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SCIENTIFIC COMPUTING
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LABORATORY INFORMATION MANAGEMENT
SYSTEM (LIMS)

Software Requirements Specification

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Table of Contents

TABLE OF FIGURES.....	6
LIST OF TABLES.....	7
ABBREVIATIONS, ACRONYMS AND DEFINITIONS.....	8
DECLARATION.....	9
1 INTRODUCTION.....	10
1.1 PURPOSE.....	10
1.2 SCOPE.....	10
1.3 OVERVIEW.....	10
2 GENERAL DESCRIPTION.....	11
2.1 PRODUCT PERSPECTIVE.....	11
2.2 PRODUCT FUNCTIONS.....	11
2.3 USER CHARACTERISTICS.....	11
2.4 GENERAL CONSTRAINTS.....	11
2.5 ASSUMPTIONS AND DEPENDENCIES.....	12
3 SPECIFIC REQUIREMENTS.....	12
3.1 EXTERNAL INTERFACE REQUIREMENTS.....	12
3.1.1 USER INTERFACES.....	12
3.1.2 HARDWARE INTERFACES.....	23
3.1.3 SOFTWARE INTERFACES.....	23
3.1.4 COMMUNICATIONS INTERFACES.....	23
3.2 FUNCTIONAL REQUIREMENTS.....	24
3.2.1 FR-01 Log LIMS system users.....	24
3.2.2 FR-02 Search From Database.....	24
3.2.3 FR-03 Manage LIMS Personnel.....	25
3.2.4 FR-04 Manage and notify task.....	25
3.2.5 FR-05 Manage LIMS data.....	25
3.2.6 FR-06 Generate checkout and lab designated number.....	26
3.3 USE CASES.....	27
3.3.1 UC-01 Add Admin.....	27
3.3.2 UC-02 Search Admin.....	28
3.3.3 UC-03 Edits admins' profile.....	28

3.3.4 UC-04 Remove Admin.....	29
3.3.5 UC-05 Add Department.....	29
3.3.6 UC-06 Search Department.....	30
3.3.7 UC-07 edits departments' info.....	30
3.3.8 UC-08 remove Department.....	31
3.3.9 UC-09 view Department info.....	31
3.3.10 UC-10 Generate Lab designated number and checkout number.....	31
3.3.11 UC-11 alter result.....	32
3.3.12 UC-12 verify sample.....	32
3.3.13 UC-13 assign task.....	32
3.3.14 UC-14 view progress.....	33
3.3.15 UC-15 send result.....	33
3.3.16 UC-16 Add Member.....	34
3.3.17 UC-17 Search Member.....	34
3.3.18 UC-18 Edits members' profile.....	35
3.3.19 UC-19 Remove Member.....	36
3.3.20 UC-20 Add Sample.....	36
3.3.21 UC-21 Search Sample.....	37
3.3.22 UC-22 Edits Sample' info.....	37
3.3.23 UC-23 Remove Sample.....	38
3.3.24 Start task.....	38
3.3.25 View Result.....	39
3.3.26 Feed Result.....	39
3.4 NON FUNCTIONAL REQUIREMENTS.....	42
3.4.1 PERFORMANCE.....	42
3.4.2 RELIABILITY.....	43
3.4.3 AVAILABILITY.....	43
3.4.4 SEQRITY.....	43
3.4.5 MAINTAINABILITY.....	43
3.4.6 USABILITY.....	43
3.4.7 FLEXIBILITY.....	43
3.4.8 PORTABILITY.....	44

3.5 INVERSE REQUIREMENTS.....	44
3.6 DESIGN CONSTRAINTS.....	44
3.6.1 STANDARD DEVELOPMENT TOOLS.....	44
3.6.2 WEB BASED PRODUCT.....	44
3.7 LOGICAL DATABASE REQUIREMENTS.....	44
3.7.1 DATA RETENTION.....	44
3.8 OTHER REQUIREMENTS.....	47
3.8.1 REGULATORY REQUIREMENTS.....	47
3.8.2 TRAINING RELATED REQUIREMTNS.....	47
4 CHANGE MANAGEMENT PROCESS.....	48
REFERENCES.....	49
APPENDIX.....	50

TABLE OF FIGURES

Figure 1 Organizer's User Interface Flow Diagram.....	13
Figure 2 Lab Technician user interface flow diagram.....	14
Figure 3 IT head UI flow diagram.....	15
Figure 4 Admin UI flow diagram.....	15
Figure 5 Add member(IT head).....	16
Figure 6 edit member(admin).....	17
Figure 7 Manage Account(lab technician).....	18
Figure 8 My task lab manager.....	19
Figure 9 Reset password1(organizer).....	20
Figure 10 Reset password2(organizer).....	21
Figure 11 Track sample(organizer).....	22
Figure 12 View progress(lab manager).....	23
Figure 13 Use cases.....	27
Figure 14 Log In Flow Diagram.....	40
Figure 15 Search Member Flow Diagram.....	41
Figure 16 Add Member Flow Diagram.....	42
Figure 17 Logical Database.....	46
Figure 18 ER-Diagram.....	47

LIST OF TABLES

Table 1 FR-01 Log LIMS system users.....	24
Table 2 FR-02 Search From Database.....	24
Table 3 FR-03 Manage LIMS Personnel.....	25
Table 4 FR-04 Manage And Notify Task.....	25
Table 5 FR-05 Manage LIMS data.....	26
Table 6 FR-06 Generate checkout and lab designated number	26

ABBREVIATIONS, ACRONYMS AND DEFINITIONS

Terms	Abbreviations, Acronyms, Definitions
LIMS	Laboratory Information Management System
SRS	Software Requirement Specification is a description of a software system to be developed
JavaScript	JavaScript is a computer programming language commonly used to create interactive effects within web browsers.
HTTP	application protocol that is the foundation of data communication for the World Wide Web.
HTML5	Hypertext Markup Language is the fifth major revision of the Hypertext Markup Language (HTML).
OS	Operating System
SDLC	Software Delivery Lifecycle
Admin	Abbreviation for Administrator

DECLARATION

We declare that this written submission represents our ideas in our own words and where others' ideas or words have been included. We have adequately cited and referenced the original sources. We also declare that we have adhered to all principles of academic honesty and integrity and have not misrepresented or fabricated or falsified any idea/data/fact/source in our submission. We understand that any violation of the above will be cause for disciplinary action by the Institute and can also evoke penal action from the sources which have thus not been properly cited or from whom proper permission has not been taken when needed.

Date: Mar-20-2018

1 INTRODUCTION

The introduction of the Software Requirements Specification (SRS) provides an overview of the entire SRS with purpose, scope, definitions, acronyms, abbreviations, references and overview of the SRS. The aim of this document is to gather and analyze and give an in-depth insight of the complete LIMS by defining the problem statement in detail.. The detailed requirements of the LIMS are provided in this document.

1.1 PURPOSE

The purpose of the document is to collect and analyze assorted ideas that have come up to define the system, its requirements with respect to consumers. Also, we shall predict and sort out how we hope this product will be used in order to gain a better understanding of the project.

In short, the purpose of this SRS document is to provide a detailed overview of our software product, its parameters and goals. This document describes the project's target audience and its user interface, hardware and software requirements. It defines how our client, team and audience see the product and its functionality. Nonetheless, it helps any designer and developer to assist in software delivery life cycle (SDLC) processes.

1.2 SCOPE

The product to be designed is a Laboratory Information Management System in-short LIMS. The general objective of this project is to simplify the work of the laboratory by providing an easy and effective management system.

Goals of the system:

- Allow authorized users to control laboratory transactions such as add or remove types of services or samples and access time of records.
- Allow authorized users to add accounts, remove accounts and search accounts.
- Use certification method to ensure only authorized users have access to the web application.
- Allow authorized users to fill forms of sample to be tested.

1.3 OVERVIEW

The document is basically divided into four sections. The first section gives an Introduction to the project, the Purpose, Scope and Overview of the project. The second section of the document is about the General Description, which includes Product Perspective which gives a brief description of the project, Product Functions, User Characteristics; which gives a detailed description of the user & the General Constraints. The third section is about the Specific Requirements, this section covers the requirement specifications and descriptions of different system interfaces, exclusively written for the system developers. The last

section deals with Change Management Process, which manages the activities that needs to be performed when there, are new requirements or changes.

2 GENERAL DESCRIPTION

2.1 PRODUCT PERSPECTIVE

A laboratory information management system (LIMS), sometimes referred to as laboratory information system (LIS) or laboratory management system (LMS), is a software based laboratory and information management system with features that support a modern laboratory operations.

Bika LIMS is a free open-source laboratory information management system (LIMS) solution released under the GNU Affero General Public License and the GNU General Public License. There is other open source LIMS, but this is the commonly used one.

And also there is a LIMS which is developed for special purpose like for conformity assessment agencies, hospitals and different sectors that have laboratories

We are trying to bring the best out of this project and hopefully it will meet the desired objective; a better LIMS for laboratories using our system.

2.2 PRODUCT FUNCTIONS

The product is intended to simplify the tasks of the laboratory technicians & laboratory managers. It allows authorized users to control transactions like removing types of services & time of records. They can also add accounts, remove accounts as well as search for an account. It also allows the enterprises customers to fill forms of samples to be tested plus the exact date to pick up their sample results. It basically makes the management system a easier.

