Software Design Descriptions Document Using IEEE 1016 Standard

<Web application of Abuse report>

Course CS509 – Design of Software Systems

Group2:

Chengjiao Yang Mohammed Ayub Qiukun Lin Rui Jin Rundong Yu Wenxin Zhao Yichen Lin

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1 Overview

1.1 Scope

This software system is a Web application which helps Group Home staff and supervisors to report incidents of abuse to the Disabled Persons Protection Commission (DPPC) and in turn report to Department of Developmental Services (DDS). This system will help the Health Care Organization efficiently manage and track all the abuse reports, smoothen the investigation process and also help the Human Rights Committee (HRC) in their decision to make appeals by providing them the details of initial report.

The administrator of this system will also have the ability to print, email or FAX the reports through the web application to different Agencies. This system also contains a database to store abuse report information of reporter, victim and abuser for efficient retrieval and tracking.

1.2 Purpose

The purpose of this document is to outline a detailed description pertaining to the development of abuse report Web Application. It will explain the Design subject in details and the elements and constraints under which the system operates. Besides, it will also explain the functionality of the system, and the platform under which the system responses to external stimuli. This document will serve as a reference to both the users and the developers of the system and will be proposed to the Third Party Health Care Organization for its approval. Specific viewpoints have been used to address the appropriate concerns.

1.3 Intended audience

This standard is intended for technical developers who will develop the abuse report Web application. Besides, this standard is also for related personnel in Health Care Organization, DPPC, DDS and HRC to have a clear mind of the construction and work flow of this abuse report Web application. It guides the development designers in the process of analysis design and system design section of this Web application. For Health Care Organization developing its abuse report Web application, the use of this standard can help to ensure that design descriptions are complete, concise, consistent, interchangeable, and appropriate for recording design experience and completing individual modules of this abuse report Web application.

2 Design viewpoints

Introduction

The following section defines several design viewpoints for use in developing the SDDs. Each of the design viewpoints are illustrated with their appropriate design languages to address respected design concerns. The design entities, relationships and constraints are also depicted in the diagrams used using standard modeling UML notations.

2.1 Context viewpoint

In this section we have used the UML Use Case diagrams to depict the relationship of actors who will be using the design subject. It also includes several scenarios of the actor's interaction with the system in its environment. The Context viewpoint provides a "black box" perspective on the design subject.

2.1.1 Design elements

<u>Design entities</u>: It consists of the Staff, Supervisors, Administrator and the Human Rights Committee Chairman who interact with the system.

<u>Design relationships</u>: Inputs are in textual form and Output is also text in human readable form. <u>Design constraints</u>: Medium of interaction is through hardware devices such as Mouse and keyboard inputs given to the system. There is no audio or video input functionality in the design subject.

