Canadian Epidemic Tracker

E-Health Canada - Comp 3004 Deliverable 1

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Table of Contents

Introduction

1.1 Purpose of system

With the current awareness of how quickly a local disease outbreak can evolve into a larger epidemic or pandemic (ref: SARS, H5N1, H1N1) it is important to track the history and progress of disease through the population. By doing so it is easier to predict the size and severity of an outbreak a community may encounter. Furthermore, accurate tracking allows for more efficient allocation of treatment supplies. It is hoped that more efficient allocation will allow for more rapid deployment, and thus reduce the severity of an outbreak. The purpose of this system is to create a utility for medical personnel and administrators that provides real-time, geographical tracking, updating and reporting.

1.2 Scope of system

This system is intended for use by medical personnel and administrators. It is intended to be a real-time system to track both disease occurrences but for supply inventory management. Users will be able to input new occurrences of diseases, and view the information graphically set over maps of selected regions. It will also serve as a central tool for supply inventory management. Users will be able to apportion supplies as well as create and receive shipments between sites.

Secondarily the system will allow for creation and maintenance of new user accounts as well as report generation both for existing data as well as for modeled data.

While its purpose is to track relative rates, it should only be used to help identify trends for further analysis. At this time, this system is not a replacement for more robust actuarial packages and the deeper analysis they provide.

1.3 Objectives and success criteria of the project

Objectives of the project consist of:

1. To create a system capable of long term tracking of epidemic outbreaks in Canada
2. To create a system that requires minimal training for new users

3. To allow for more efficient inventory tracking for epidemic remedies

The project should be considered a success if:

1. It is used by hospitals to track outbreaks and supply levels

1.4 Definitions, acronyms, and abbreviations

- C.E.T. – Canadian Epidemic Tracker – The proposed system
- GUI – Graphical User Interface
- M.A. – Medical Administrator
- S.A. – System Administrator
- Data Visualization – Presentation of raw data on the map with a certain degree of granularity
- Real-time, up-to-date – Latest data is always provided and presented

1.5 References

Bruegge, B., Dutoit, A.H., Sommerville, I., Quinn, M.J., 2010, *Object Oriented Software Engineering, Using UML, Patterns, and Java,* Canada:Pearson Education

1.6 Overview

As mentioned previously, this system is primarily designed to track occurrences of disease outbreaks as well as regional supplies of treatments for the diseases. There will be three main classes of users of this system: clerks, medical administrators, and system administrators. Each of these will have access to differing tasks within the system.

Clerks primary responsibility is the actual input of cases of diseases. As they are informed about instances they will enter the information into the system for tracking. They will also have access to tasks involving inventory control. Specifically, those tasks involving accounting for supplies that have been used, as well as preparing and receiving shipments between sites.

Medical administrators will perform the same tasks as the clerks plus one additional task. Medical Administrators will be capable of running reports on the data collected. This

reports will graphically display various criteria of their choosing. For example comparing the rates of avian flu between provinces.

As the name implies the tasks the system administrator is involved in more behind the scenes operations of the system. They will be the ones to add new diseases and supplies to the system to allow for management and tracking. Additionally they will be the ones to create and edit the various users logins and setting their privileges.

2. Proposed System

2.1 Overview

Section 2 is a presentation of the proposed C.E.T. system. We begin with the functional requirements, detailing the tasks and options available to the different types of users. Following that are the non-functional requirements detailing the constraints on the system.

Following the requirements specifications are the scenario descriptions, followed by use-case descriptions. These should provide a high-level understanding of the systems operations.

2.2 Functional requirements

2.2.1 Disease tracking

1. Clerks and Medical Administrators must be capable of inputing new documented cases as they occur, documenting information such as: location, number infected, dates.

2.Clerks and Medical Administrators must be capable of editing cases in the event of erroneous input.

