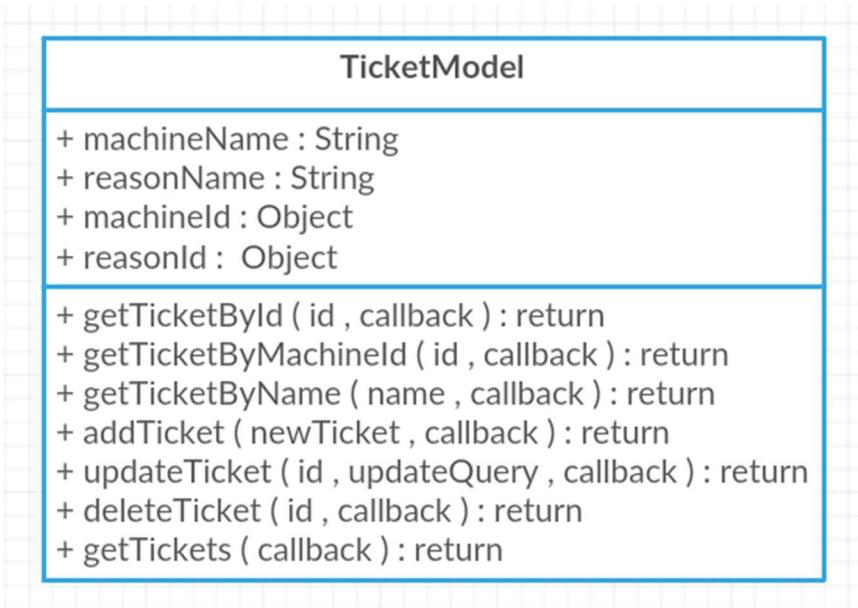


Ticket:

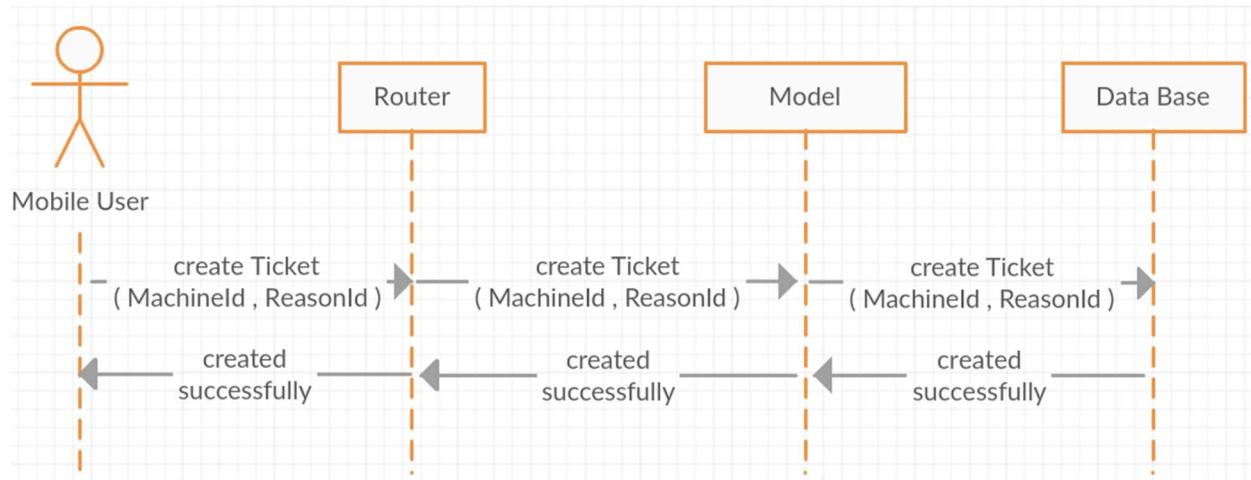
In this ticket page we can create ticket when the machine is failed during production.

The screenshot shows a mobile application interface titled "Ticket" in a blue header bar. Below the header, there is a section labeled "Scan Machine" with a camera icon. Underneath this, there are two input fields: "Machine Name" with a dropdown placeholder "-Select Mac..." and "Reason" with a dropdown placeholder "-Select Reas...". At the bottom of the screen is a large blue button labeled "CREATE TICKET".