2.1.2 Boundary Use Cases

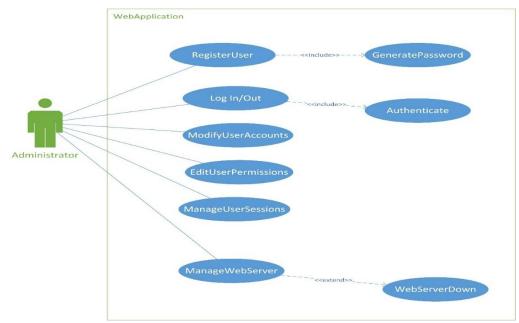


Figure 2.1

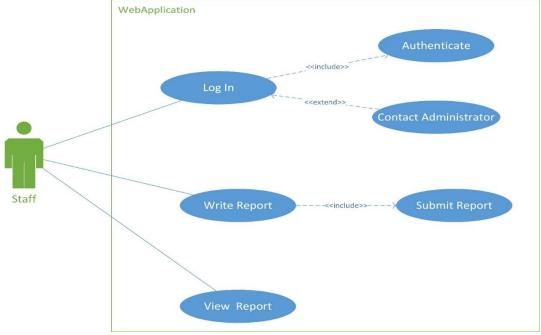


Figure 2.2

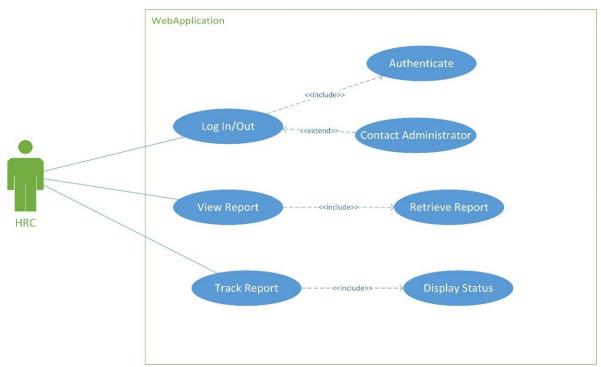


Figure 2.3

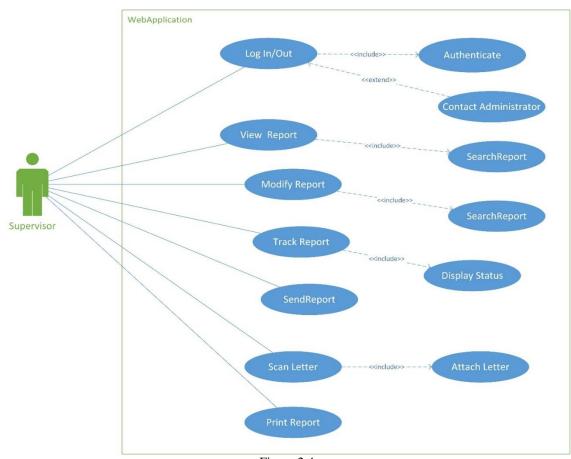


Figure 2.4

2.1.3 Specific Use Cases

2.1.3.1 Login Use Case

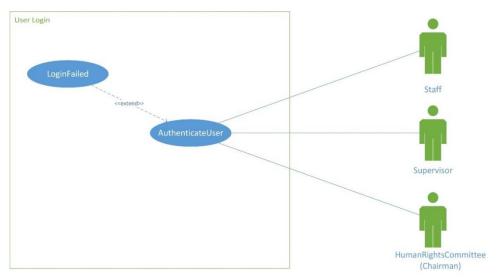


Figure 2.5

Use case name	User Login
Participants actor	Staff, Supervisor, HumanRightComittee (Chairman)
Flow of events	 User connects to the Application URL. He is presented with a login page which contains two fields Username and password. The user enters the Username and password in the fields. The system authenticates both the username and the password. If the details are correct, the system present the user with the home age or the search page depending on the user type (i.e. if the user is staff, supervisor or Chairman). If the details are incorrect, the system prompts the user to enter the correct details. If the user fails to enter the correct details after three attempts, it locks the user and prompts the user to contact admin.
Entry condition	1. User is connected to the internet from his computer with either one of the internet explorer (Firefox, IE, Chrome, Safari).
Exit condition	 User is presented with a success login message. User is presented with an error message if the login fails. If the login attempts fail after three time, he is presented with an appropriate message to contact admin.
Nonfunctional/ Quality requirement	 The application must be stable when the reporter is writing the initial report. The home page should be shown within 3 seconds independent of the user browser.

Table 2.1

2.1.3.2 Write Report Use Case

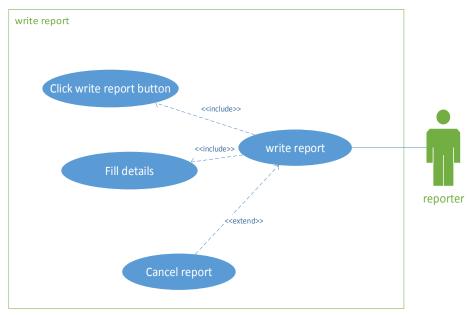


Figure 2.6

Use case name	Write Report
Participants actor	Direct staff(reporter)
Flow of events	The reporter after logging into the system he performs the following tasks. Reporter clicks the "Write report" button The application provides the empty abuse report to fill the details. The reporter enters the necessary details of victim and abuser (name, address etc.) and the abuse description. Reporter clicks the submit button to send it to the supervisor. The application saves the report to the server with the partial details of the incident. The application could invoking the initial report where supervisor could edit or check the status
Entry condition	The reporter has already logged into the system with his
	credentials successfully.
Exit condition	The application saved the initial abuse report to the server The reporter logs out the application after writing the report or without writing report
Nonfunctional/Q	The reporter should be able to use the application independent of
uality	any browser.
requirement	The application must be stable when the reported is writing the
	initial report. The application must be able to save the report to database. The reporter can save the partial report and enter rest of the details later before submitting it.

Table 2.2

2.1.3.3 Modify Report Use Case

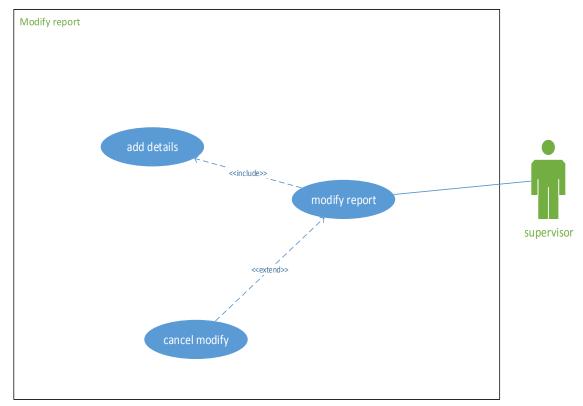


Figure 2.7

Use case name	ModifyReport
Participate actors	Supervisor
Flow of events	 Supervisor after logging in to the system searches the appropriate report by entering the report number into the search field. Supervisor chooses the report by report number to view. The application presents the user with the partially filled details of the abuse report. Supervisor clicks 'edit' button besides the item he or she wants to modify. Supervisor modifies or add additional details to the report. Supervisor clicks 'save' button. The application inserts the details into the database. System saves the revised abuse report to central computer (server). Supervisor notifies the DPPC that a report has been created.
Entry condition	1. The supervisor has logged into the application with his credentials.
Exit condition	 The Supervisor successfully modifies and inserts the report into the database. The supervisor logs out of the application.