2.3 USER CHARACTERISTICS

The system we are proposing will cover the laboratory management which includes five types of users in the line the first user in the line is the IT head which is responsible for managing the whole system including adding Admins(the second user in the line) and departments then admins came they manage LIMS personnel and sample so they are responsible for adding, removing, editing both members and sample. But the real testing process starts in the third line which is the organizers line. The organizer is responsible for accepting sample and handing to the lab technician and also organizer is responsible for filling sample form and sending it to the lab manager which assigns tasks to lab technicians then the last ones the lab technicians are responsible to test sample and feed result to the system and send the result to the lab manager then the lab manager verifies or alters the result and send back the result to the organizer.

2.4 GENERAL CONSTRAINTS

There are some constraints that will limit the system from its full implementation such as:

1. Safety and security considerations: necessary precautions need to be taken by developers since LIMS will be responsible for handling the sample results.
2. Regulatory policy: we tried our best to respect the rules & policy of the enterprises or organizations using our system so as to function within the bounds of law.

2.5 ASSUMPTIONS AND DEPENDENCIES

1. To run our system both hardware and software applications are needed, it will be able to run in any recent OS.
2. Since the system is web based, good internet connection must be provided. Updated web browsers are also required.

3 SPECIFIC REQUIREMENTS

3.1 EXTERNAL INTERFACE REQUIREMENTS

3.1.1 USER INTERFACES

The user interface for the software is expected to be compatible to any browser such as Internet Explorer, Mozilla or Netscape Navigator by which user can access to the system.