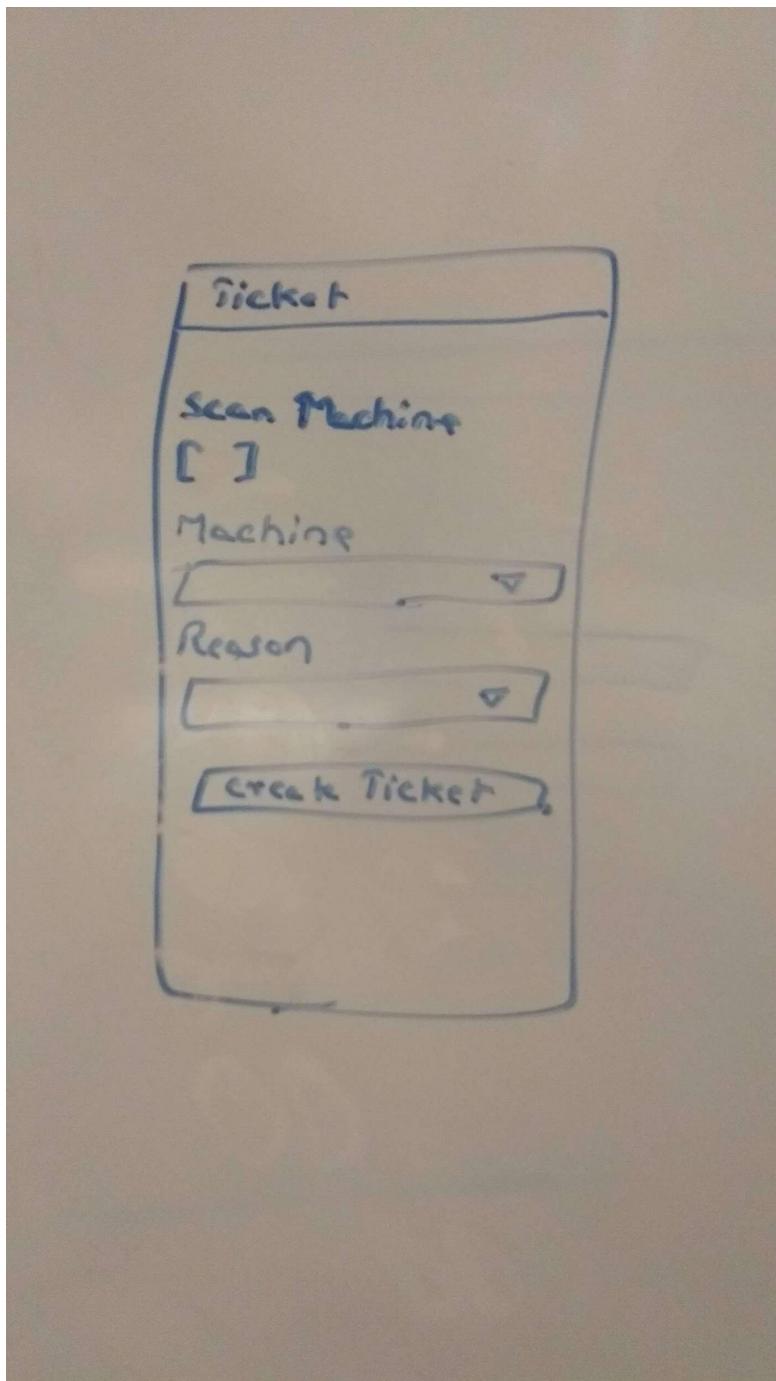
Class diagram:



Sequence diagram:

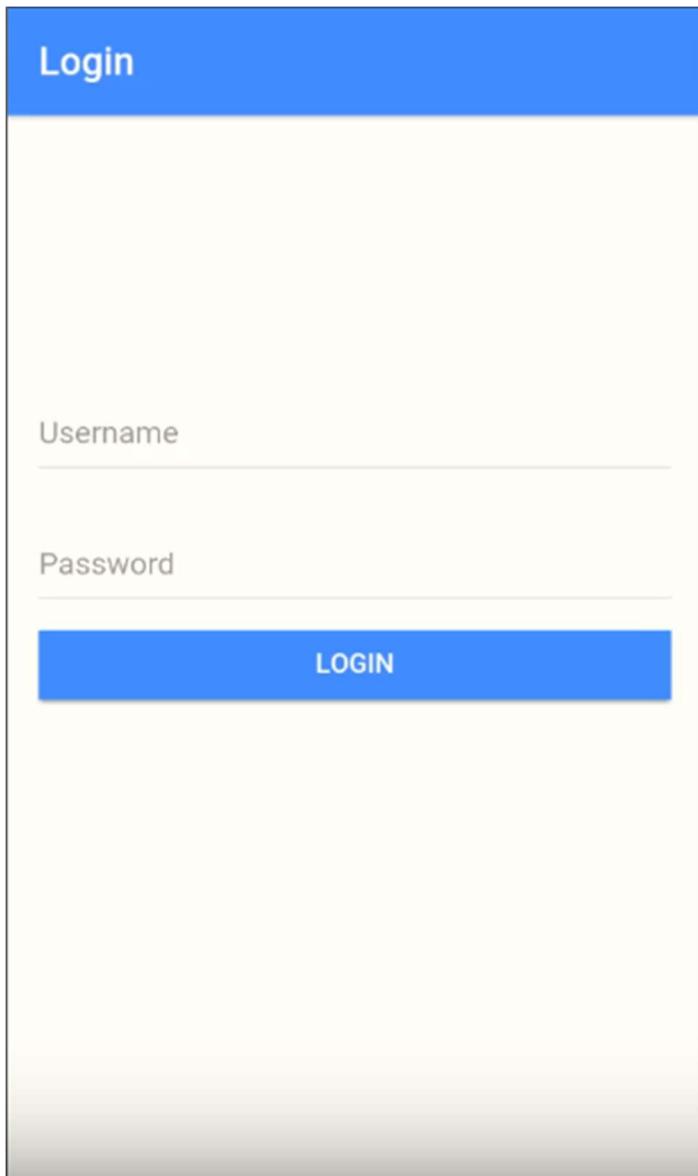


Wireframe:

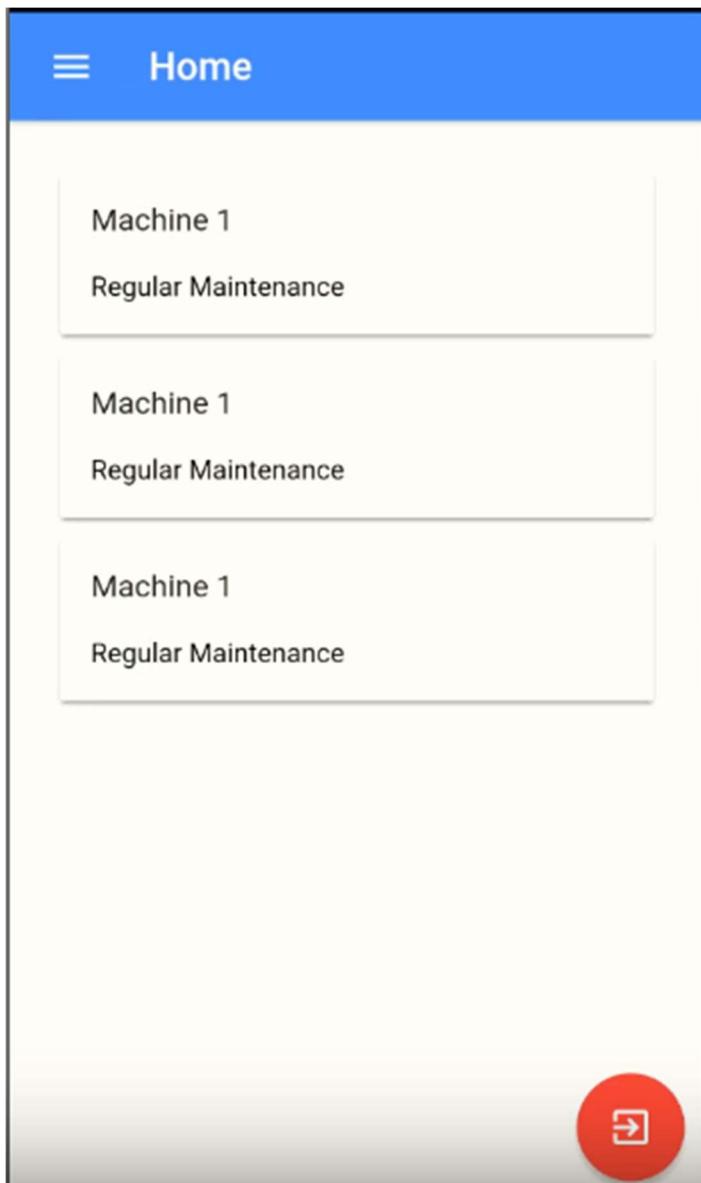


Mobile Pages:

Login:



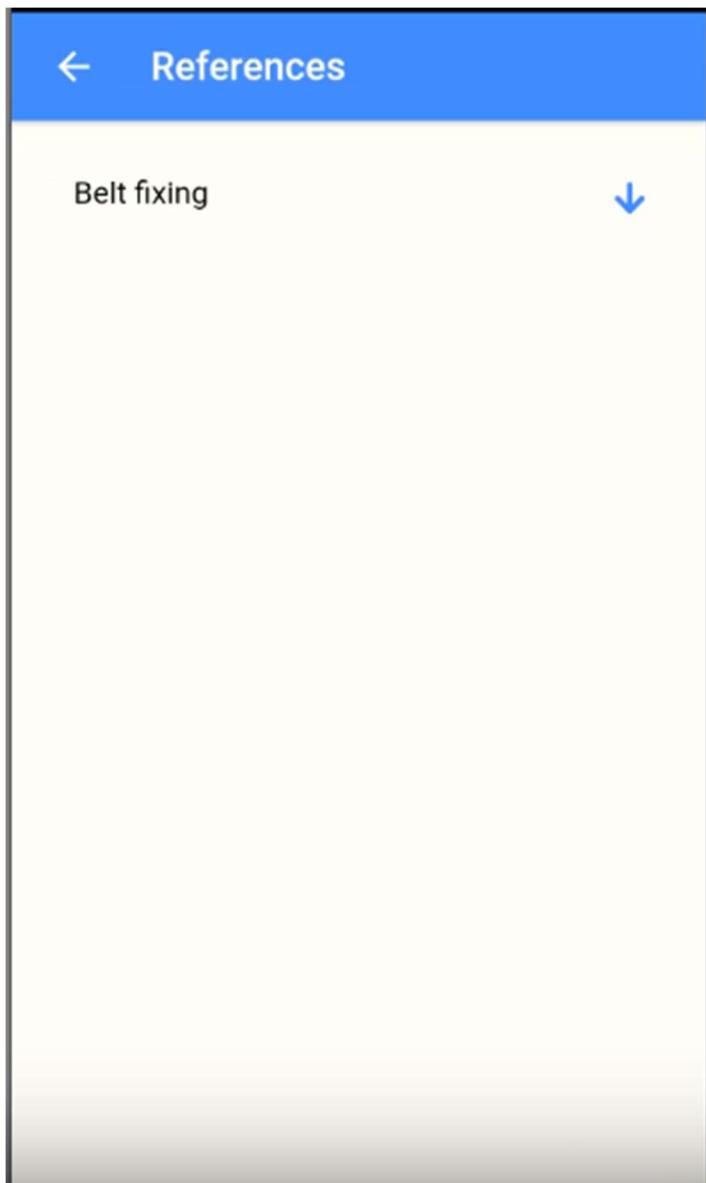
Home



Steps:



References:



Source code:

https://github.com/chkrish9/CS5551_Team_4_Project

Video Url:

<https://www.youtube.com/watch?v=Mw6W-P02KGg>

References :

<https://www.npmjs.com/package/ngx-qrcode2>

<https://getbootstrap.com/docs/3.3/components/>

<https://angular.io/docs>

<https://www.youtube.com/watch?v=DQ9pZ2NKXRo&index=2&list=PLiIIGF-RfqbZMNtaOXJQiDebNXjVapWPZ>

<https://www.npmjs.com/package/ng2-file-upload>

<https://www.npmjs.com/package/xlsx>

<https://www.npmjs.com/package/multer>

<https://socket.io/>

<https://www.npmjs.com>