Table 2.3

2.1.3.4 Send Report Use Case

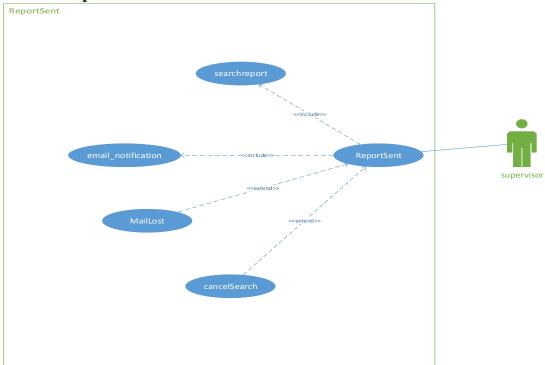


Figure 2.8

Use case name	SendReport
Participate Actors	Supervisor
Flow of events	1. After the supervisor logins into the system, he performs the following tasks.
	2. Supervisor clicks on the report sent button, and opens the report sent web page.
	3. Supervisor opens pushdown menu which lists the most
	recent abuse report, and selects the abuse report that he/she
	wants. Or supervisor enters an abuse report ID in a text frame
	and finds the abuse report that he/she wants.
	4. Supervisor prints the abuse report for mailing or faxing.
	5. Supervisor sends the abuse report to DPPC by mail or fax.
	6. Supervisor receives the confirmation that the abuse report is received.
Entry condition	Supervisor clicks on the report sent button.
Exit condition	1. The report is sent out by mail or fax
	2. The Supervisor cancels sending the abuse report or the abuse
	report is lost when it is mailing or faxing

Nonfunctional/Quality	1. The supervisor should be able to use the application
requirement	independent of the browser.
	2. The Web application must be stable when supervisor is
	searching the desired abuse report.
	3. The desired Abuse report is in the database.
	4. The mailing process or the faxing process is successful.

Table 2.4

2.1.3.5 View Report Use Case

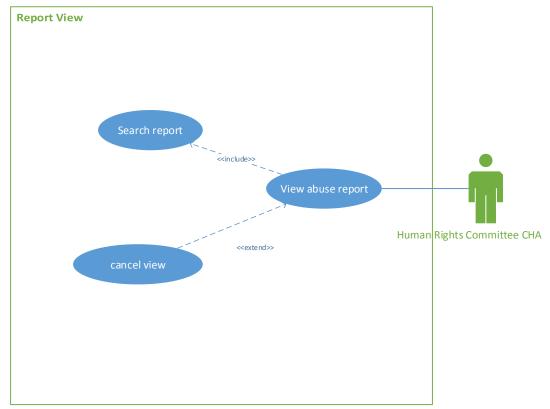


Figure 2.9

Use case name	View Report
Participate	Staff, Human rights committee chairman, Supervisor
Actors	
Flow of events	1. Users enter valid report ID into the search field provided in
	the main menu.
	2. Users click on "search" button.
	3. Web retrieves the abuse report submitted by the user if it is
	present in the database, otherwise prompts to enter the correct
	report id. from database.
	4. Report title is displayed on screen with options to view.
	5. User click on "view" button.
	6. Application displays the detail description of the report.
Entry condition	The user has already logged in the Web application

Exit condition	User is presented with the details of the report.
	Authorized users log out the Web application.
Quality	1. The Web application must be stable when the abuse report is
requirement	being viewed
	2. Abuse reports that are in the process of being viewed are
	maintained in server
	3. Reports should be displayed in short time after user submit
	request.