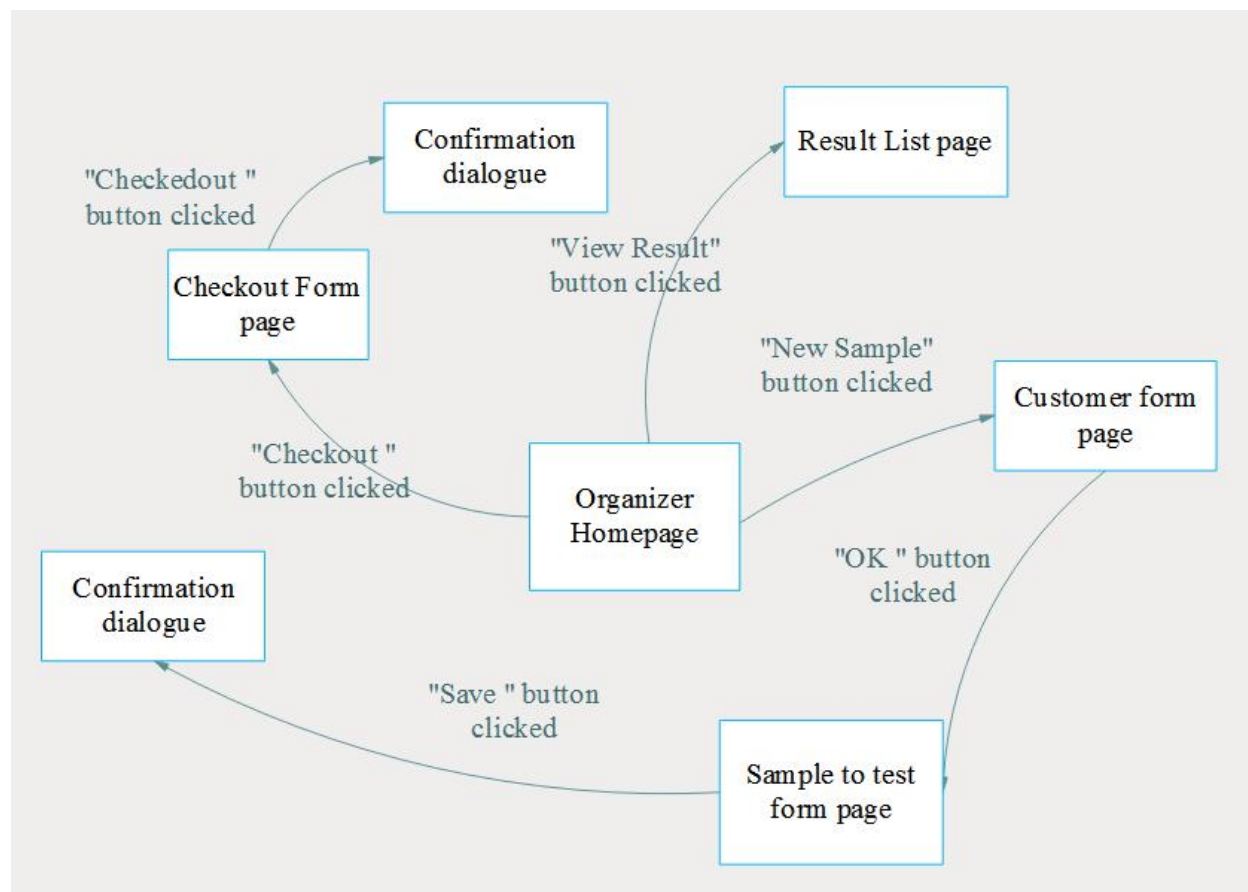


Figure 1 Organizer's User Interface Flow Diagram

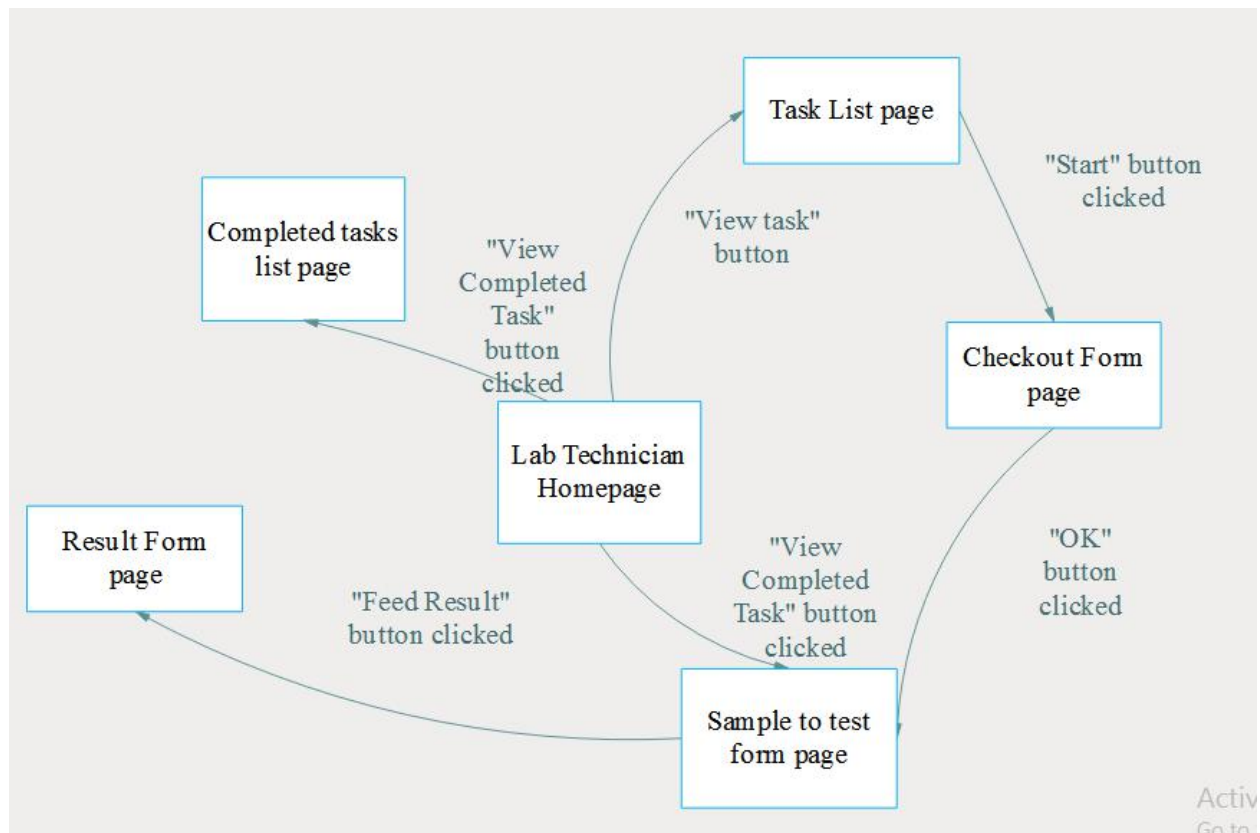


Figure 2 Lab Technician user interface flow diagram

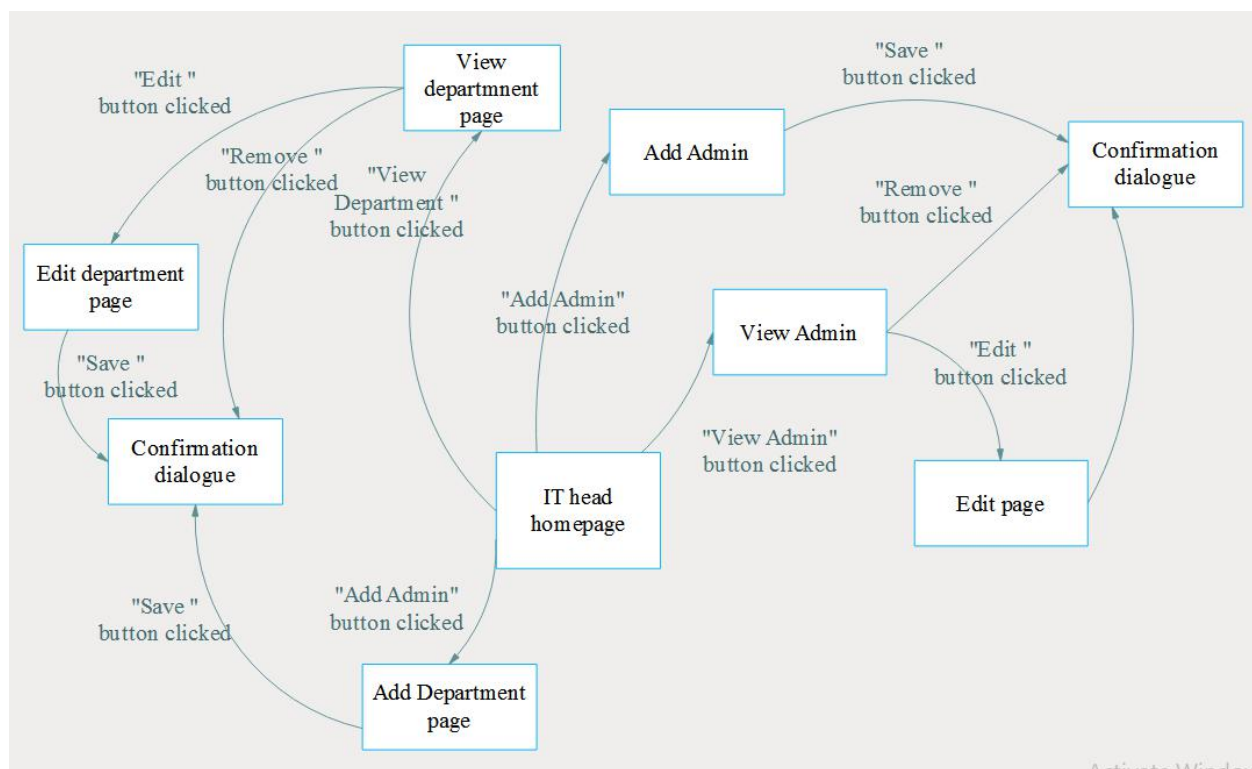


Figure 3 IT head UI flow diagram

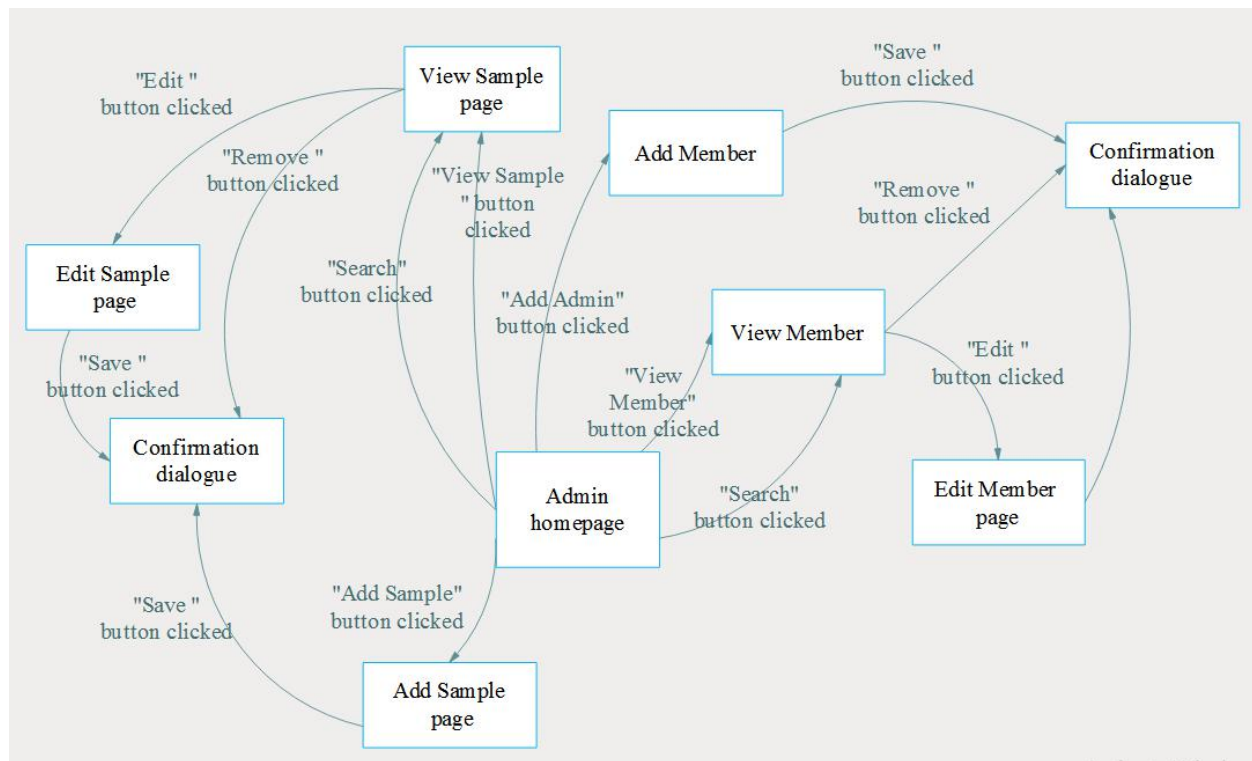
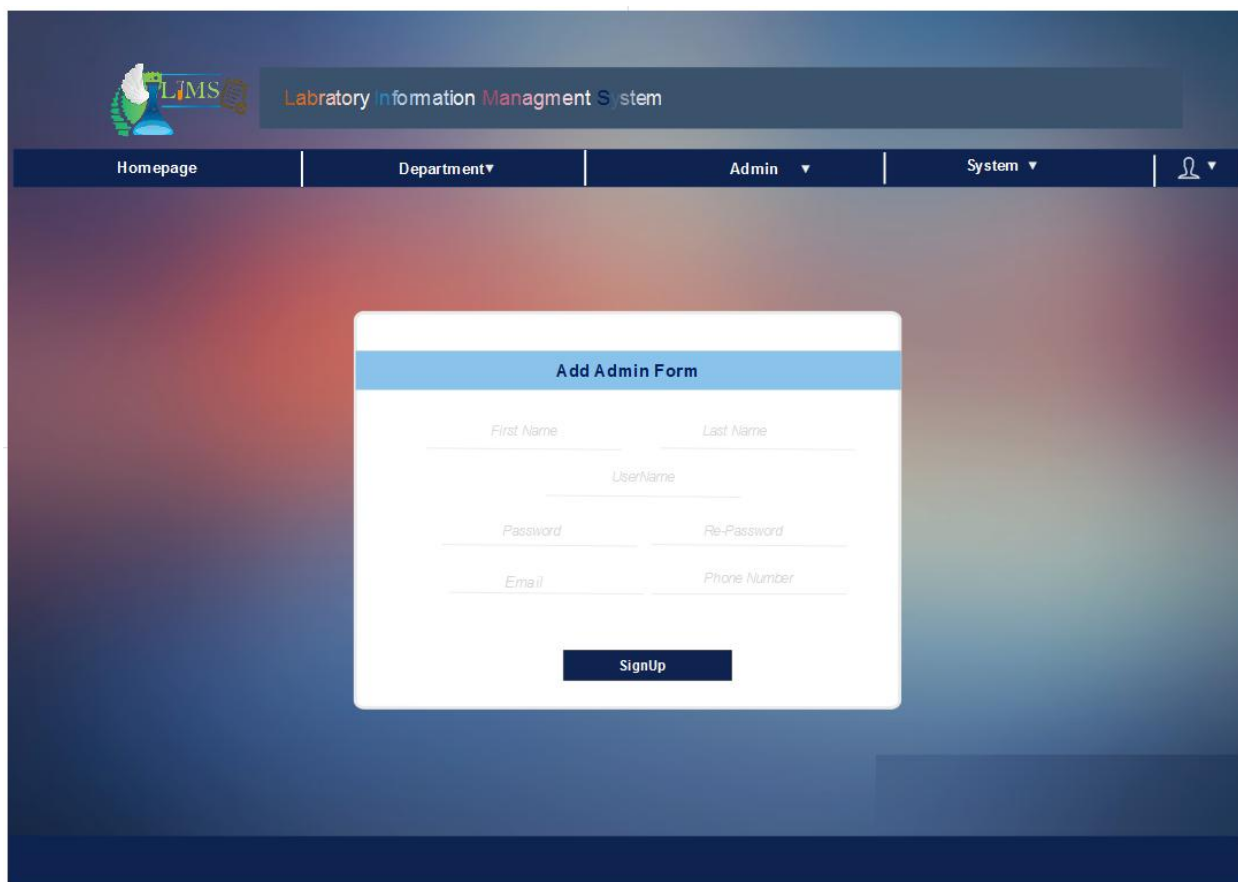


Figure 4 Admin UI flow diagram

3.1.1.1 User Interface Prototype



The screenshot displays the LIMS (Laboratory Information Management System) web interface. At the top, a dark blue header contains the LIMS logo on the left and the text 'Laboratory Information Management System' in the center. Below the header is a navigation bar with links for 'Homepage', 'Department' (with a dropdown arrow), 'Admin' (with a dropdown arrow), 'System' (with a dropdown arrow), and a user profile icon (with a dropdown arrow). The main content area features a central white modal box titled 'Add Admin Form'. This form includes input fields for 'First Name', 'Last Name', 'UserName', 'Password', 'Re-Password', 'Email', and 'Phone Number'. A dark blue 'SignUp' button is positioned at the bottom of the form.