Table 2.5

2.1.3.6 Print Report Use Case

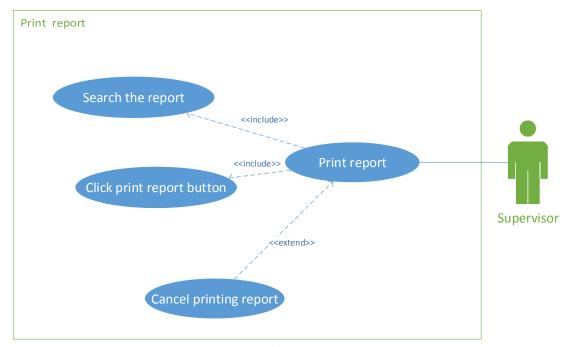


Figure 2.10

Use case name	Print Report
Participating	Supervisor
Actors	
Flow of event	1. The supervisor after logging into the system he performs the
	following tasks.
	2. Supervisor types in the public log number to view the report.
	3. Application responds by showing the appropriate report to the user
	with available options to return or print.
	4. Supervisor clicks "Print Report" button.
	5. The application shows the pdf form of the official report to the user
	by encrypting the important details of the reporter, abuser and victim.
	6. Application sends signal to the user system's connected printers.
	7. If there is any local printer connected to the user system then it
	prints the report, if there is no printer connected it displays a message

	to the user.
Entry condition	Supervisor has logged into the application with his credentials.
Exit condition	The user gets a hard copy of the report from the application.
Nonfunctional/	1. The system is stable while the user is printing the hard copy of
Quality	report.
requirements	2. After supervisor selects "Print Report", system sends printer signal
	no later than 3 seconds.

Table 2.6

2.1.3.7 Track Report Use Case

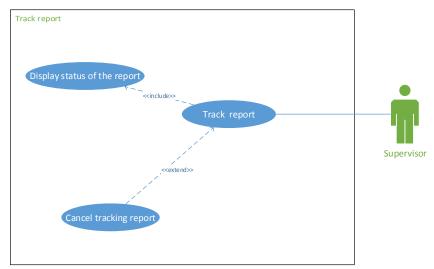


Figure 2.11

Use Case Name	Track Report
Participate	Supervisor
Actors	
Flow of events	1. Supervisor selects the "Track Report" button.
	2. The system redirects the user to the track report page.
	3. Supervisor inputs the Public Log Number of the report, then
	click the "Search" button.
	4. The application recognizes the tracking number and connects
	with the database to match the report number and shows the report
	along with its status in the same page, if the number is correct, or
	displays the error message and prompts the user to input the
	correct tracking number again.
	5. Supervisor can now checks the status of the report or type the
	tracking number to search again.
Entry Condition	Supervisor has already logged into the system with his credentials.
Exit Condition	Supervisor is shown the details of the report and its status.
Quality	Application should be stable when user is checking the status of
Requirement	the report.
	The user should be connected to the internet while tracking the

report.
Application should shows the status of report or display error information within 3 seconds.

Table 2.7

2.1.3.8 Scan Report Use Case

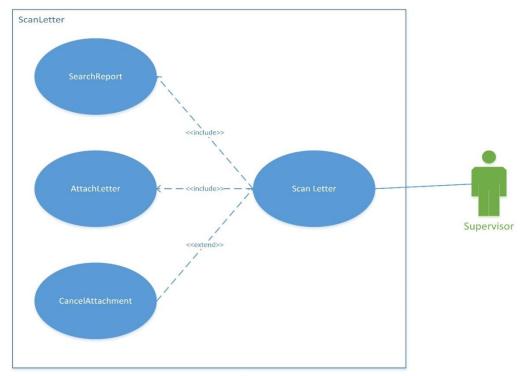


Figure 2.12

Use Case Name	ScanLetter
Participants	Supervisor
actor	
Event Flow	1. The supervisor logs into the application successfully with his credentials.
	2. Supervisor retrieves the appropriate report from database by entering the report number into the search report field.
	3. If the report is present, the supervisor is presented with the
	options of view, print and attaching the document/letters to that
	report.
	4. The supervisor clicks on Attach button.
	5. The application then presents the user with the dialog box to
	browse and select the Disposition/Decision from his local system
	depending on the status of the report.
	6. The supervisor then selects the attachment and uploads it in that
	report.
	7. If the file size of the attachment is less than 5MB the supervisor

	successfully attaches the file to the report.
	8. If the file size is more than 5MB then the user is prompted to
	upload an optimal size file.
	9. Supervisor then saves the report.
Entry Condition	Supervisor is logged into the system with his credentials
Exit Condition	1. Supervisor successfully attaches the letter and can view the
	letter, also is presented with the success message.
	2. Supervisor is prompted to attach the file with less size.
Nonfunctional/	1. The system is connected to the internet.
Quality	2. Attaching the scan letter should be within 3-7 seconds
Requirements	depending on the size of the file.

Table 2.8

2.1.3.9 TrackAppeal Use Case

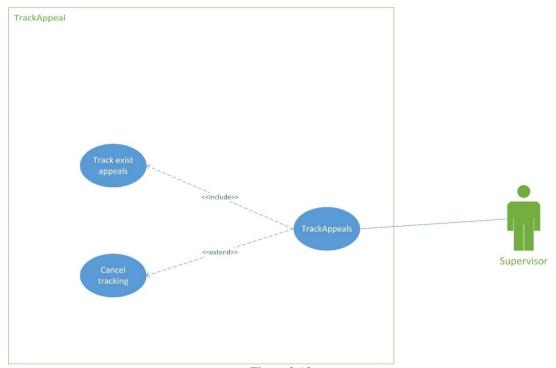


Figure 2.13

Use Case Name	TrackAppeal
Participate	Supervisor
Event Flow	 Supervisor enters the report id in the search field and clicks on the Search Button. The application fetches a record for that report displaying the options of view and attach. He clicks on that report to view the details of the report including the status.
	4. If the status is not yet moved to investigation complete then
	there will be no appeals for that report.

	5. Otherwise, the report details will show the number of appeals
	attached with the dates to the supervisor.
	6. Supervisor then reports the results to the Human Rights
	Committee.
Entry Condition	1. Supervisor gets a request from HRC to track.
	2. Supervisor is logged into the system.
Exit Condition	Supervisor makes note of the number of appeals done by Human
	Rights Committee.
Quality	1. The system return the report within 3 seconds.
Requirements	2. Supervisor could input the new appeals without deleting the
	exist appeals.

Table 2.9

2.1.3.10 AuditTrial Use Case

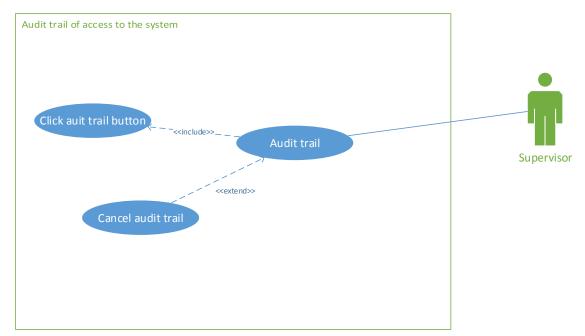


Figure 2.14

Use Case Name	AuditTrail
Participate	Administrator
Event Flow	1. User clicks on the "Get Audit Trail" Button.
	2. The web application fetches all the details of the users accessing
	the system by invoking the records in database.
	3. List of trail of access is displayed on screen with all the details
	including Date, time, etc.
Entry Condition	Supervisor has already logged into the application with his
	credentials.
Exit Condition	User is presented with the audit trails of all the users accessing the
	system.
Quality	1. The application shows the list all trail of accesses done within past

Requirements	month.
	2. The response time of the displaying all results is less than 15
	seconds.

Table 2.10

2.1.3.11 CalendarDisplay Use Case

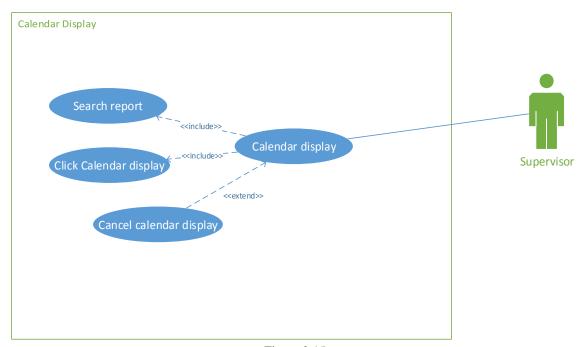


Figure 2.15

Use Case Name	Calendar Display
Participate	Supervisor
Event Flow	1. Supervisor type in the report track number
	2. User click "search" button.
	3. The application shows the status of report
	4. Supervisor click "Calendar Display" button
	5. The application invoking all the dates of initial report submit date
	and modified date and deadline of attached appeals from HRC from
	the database
	6. The application display the Calendar of related report
Entry Condition	Supervisor log in the application
Exit Condition	Supervisor log out the system after viewing the list
Quality	The application shows the detailed calendar information in 30
Requirements	seconds.

Table 2.11

2.1.4 Scenarios

Scenario name	Successful Login
Participate actors	Staff, Supervisor, Human Rights Committee chairman

Flow of events	1. The user opens the browser and logs in to the Application URL,
	which redirects him to the login page.
	2. Then user then enters his credentials (Username and the
	password) to enter into the system.
	3. The system validates the credentials by fetching and matching
	the details form the database.
	4. The system authenticates that the details are correct and then the
	user is directed to the home page of the system.
	5. The user then performs all his actions with his limited
	permissions.

Table 2.12

Scenario	Failed Login
name	
Participate	Staff, Supervisor, Human Rights Committee chairman
actors	
Flow of	1. The user opens the browser and logs in to the Application URL, which
events	redirects him to the login page.
	2. Then user then enters his credentials (Username and the password) to
	enter into the system.
	3. The system validates the credentials by fetching and matching the
	details form the database.
	4. The system authenticates that the details are incorrect and therefore the
	user is presented with a message to enter the correct credentials.
	5. If the user enters incorrect details more than two times then the specified
	user account is locked (assuming a hacker is trying to access the system),
	the user is prompted by a message which says the account is locked and to
	contact the system administrator.
	6. The user fails to log into the system.