Figure 5 Add member(IT head)

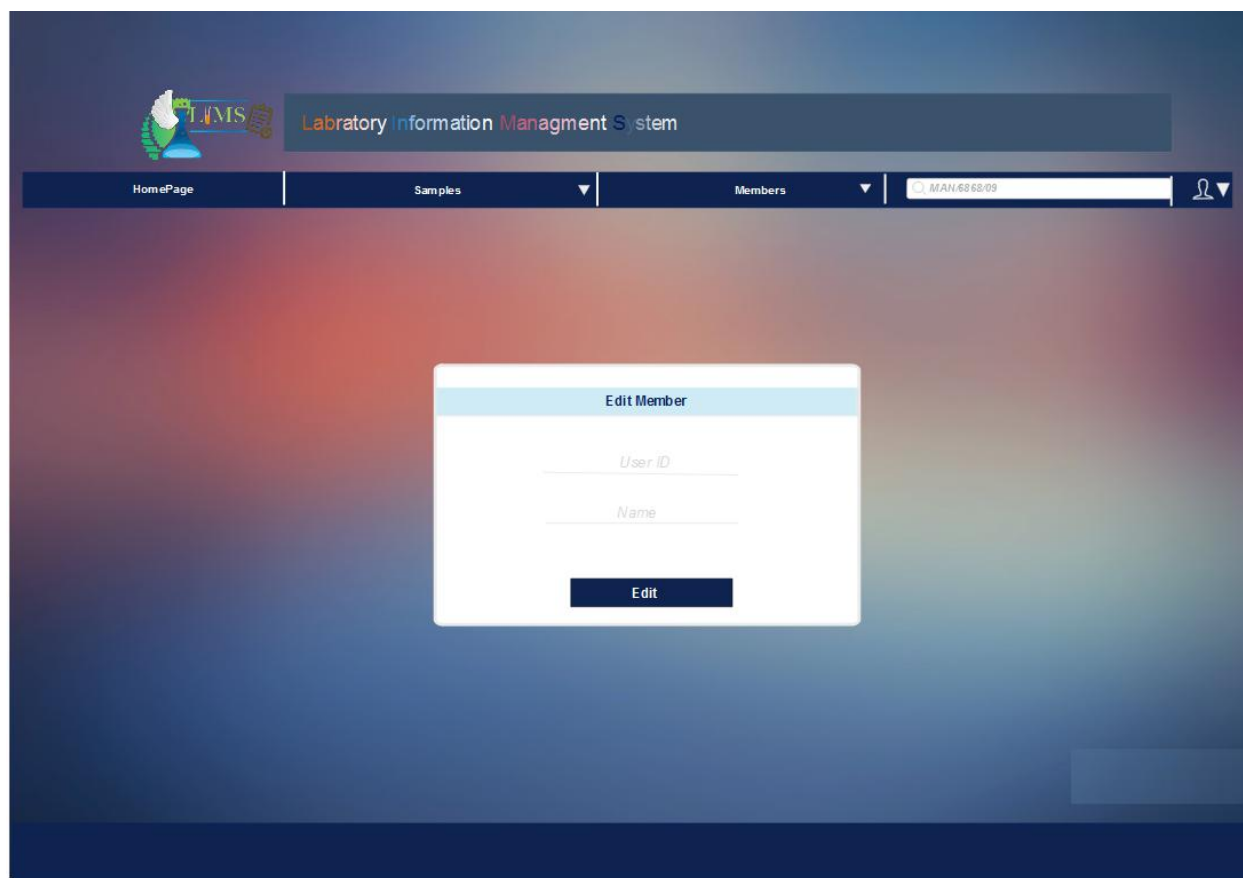


Figure 6 edit member(admin)

The screenshot shows the LIMS (Laboratory Information Management System) interface. At the top, there is a header with the LIMS logo and the text "Laboratory Information Management System". Below the header is a navigation bar with links: "Homepage", "My task", "View sample progress", "Feed Result", "Checkout", and a user profile icon. The main content area displays a "Manage Account" form. The form has two sections: "Change Password" and "Change Username". The "Change Password" section includes fields for "Current Password", "New Password", and "Re-Enter new Password", followed by a "Change" button. The "Change Username" section includes a field for "New Username" followed by a "Change" button.

LIMS Laboratory Information Management System

Homepage | My task | View sample progress | Feed Result | Checkout | User Profile

Manage Account

* Change Password

Current Password

New Password

Re-Enter new Password

Change

* Change Username

New Username

Change

Figure 7 Manage Account(lab technician)



The screenshot displays the 'My task' section of the LIMS interface. The navigation bar includes links for 'Homepage', 'My task', 'View completed Task', 'Alter Result', and 'Sample v'. The main content area features a table titled 'My task' with the following data:

Task Name	Create Time	Due Date	Product	Lab Designated number	Action
Check and Verify	Thur Mar 04:12:05 24 EAT 2018	Mon April 03:09:07 09 EAT 2018	Pulses,Soya Beans	7394792374	Start
Assign Personnel	Thur Mar 04:12:05 24 EAT 2018	Wen April 03:09:07 12 EAT 2018	Beer,Specific Gravity	3098302804	Start

Figure 8 My task lab manager

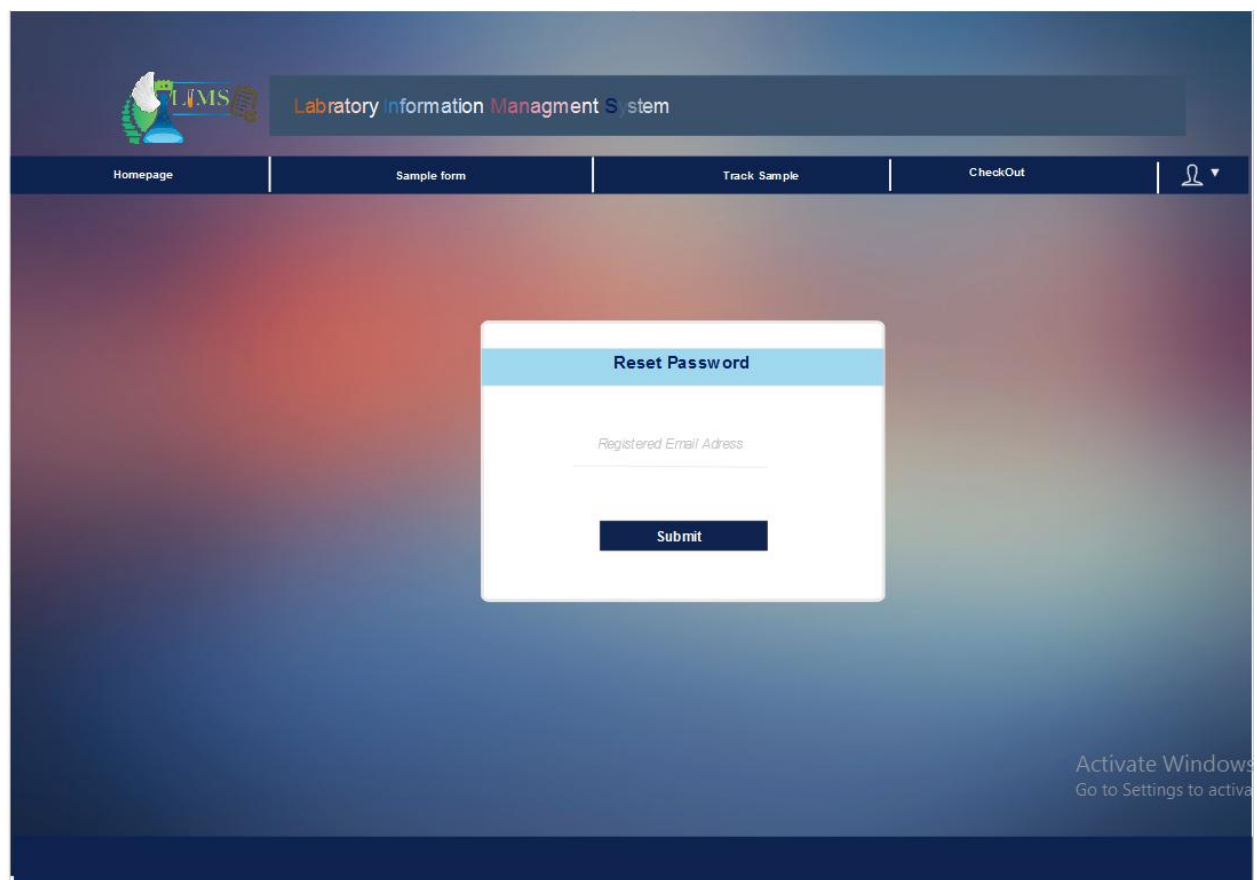


Figure 9 Reset password1(organizer)