Table 2.13

Scenario name	modifyabusereportUse Case
Participate	Supervisor
actors	
Flow of events	1. Supervisor opens the Web application and log in to his account.
	2. System responds by showing home page.
	3. Supervisor retrieves the archived abuse report in his account.
	4. Supervisor choose one report by search report number to view.
	5. System responds by showing the report list fit requirement if any.
	6. Supervisor clicks 'edit' button besides the item he or she wants to modify.
	7. Supervisor modifies or add additional details.
	8. Supervisor clicks 'save' button.
	9. System responds by saving the revised abuse report to central computer.
	10. System responds by authenticating DPPS the review authority to this
	abuse report.

Table 2.14

Scenario name	PrintReportUse Case: Successfully printing abuse report
Participate	Supervisor
actors	
Flow of events	1. Supervisor goes to the web application and log in
	2. Supervisor clicks view report button
	3. The web application would automatically display a list of all the abuse
	report.
	4. The supervisor could open any report he wants to see or types in a public number to search a specific report
	5. The web application display the report follows with a print button.
	6. Supervisor clicks print button, then application display a pdf format of the abuse report.
	7. Supervisor right click mouse and click print button. The printer receive
	the instruction and prints the report.

Table 2.15

Scenario name	ViewReportUse Case: Successfully viewing report
Participate actors	Supervisor, Staff, HumanRightsCommitteeChairman
Flow of events	1. User clicks on"view reports" button.
	2. System send request to HTTP servlet, waiting response.
	3. Servlet then links our application to Web server.
	4. Web server execute query on backstage database for reports.
	5. Once query is done, web server receives success feedback.
	6. Data flow passes through http servlet.
	7. Through UI component, abuse reports are displayed on screen
	in correct format.
	8. User can now view it.

Table 2.16

Scenario name	WriteReportUse Case		
Participate actors	Staff		
Flow of events	1. Reporter goes to the web application and logs in		
	2. Reporter clicks the "write abuse report" button		
	3. The web application would automatically display the empty abuse report		
	form		
	4. The Reporter begins to fill the details of abuse report and the application		
	saves the information periodically.		
	5. After Reporter finishes writing the report, staff click submit button		
	6. The application automatically saves the report into database, by		
	connecting to the database instance and inserting into it.		
	7. The application then presents a success message to staff.		

Table 2.17

Scenario name	TrackReportUse Case	
Participate	Supervisor	
actors		
Flow of events	1. Supervisor successfully logs into the application with his credentials.	
	He is redirected to the home page with all the permitted options.	
	3. He clicks the "Track Report" button in the menu, a new page appears	

- which asks the supervisor to input the Public log no of the report.
- 4. Supervisor types the track number and clicks on the "Search" button, unfortunately, the number he types is wrong, the application show the message "Invalid Log Number, Please enter the correct one".
- 5. Supervisor types the correct log number and tries again, the application validates it and lists the content of the report and the status of the report below.
- 6. Supervisor notes the details carefully, after that, he clicks "Return" button which takes him back to the main page.

Table 2.18

2.2 Logical viewpoint

This section depicts the logical view of the system and UML Class and Object diagrams are used to show the relationship between the classes and abstraction classes which can provide code reusability.

2.2.1 Design elements

<u>Design entities</u>: It consists of design entities such as GroupHome, Patients, Disability, Member Details, Staff and Supervisor.

<u>Design relationships</u>: There is a composition relation between the HealthCareOrg and Group Home; health care agency consists of many group homes. Member details is an Abstract class where Staff and Supervisor inherits attributes and methods form it.

<u>Design constraints</u>: Multiplicity between all the class has been shown in the below diagram.

2.2.2 Class Diagram

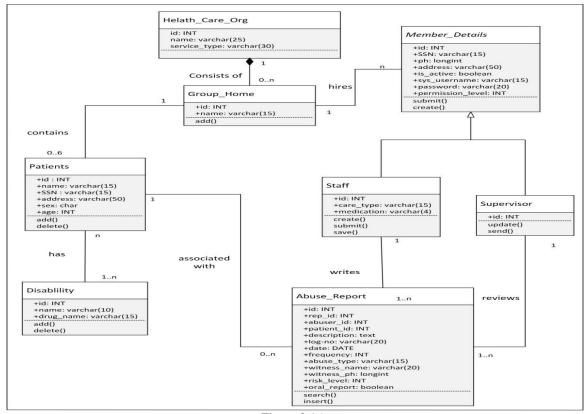


Figure 2.16

2.2.3 Object Diagram

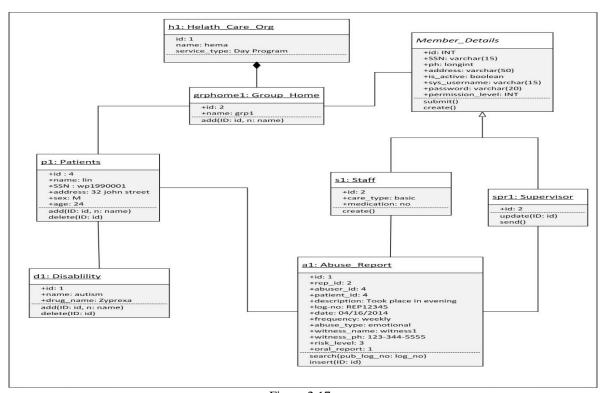


Figure 2.17

2.3 Interaction viewpoint

This section describes the interaction between the different entities of the design system and how they interact, passing function calls and messages between interaction objects. This information is captured by evaluating interactions against time using the UML sequence diagram.

2.3.1 Sequence Diagrams

2.3.1.1 UserLogin

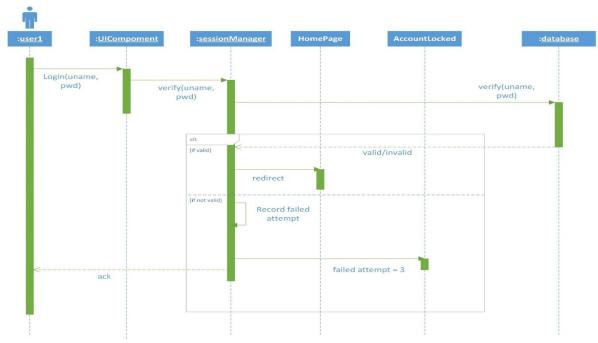


Figure 2.18

2.3.1.2 WriteReport

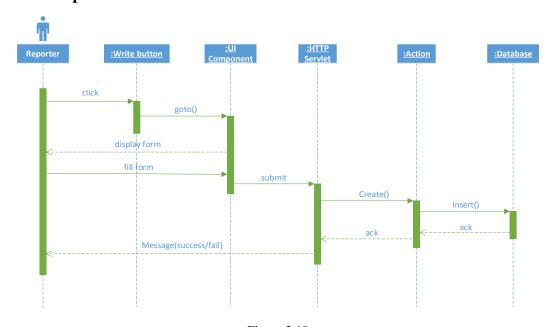


Figure 2.19

2.3.1.3 ModifyReport

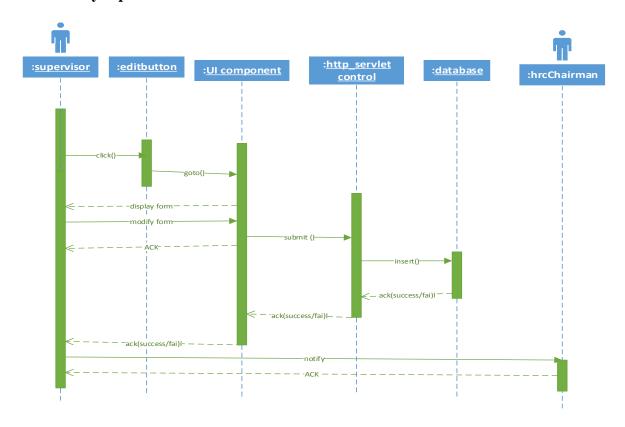
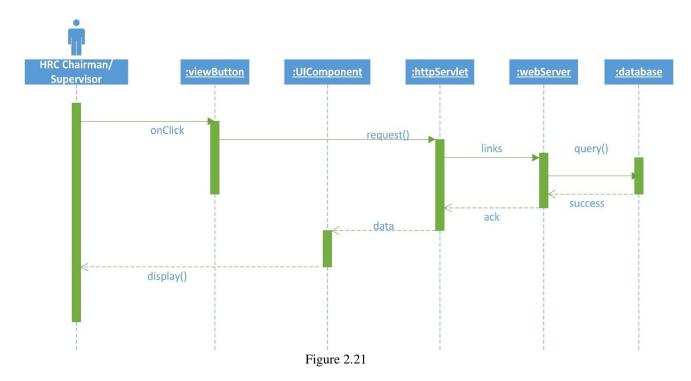