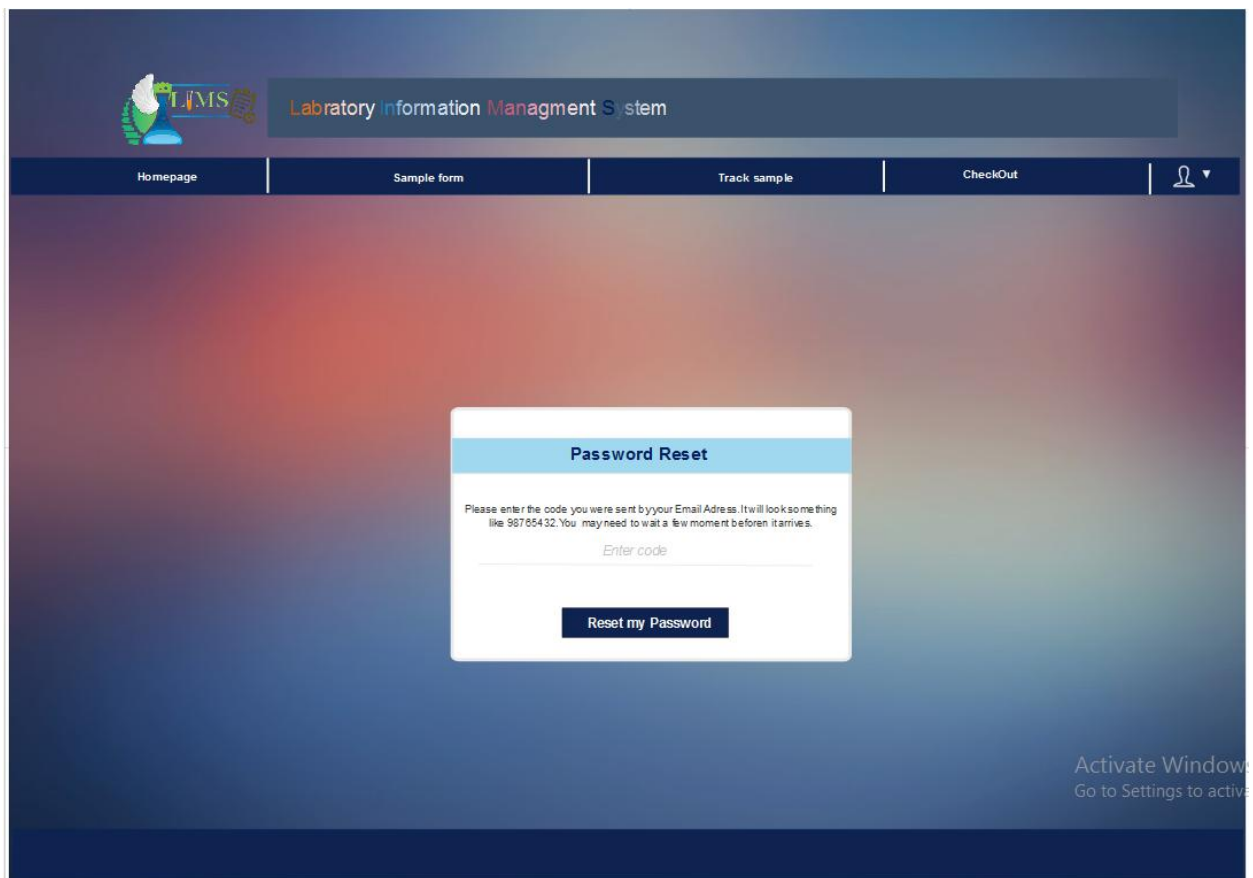


Figure 10 Reset password2(organizer)



The screenshot displays the LIMS Laboratory Information Management System interface. At the top, there is a header bar with the LIMS logo and the text 'Laboratory Information Management System'. Below this is a navigation bar with links: 'HomePage', 'Assign Task', 'View Progress', 'Alter Result', and a user profile icon. The main content area features a table titled 'Track Sample' with five columns: 'customerID', 'Sample ID NO', 'Lab designated number', 'Lab Manager', and 'Lab Technician'. The table contains seven rows of data. A watermark 'Activate Windows Go to Settings to activate Windows' is visible in the bottom right corner of the screenshot.

Track Sample				
customerID	Sample ID NO	Lab designated number	Lab Manager	Lab Technician
CS12220181	SAM/3456/09	12345678	Waiting	Waiting
CS12220181	SAM/5678/09	12345698	Waiting	Waiting
CS12220181	SAM/7890/09	44324234	Assigned	InProgress
CS12220181	SAM/7384/09	432342344	Waiting	Waiting
CS12220181	SAM/8976/09	54345434	Assigned	InProgress
CS12220181	SAM/7777/09	64434233	Waiting	Waiting
CS1222018	SAM/9876/09	54345434	Accepted	InProgress

Figure 11 Track sample(organizer)



The screenshot displays the LIMS web application interface. At the top, there is a header bar with the LIMS logo and the title 'Laboratory Information Management System'. Below this is a navigation menu with options: 'Home Page', 'My task', 'View sample progress', 'Alter Result', 'Sample', and a user profile icon. The main content area is titled 'View progress' and contains a table with the following data:

Sample Name	Sample ID NO	Lab designated number	parameter	Status
Beer	SAM/3456/09	38429343	Bottling	Waiting
Beer	SAM/5678/09	89438293	Alcohol content	Waiting
Biscuit	SAM/7890/09	93498344	Packaging	InProgress
penmuet	SAM/7384/09	48329834	iron content	Waiting
Biscuit	SAM/8976/09	84923843	Glucose content	InProgress
Soap	SAM/7777/09	74829832	Acid content	completed
Water	SAM/9876/09	95438434	PH	InProgress

Figure 12 View progress(lab manager)

3.1.2 HARDWARE INTERFACES

Since the application must run over the internet, all the hardware shall require to connect internet will be hardware interface for the system.

3.1.3 SOFTWARE INTERFACES

The LIMS is a web-based system so it's dependent on the specifications of the desktop browser it would be accessed with. The browser should support HTML 5 and be capable of running JavaScript.

3.1.4 COMMUNICATIONS INTERFACES

The LIMS will use HTTP for all communications over the internet.

3.2 FUNCTIONAL REQUIREMENTS

3.2.1 FR-01 Log LIMS system users

Name	Log LIMS system users
Summary	The members will have access to pages according to their authorization
Input	UserID and password
Output	Users log to their account
Description	Members which enters valid userID and password will have access to (will be authorized to access) their own accounts.
Error Handling	Display the cause of the Error in familiar terms.

Table 1 FR-01 Log LIMS system users

3.2.2 FR-02 Search From Database

Name	Search From Database
Summary	The system displays search results
Input	Search field
Output	The required information will be filtered and displayed
Description	The system filters data from database according to the search filed the search field can be sampleID/sample name if the user wants to search sample, userID if user wants to search users of the system, department name/departmentID if the user wants to search department
Error Handling	Display the cause of the Error in familiar terms.

Table 2 FR-02 Search From Database

3.2.3 FR-03 Manage LIMS Personnel

Name	Manage LIMS Personnel
Summary	Members database will be updated
Input	Member information
Output	Modified or updated or added member information
Description	The system shall allow manipulation of member information like editing member profile, adding member and removing member
Error Handling	Display the cause of the Error in familiar terms.

Table 3 FR-03 Manage LIMS Personnel

3.2.4 FR-04 Manage and notify task

Name	Manage and notify task
Summary	Respective actors will be notified and task is managed
Input	Task info or nothing
Output	The actors will get their tasks and task data will be manipulated
Description	The system should notify each actors about the task assigned to them and also the authorized personnel should manage the tasks like assigning and modifying tasks
Error Handling	Display the cause of the Error in familiar terms.

Table 4 FR-04 Manage And Notify Task

3.2.5 FR-05 Manage LIMS data

Name	Manage LIMS data
Summary	Samples' and departments' data is manipulated

Input	Samples'/departments' information
Output	Successful manipulation of data
Description	The system shall allow data manipulation options for samples and departments such as adding(feed), removing, editing(alter), getting(view) sample,department and results of sample test
Error Handling	Display the cause of the Error in familiar terms.

Table 5 FR-05 Manage LIMS data

3.2.6 FR-06 Generate checkout and lab designated number

Name	Generate checkout and lab designated number
Summary	The system generates checkout and lab designated number
Input	customerID, valid sample info
Output	Checkout number and lab designated number
Description	To start to test/operate on a sample there should be a unique number to identify each sample so lab designated number and checkout number is generated and lab designated number is assigned to each sample when the sample is received to the organizer then to test/operate on a sample the sample should have to be in the hands of the lab technician so the lab technician needs checkout number to take the sample from the organizer
Error Handling	Display the cause of the Error in familiar terms.

Table 6 FR-06 Generate checkout and lab designated number

3.3 USE CASES

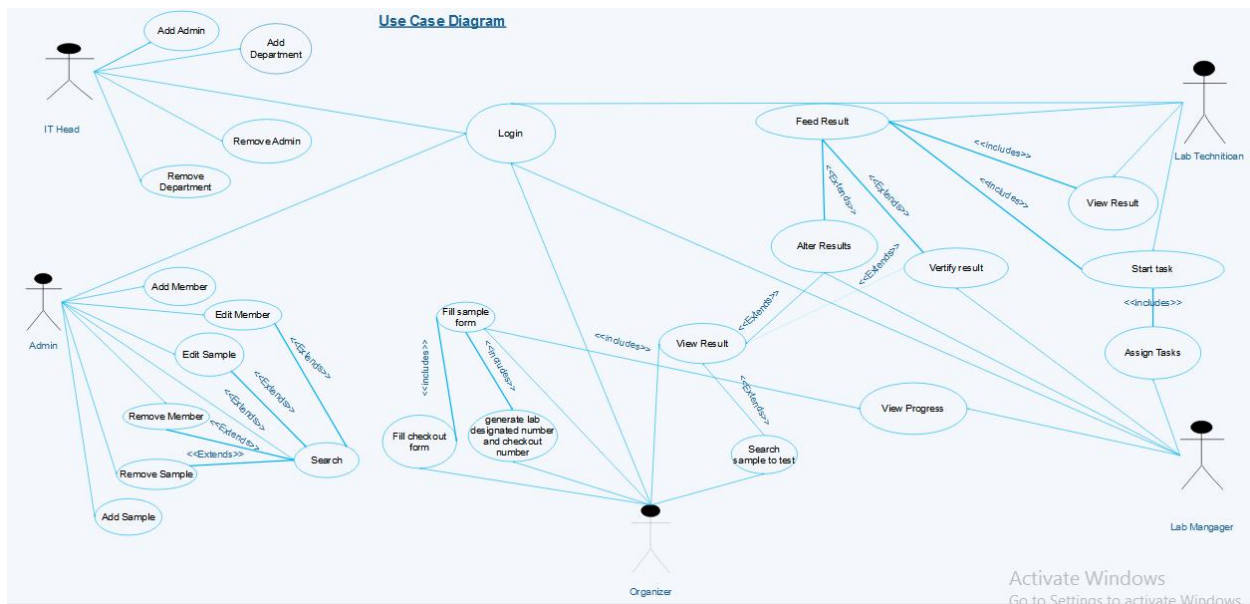


Figure 13 Use cases

3.3.1 UC-01 Add Admin

Related Requirement: FR-3 manage LIMS personnel

Primary Actor – IT head

Summary: Admins information will be added to the member info database

Pre-condition: the member should be an employee of the organization

Post Condition: the employee become a member

Trigger: Authorized personnel want to add members.