Figure 2.20

2.3.1.4 ViewReport



2.3.1.5 PrintReport

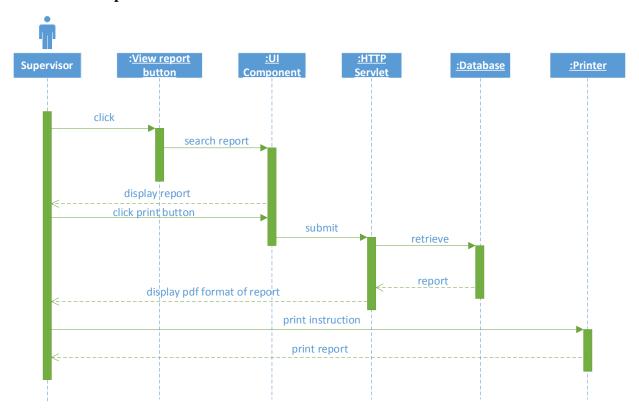


Figure 2.22

2.3.1.6 TrackReport

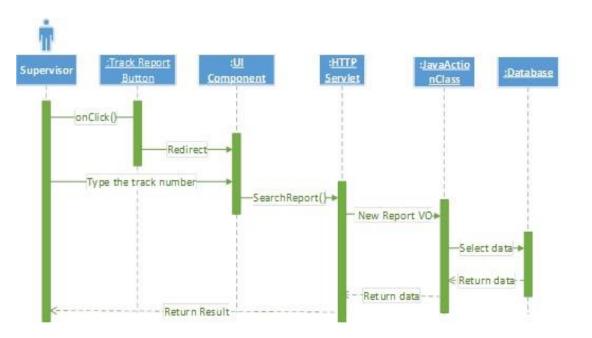


Figure 2.23

2.3.1.7 TrackAppeal

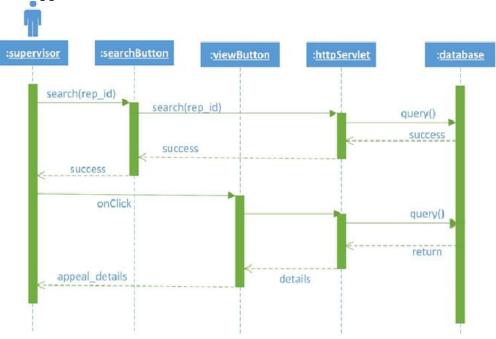


Figure 2.24

3 Summary of Design Goals:

The purpose of Abuse report web application is to facilitate the process of dealing with abuse incidents happened in health care organization, where reporting abuse incidents and tracking the investigation of abuse report would happen. Thus, the final product must be quick, efficient, easy, and safe to use. The user interface must be intuitive and have little learning curve. The following are the non-functional requirements which have contributed to our design goals.

1. Reliability:

The use of configuration file deployment allows applications to be deployed at different hardware and software environments, the use of filter technology and permissions URL control enhances the application security. Usage of log4j output and audit trail to record system state when running application ensures stability and security of the system.

2. Usability

The page and page element patterns are friendly to user and easily to operate. The application include administrator management and authority management which are easy to update and adapt for using. The section 508 rules are also applies during the data validation while the user enters the data into the system. Description of each of the fields are provided for better understandability.

3. Efficiency

Clever Algorithm for determining the most efficient save report scheme. Rationally designing the database and improving performance of database by index, partition and other features, periodically organize and scaling for large data tables. Our focus is on finding the balance between complexities the code and the number of operations required to implement the functionality.

4. Reusability

The Classes are named with meaningful names and we have abstracted some of the classes like Member_Details which help in code reuse. Use MVC, factory, proxy design pattern which allow us divide the application by different layers which improves the class reuse. Separating the common CSS and functional JavaScript from page at front end.

5. Traceability of requirements

Encapsulation or extend functionality by new class methods or with an abstract class & several derived classes. Rationally using the interface and abstract defined base class object, we can implement and extend new classes without disrupting the present design. Defining the structure of general object such as page class and use of these basic objects we can extensively write web applications.

6. Maintainability

Most of jobs are done by triggers and <u>stored procedures</u> of the database and shell script. Supply the administrator management function and administrator tools which allow us to maintain the system without much hazel.

7. Robustness

Use data abstraction and encapsulation as create ADTs and simple interfaces and shield from data corruption; Qualify all inputs, all formal parameters, invariants.

8. Modifiablity

The application use Java language to code and github for version control every modify is submited and recorded by github. Adopting standard written format and comments to improve the readability, the use of hierarchical design pattern, the code will be easy to understand and modify.

3.1 The Design Trade offs RAD vs. Functionality

Since our team is using Rapid Application Development to come up with prototypes the additional functionalities of the system will be implemented later on in the process; after we have completely implemented the required functionality of the system at first. There will be frequents changes to the design and logic implemented alongside with simple unit testing to decrease faults, failures and system downtime.

Functionality vs. Usability

In the process of developing the required functionality of the system we are also looking at how the end user is going to use the system. We have simple text buttons for navigation and forms filled with text description of every field for the user to easily complete and submit the forms. We hide the complex logic of retrieving and storing the report information from or to the database from the user.

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