Main success scenario:

1. The IT head clicks on Add Admin Button
2. The system will display the registering form
3. The IT head will fill the required info
4. The system checks if all the necessary information is filled
5. The IT head clicks save button
6. The system verify if the user didn't registered previously
7. The system display confirmation dialogue to verify the data input and resumes
8. The IT head confirms
9. The system generates ID for the Admin
10. Admins information will be saved to database and the system displays success message dialogue

Extension:

6 a The user is already a member

6.a.1 the system display the user is already a member

6.a.2 The IT head acknowledges the information

- 8.a IT head didn't confirm
- 8.a.1 the previous page displayed

3.3.2 UC-02 Search Admin

Related Requirement: FR-2 search from database

Primary Actor – IT head

Summary: Search for a specific member

Pre-condition: IT head should log in

Post Condition: The desired info is displayed

Trigger: The IT head chooses to search for the admin to edit profile or authorized personnel wants to view profile of the admin

Main Success scenario:

1. The IT head clicks on the search box
2. Write name of admin
3. The IT head clicks search button
4. The system finds the required info from the member database
5. The system displays required info

Extension:

- 2.a the head wants to write ID of the admin
- 3.a The system couldn't find user
- 3.a.1 The system display user not found dialogue

3.3.3 UC-03 Edits admins' profile

Related Requirement: FR-3 manage LIMS personnel

Primary Actor – IT head

Summary: Members' database will be updated

Pre-condition: The user is already a member

Post Condition: Members' info is updated

Trigger: Members info should be updated as well

Main Success scenario:

1. The actor clicks edit button
2. The system displays the forms as editable form
3. The IT head clicks on each box that needs to be updated and rewrite
4. The IT head clicks on save button
5. The system checks if there is an empty field
6. The system displays confirmation dialogue to verify updated data
7. The IT head confirms
8. The system displays update success message

Extension:

- 5.a there is empty field
- 5.a.1 the system notifies

6.a The actor didn't confirm changes

6.a.1 The system displays change not saved message

3.3.4 UC-04 Remove Admin

Related requirement - FR-03 manage LIMS personnel

Primary Actor – IT head

Summary: Members database will be updated and the user is no longer a member

Pre-condition: The user exists

Post Condition: The user is removed

Trigger: authorized personnel issued the removal since the user is no longer working

Main Success scenario:

1. The IT head clicks on remove button
2. The system displays confirmation dialogue
3. The IT head verifies removal
4. Displays success message

Extension:

2.a The IT head didn't confirm change

2.a.1 the system alerts member not removed message

3.3.5 UC-05 Add Department

Related Requirement: FR-3 manage LIMS data

Primary Actor – IT head

Summary: Departments information will be added to the Department database

Pre-condition: Departments info should be approved by authorized personnel

Post Condition: Department is added to the database

Trigger: Authorized personnel want to add Department.

Main success scenario:

1. The IT head clicks on Add Department Button
2. The system will display the registering form
3. The IT head fills required info
4. The system checks if all the necessary information is filled
5. The IT head clicks save button
6. The system verify if the department didn't exist previously
7. The system display confirmation dialogue to verify the data input and resumes
8. The IT head confirms
9. The system generates ID for the Department
10. Department's information will be saved to database and the system displays success message dialogue

Extension:

6 a The Department exists

- 6.a.1 the system displays so
- 8.a IT head didn't confirm
- 8.a.1 the previous page displayed

3.3.6 UC-06 Search Department

Related Requirement: FR-2 search from database

Primary Actor – IT head

Summary: Search for a specific department

Pre-condition: IT head should log in

Post Condition: The desired info is displayed

Trigger: The IT head chooses to search for the department to edit information or authorized personnel wants to view department info

Main Success scenario:

1. The IT head clicks on the search box
2. Write name of department
3. The IT head clicks search button
4. The system finds the required info from the department database
5. The system displays required info

Extension:

- 2.a the head wants to write ID of the department
- 3.a The system couldn't find department
 - 3.a.1 The system display department not found dialogue

3.3.7 UC-07 edits departments' info

Related Requirement: FR-3 manage LIMS data

Primary Actor – IT head

Summary: departments' database will be updated

Pre-condition: The department exists

Post Condition: department's info is updated

Trigger: departments info should be updated

Main Success scenario:

1. The IT head clicks edit button
2. The system displays the forms as editable form
3. The IT head clicks on each box that needs to be updated and rewrite
4. The IT head clicks on save button
5. The system displays confirmation dialogue to verify updated data
6. The IT head confirms
7. The system displays update success message

Extension:

- 6.a The IT head didn't confirm changes
 - 6.a.1 The system displays change not saved message

3.3.8 UC-08 remove Department

Related Requirement: manage LIMS data

Primary Actor – IT head

Summary: Department database will be updated and the Department no longer exists

Pre-condition: The Department exists

Post Condition: The Department is removed

Trigger: authorized personnel issued the removal of the department

Main Success scenario:

1. The IT head clicks on remove Department
2. The system displays confirmation dialogue
3. The IT head verifies removal
4. Displays success message

Extension:

2.a The IT head didn't confirm change

2.a.1 the system alerts member not removed message

3.3.9 UC-09 view Department info

Related Requirement: manage LIMS data

Primary Actor – IT head

Summary: Departments' info displayed

Pre-condition: The Department exists

Post Condition: The Department info is displayed

Trigger: authorized personnel wants to see departments info

Main Success scenario:

1. The IT head clicks on view Department button
2. Departments' information displayed

3.3.10 UC-10 Generate Lab designated number and checkout number

Related Requirement: Generate Lab designated number and checkout number

Primary Actor – Organizer

Summary: each sample will have unique lab designated number and checkout number

Pre-condition: The organizer fills valid form

Post Condition: each sample will have unique lab designated and checkout number

Trigger: each sample should have id to identify them uniquely

Main Success scenario:

1. The organizer clicks save sample form
2. The system displays confirmation dialogue
3. The organizer confirms
4. Displays success message

Extension:

- 3.a The organizer didn't confirm change
 - 3.a.1 the system displays the previous page

3.3.11 UC-11 alter result

Related requirement - FR-05 manage LIMS data

Primary Actor – lab manager

Summary: the result is modified

Pre-condition: sample test result is feed by the lab technician

Post Condition: the result is altered

Trigger: there is something wrong filling the result that need to be changed

Main Success scenario:

1. The actor click on change result button
2. The system displays the forms as editable form
3. The admin clicks on each box that needs to be changed and rewrite
4. The admin clicks on save button
5. The system displays confirmation dialogue to verify updated data
6. The admin confirms
7. The system displays update success message

Extension:

- 6.a The admin didn't confirm changes
 - 6.a.1 The system displays change not saved message

3.3.12 UC-12 verify sample

Related Requirement - FR - 05 Manage LIMS data

Primary Actor – lab manager

Summary: the sample will be verified by the lab manager

Pre-condition: sample test result is feed by the lab technician

Post Condition: the verified sample will be ready for validation

Trigger: the sample should be validated

Main Success scenario:

1. The actor clicks verify button
2. The feed result will be presented which is editable
3. The actor edits and click the button save, to save it
4. The actor confirms
5. The system displays success message

Extension:

- 3.a The actor didn't confirm the verified sample test
 - 3.a.1 The system notifies that the verified sample test is not saved

3.3.13 UC-13 assign task

Related Requirement - FR - 06 Manage and notify task

Primary Actor – lab manager

Summary: the lab manager assigns lab technicians to work on testing samples

Pre-condition: check out number generated

Post Condition: the actor assign task for lab technician

Trigger: actor wants to assign task

Main Success scenario:

1. The actor chooses lab technicians name from the list of names near the task
2. Then the actor clicks on complete assignment button
3. The system displays confirmation dialogue to verify the assignment is final
4. The actor confirms
5. The system displays update success message

Extension:

- 5.a The actor didn't confirm changes
- 5.a.1 The system displays the previous page

3.3.14 UC-14 view progress

Related Requirement - FR - 05 Manage LIMS data

Primary Actor – lab manager

Summary: sample status can be viewed by the lab manager

Pre-condition: the task should exist

Post Condition: progress will be presented for the actor

Trigger: actor want to know progress of sample status

Main Success scenario:

1. The lab manager clicks on view progress button
2. Tabular representation of sample progress will be viewed

3.3.15 UC-15 send result

Related Requirement - FR - 05 Manage LIMS data

Primary Actor – lab manager

Summary: result is ready to be send to organizer

Precondition: Verified sample

Post condition: The result will be send

Trigger: The actor wants to send the result

Main success Scenario

1. The actor clicks send result button.
2. The system displays confirmation dialogue to send the final result
3. The actor confirms

4. The system displays update success message

Extension:

- 2.a The actor didn't confirm changes
- 2.a.1 The system displays the previous page

3.3.16 UC-16 Add Member

Related Requirement: FR-3 manage LIMS personnel

Primary Actor – Administrator

Summary: member information will be added to the member info database

Pre-condition: the member should be an employee of the organization

Post Condition: the employee become a member

Trigger: Authorized personnel want to add members.

Main success scenario:

1. The Administrator clicks on Add Member Button
2. The system will display the registering form
3. The Administrator will fill the required info
4. The system checks if all the necessary information is filled
5. The Administrator clicks save button
6. The system verify if the user didn't registered previously
7. The system display confirmation dialogue to verify the data input and resumes
8. The Administrator confirms
9. The system generates ID for the member
10. Members information will be saved to database and the system displays success message dialogue

Extension:

- 6 a The user is already a member
 - 6.a.1 the system display the user is already a member
 - 6.a.2 The IT head acknowledges the information
- 8.a Administrator didn't confirm
 - 8.a.1 the previous page displayed

3.3.17 UC-17 Search Member

Related Requirement: FR-2 search from database

Primary Actor – Administrator

Summary: Search for a specific member

Pre-condition: Administrator should log in

Post Condition: The desired info is displayed

Trigger: The Administrator chooses to search for the member to edit profile or authorized personnel wants to view profile of the member

Main Success scenario:

1. The Administrator clicks on the search box
2. Write name of member
3. The Administrator clicks search button
4. The system finds the required info from the member database
5. The system displays required info

Extension:

- 2.a the head wants to write ID of the member
- 3.a The system couldn't find user
 - 3.a.1 The system display user not found dialogue

3.3.18 UC-18 Edits members' profile

Related Requirement: FR-3 manage LIMS personnel

Primary Actor – Administrator

Summary: Members' database will be updated

Pre-condition: The user is already a member

Post Condition: Members' info is updated

Trigger: Members info should be updated as well

Main Success scenario:

1. The Administrator clicks edit button
2. The system displays the forms as editable form
3. The Administrator clicks on each box that needs to be updated and rewrite
4. The Administrator clicks on save button
5. The system checks if there is an empty field
6. The system displays confirmation dialogue to verify updated data
7. The Administrator confirms
8. The system displays update success message

Extension:

- 5.a there is empty field
 - 5.a.1 the system notifies
- 6.a The actor didn't confirm changes
 - 6.a.1 The system displays change not saved message

3.3.19 UC-19 Remove Member

Related requirement - FR-03 manage LIMS personnel

Primary Actor – Administrator

Summary: Members database will be updated and the user is no longer a member

Pre-condition: The user exists

Post Condition: The user is removed

Trigger: authorized personnel issued the removal since the user is no longer working

Main Success scenario:

1. The Administrator clicks on remove button
2. The system displays confirmation dialogue
3. The Administrator verifies removal
4. Displays success message

Extension:

- 2.a The Administrator didn't confirm change
- 2.a.1 the system alerts member not removed message

3.3.20 UC-20 Add Sample

Related Requirement: FR-5 manage LIMS data

Primary Actor – Administrator

Summary: sample information will be added to the sample info database

Pre-condition: the sample information is approved by authorized personnel

Post Condition: new sample is added

Trigger: Authorized personnel want to add new sample

Main success scenario:

1. The Administrator clicks add sample button
2. The system will display the required form
3. The Administrator fill the required info
4. The Administrator clicks save button
5. The system verify if the sample didn't registered previously and display confirmation dialog
6. The system display confirmation dialogue to verify the data input and resumes
7. The Administrator confirms
8. The system displays success message dialogue

Extension:

- 5.a The sample is already in the database
 - 5.a.1 The system display the sample is already registered
 - 5.a.2 The Administrator acknowledges the information

3.3.21 UC-21 Search Sample

Related Requirement: FR-2 search from database

Primary Actor – Administrator

Summary: Search for a specific sample

Pre-condition: Administrator should log in

Post Condition: The desired info is displayed

Trigger: The Administrator chooses to search for the sample to edit the sample information or authorized personnel wants to view information of the sample

Main Success scenario:

1. The Administrator clicks on the search box
2. Write name of sample
3. The Administrator clicks search button
4. The system finds the required info from the sample database
5. The system displays required info

Extension:

- 2.a the head wants to write ID of the sample
- 3.a The system couldn't find sample
 - 3.a.1 The system display sample not found dialogue

3.3.22 UC-22 Edits Sample' info

Related Requirement: FR-5 manage LIMS data

Primary Actor – Administrator

Summary: - Samples' database will be updated

Pre-condition: The sample exists

Post Condition: Samples' info is updated

Trigger: The authorized personnel needs to update sample info

Main Success scenario:

1. The Administrator clicks edit button
2. The system displays the forms as editable form
3. The Administrator clicks on each box that needs to be updated and rewrite
4. The Administrator clicks on save button
5. The system checks if there is an empty field
6. The system displays confirmation dialogue to verify updated data
7. The Administrator confirms
8. The system displays update success message

Extension:

5.a There is empty field

5.a.1 the system notifies

6.a The actor didn't confirm changes

6.a.1 The system displays change not saved message

3.3.23 UC-23 Remove Sample

Related requirement - FR-05 manage LIMS data

Primary Actor – Administrator

Summary: Samples' database will be updated and the sample is deleted from the database

Pre-condition: The sample exists

Post Condition: The sample is removed

Trigger: authorized personnel issued the removal since the laboratory is not testing that specific sample permanently or temporarily

Main Success scenario:

1. The Administrator clicks on remove button
2. The system displays confirmation dialogue
3. The Administrator verifies removal
4. Displays success message

Extension:

2.a The Administrator didn't confirm change

2.a.1 the system alerts sample not removed message

3.3.24 Start task

Related requirement - FR-05 manage LIMS data

Primary Actor – Lab technician

Summary: task status will be changed to In Progress

Pre-condition: The sample is assigned to the lab technician

Post Condition: start testing the samples

Trigger: the sample to be tested should occur

Main Success scenario:

1. The lab technician clicks start button
2. The system displays a checkout form
3. The lab technician enters checkout number
4. The system checks if the checkout number is correct
5. The task status updated

Extension:

4.a the lab technician enters incorrect checkout number

4.a.1 The system notifies and displays the previous page

3.3.25 View Result

Related requirement - FR-05 manage LIMS data

Primary Actor – lab technician

Summary: the result of the sample test will be reveled to the lab technician

Pre-condition: The result of the sample test exists

Post Condition: The lab result is displayed

Trigger: the authorized personnel issued to see the results send by the lab technician or the lab technician wants to see

Main Success scenario:

1. The lab technician clicks view result button
2. The system displays results

3.3.26 Feed Result

Related requirement - FR-05 manage LIMS data

Primary Actor – lab technician

Summary: after working on the sample the lab technician feeds the results to the system the result will be saved to the database

Pre-condition: sample to test exists

Post Condition: The lab result entered to the system

Trigger: the result should be entered

Main Success scenario:

1. The lab technician clicks to each field and fills the result from the lab
2. The lab technician clicks OK button
3. The system displays confirmation dialogue to verify the assignment is final
4. The lab technician clicks SAVE button
5. The system notifies save success

Extension:

4.a the lab technician clicks CANCEL button

4.a.1The system displays change not saved message

4.a.2 The system displays the previous page

ACTIVITY FLOW DIAGRAM

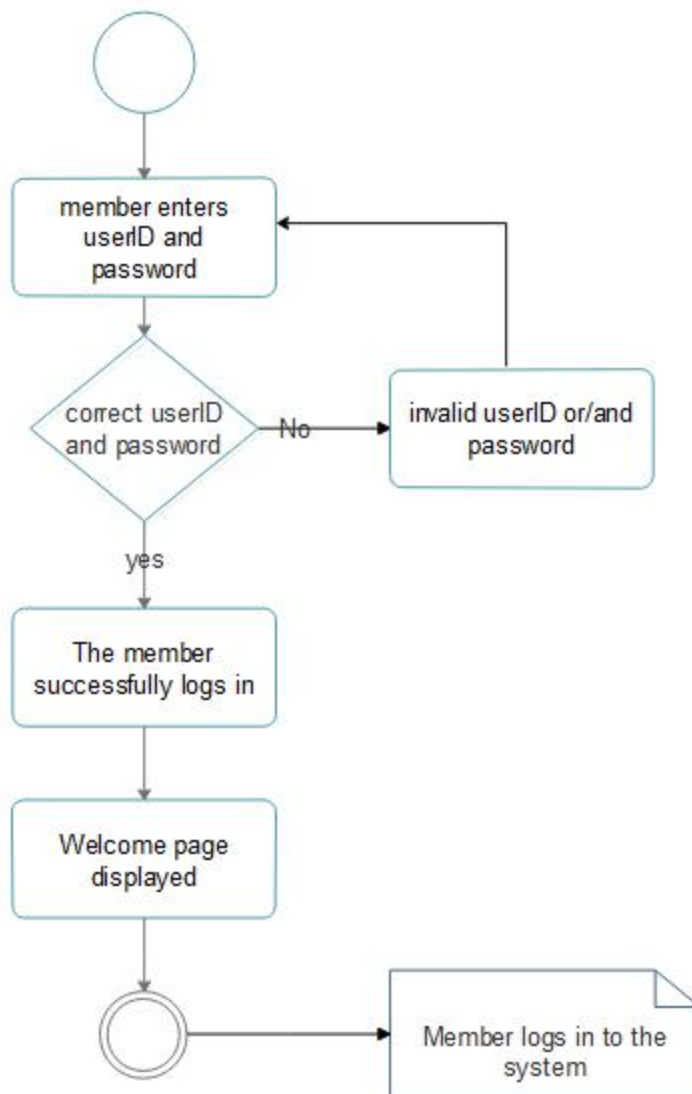


Figure 14 Log In Flow Diagram

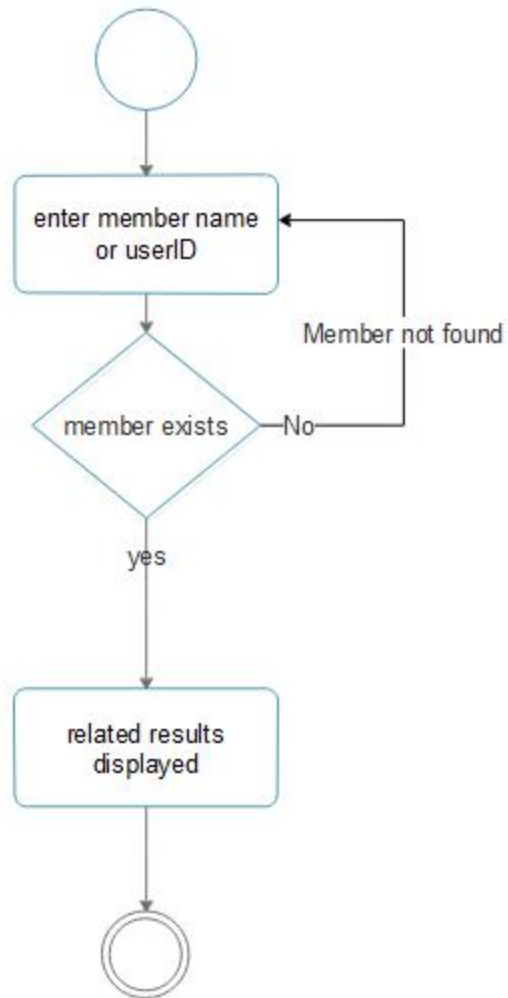


Figure 15 Search Member Flow Diagram

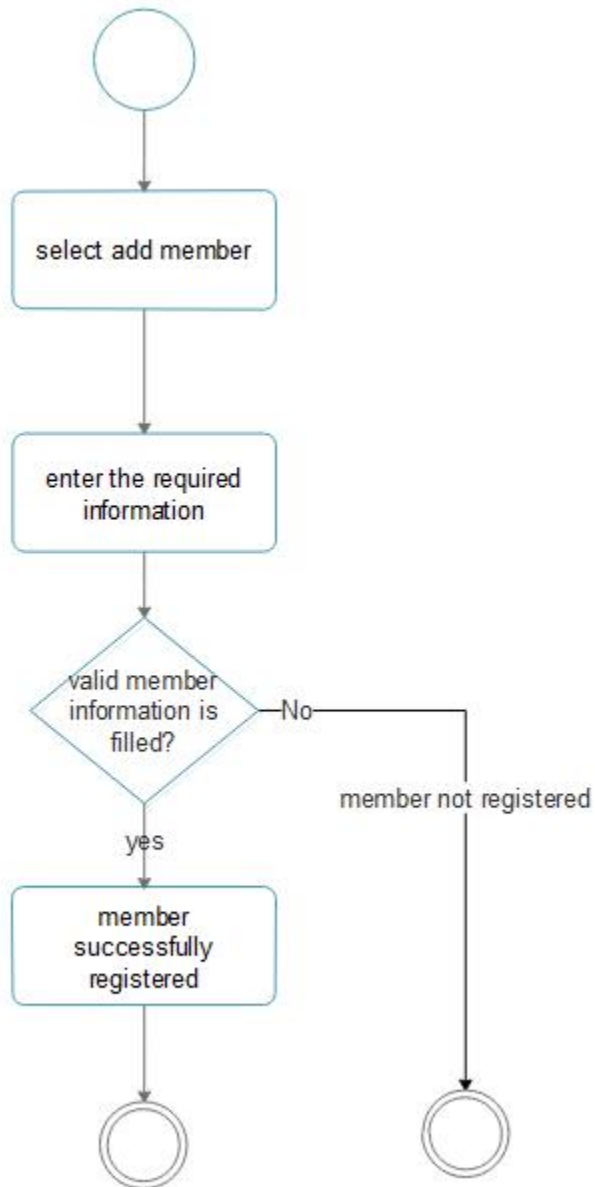


Figure 16 Add Member Flow Diagram

3.4 NON FUNCTIONAL REQUIREMENTS

We are designing a general purpose LIMS so its hard to list out non functional requirements accurately so we tried to analyze non functional requirements assuming larger laboratories to use our system.

3.4.1 PERFORMANCE

- Opening new windows, clicking buttons and dismissing pop-up messages shall take no more than 1 second.

- The software shall support 30-60 users concurrently up to 2 seconds response time
- Accessing the database shall take no more than 2 seconds.
- The product shall be based on web and has to be run from a web server.
- The product shall take initial load time depending on internet connection strength which also depends on the media from which the product is run.
- The performance shall depend upon hardware components of the client/customer.

3.4.2 RELIABILITY

- The system should be able to back up the database in case of any failure that may occur.
- The system should be able to update its database instantaneously as any change occurs.
- The system should alert the user of errors.
- The system should save the current configuration & restore the configuration after malfunction.

3.4.3 AVAILABILITY

- The system should be available 24 hours a day, 7 days a week throughout the year.

3.4.4 SECURITY

- The system will provide accounts to the authorized users.
- Proper login mechanisms shall be used to avoid account hacking, more than three failure attempts will produce a red flag to the systems administrator.
- The users should be forced to change their password after the first login.
- The system should provide databases' modification only for the authorized users after authorization procedures.

3.4.5 MAINTAINABILITY

- The system should be flexible enough for changes.
- The system should be capable of any modifications that would be applied to it.

3.4.6 USABILITY

- The software should be intuitive to use which means the average required time for novices to use the software effectively should not be more than 5 minutes.

3.4.7 FLEXIBILITY

- The system shall be modified to adopt different environments, configurations and user expectations so there will not be any text that will be displayed to the user in the source code. Every piece of text that a user might see is modifiable without changing the source code.

3.4.8 PORTABILITY

The system is expected to be compatible with all web browsers.

3.5 INVERSE REQUIREMENTS

- The system can be used in different environments so its hard to predict the exact data usage
- The system is dependent on the users input and the user will have a lot of work to to ahead.

3.6 DESIGN CONSTRAINTS

There are factors that have impact on the system. These are the following

- The data accumulation: data accommodated by the system will need more storage space as time passes.
- Web page standard: The system shall be built using a standard web page development tool that conforms to web development standards

3.6.1 STANDARD DEVELOPMENT TOOLS

- The system shall be built using standard web page development tools.

3.6.2 WEB BASED PRODUCT

- The computers should be equipped with web browsers.
- The product must be stored in such a way that allows the user easy access to it.
- A general knowledge of basic computer skills is required to use the system.

3.7 LOGICAL DATABASE REQUIREMENTS

All the data will be saved to the database: member account, sample information, result data, test progress. The database allows concurrent access and will be kept consistent at all times requiring a good database design.

3.7.1 DATA RETENTION

Data retention is according to the policy of the users(enterprises, organizations ...)

Below there is an image about data entities and their relationships, integrity constraints.

Data	Attribute	Use
Sample to test info	Sample type Parameter Sample status Customer Id Size of sample Sampling date Standard reference Sample Id department Lab designated number Checkout number Date sample received Time sample received deadline	To track each customer sample id sample to the customer and to identify the sample
Member data	First name Last name Qualification Type of user department Password Username User Id Age Sex Joined date	This table is to store members' information and make sure the entire users login to their page considering the type of user they are.
Sample data	Sample name Parameter Sample Id Testing time Failed range Moderate range Standard reference Pass range	Is to calculate time taken for each sample to test, to validate sample weather its passed or failed, to view the samples available for testing to the customers with the cost (payment)
Result data	Lab designated number Sample Id Analyst Id Analyst name Result Result description Validation status Sample Name Lab designated number parameter	This result data is stored to make sure that changes are valid like if there is something wrong with the result it can easily view who made it by seeing this table.

Sample Progress data	Customer Id Lab designated number Sample status	This table is to track the progress of the sample if the customer wants to know where there sample is weather testing is started or not and weather its rejected or accepted though they are notified when they give the sample to the storekeeper.
Task data	Task id User ID Sample ID Deadline Task status Lab designated number	To notify task for responsible actors and to track sample
Department data	Department Id Department name No of department Members in department	Is to track department

Figure 17 Logical Database



Figure 18 ER-Diagram

3.8 OTHER REQUIREMENTS

3.8.1 REGULATORY REQUIREMENTS

Management must define, implement, communicate and maintain quality objectives and assign personnel at all levels of the organization to be responsible for verifying the company's quality system.

3.8.2 TRAINING RELATED REQUIREMENTS

There is no special training related requirement just the general knowledge of basic computer skills is required to use the product

4 CHANGE MANAGEMENT PROCESS

This SRS document states the requirements of LIMS system as clear as possible, which is done by consulting our clients to dig deep into the specifications, that assist us to address any questions regarding requirements.

The team prefers using the waterfall life cycle to proceed with LIMS project. This enables team members to have profound understanding about all the requirements of the laboratory tasks including the resources that the customers use. Attempts to confer with our clients while working on our SRS document, assist us avoid changes that could ruin strategy of the LIMS system as much as possible. Changes that should be made will be discussed among teammates and then applied.

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APPENDIX

A

- Availability

C

- Conformity

E

- E-R diagram

F

- Flexibility

I

- Interface

L

- Logical database

M

- Maintainability

P

- Performance
- Portability

R

- Reliable

S

- Security

U

- usability