3.Clerks and Medical Administrators must be capable of viewing cases on a

map

i. Must allow display of multiple diseases at once, with clear differentiation between disease types

ii.Must allow user to select area covered by map (Canada, province, region)

2.2.2 Supply Management

1. Clerks and Medical Administrators should be able to maintain supply inventory

i. Adjusting of inventory as supplies are used

ii. Creation of shipments for transfer of supplies to a different facility

iii. Receipt of shipments of supplies from a different facility

iv. Tracking of shipments in transit

2. Clerks and Medical Administrators must be capable of viewing supplies on a map

i. Must allow display of multiple supplies at once, with clear differentiation between supply types

ii.Must allow user to select area covered by map (Canada, province, region)

2.2.3 Report Generation

1.Medical Administrators must have access to report generating functions in the form of graphs and/or tables

i.Statistics on diseases by dates, locations, disease type

ii.Statistics on supplies by dates, locations, supply type

2. It is also desirable that Medical Administrators be capable of loading modeled

data into the system and generate reports based on the model's data.

2.2.4 Administration Functions

1. System Administrators must be capable of managing user accounts
    i.Creation of new user accounts
    ii.Modification of user accounts (e.g. name changes)
    iii.Deletion of user accounts (e.g. employee leaves or account created in error)
2. System Administrators must be capable of managing disease types
    i.Creation of new disease types in database
    ii.Modification and/or removal of erroneous disease types in system
3. System Administrators must be capable of managing supply types
    i.Creation of new supply types in database
    ii.Modification and/or removal of erroneous supply types in system

2.3 Non-functional requirements

2.3.1 Usability

1. System must be usable by someone with basic computer knowledge (i.e. how to create a basic document with a word processor, browse the web)
2. GUI layout shall be clear and easy to use
3. A user with the appropriate medical background should understand all terms
4. Reports must be scientifically valid and easy to read
5. Data entry should be efficient and quick
6. Provision of documentation regarding installation and use

2.3.2 Reliability

1. Client crashes should not jeopardize data on the server, client crash should result in the loss of at most the data actively being input by the user
2. Server should maintain copy of data on disk to prevent data loss due to unforeseen system failure
3. Must be capable of handling improper input
4. Server must tolerate client exiting in the middle of session
5. System must tolerate concurrent editing of data by multiple users
6. System must be secure, and require user authentication

2.3.3 Performance

1. The system must support four concurrent client connections and handle simultaneous input from multiple clients
2. The system shall provide acknowledgement within a few seconds

2.3.4 Supportability

1. The system must be scalable, allowing for the possible future increase in number of concurrent client connections. Down-time may be necessary to implement
2. The system must also be built in a modular fashion allowing the addition of additional data types for tracking or additional functionality processing existing data types. Again downtime may be necessary.

2.3.5 Implementation

1. C.E.T. Should run on any Linux system (e.g. Ubuntu, Fedora, Debian)
2. C.E.T. is to be written using QT Creator and its C++ libraries

2.3.6 Interface

1. Communication between client and server is to make use of sockets
2. Data will be maintained using a MySQL database

2.3.7 Packaging

1.The System shall be delivered as compiled binary files, with a back-up copy on optical disk

2.3.8 Legal

1. Where required, license and copyright shall comply with the regulations of Carleton University.

2.4 System models

2.4.1 Scenarios

SC-1

Scenario Name	addNewDiseaseCase
Participating actor instances	Bob:clerk
Flow of events	1. Bob sits down at his desk and sees that he needs to add a new disease case into the C.E.T. system 2. Bob logs into the C.E.T. System 3. He activates the “add a disease case” function and looks at his information to determine if he has all the information he needs 4. Bob then fills out the fields with the required information (location, number of occurrences, dates) 5. Bob confirms that the information he input was accurate and presses the submit button to finalize his input.

FR-2.2.1.1, NFR-2.3.1.1,

SC-2

Scenario Name	createShipment
Participating actor instances	Bob:Clerk
Flow of events	1. Bob is logged into the C.E.T. System and notices that Montreal is short on Tamiflu 2. Bob takes note of how many he can spare from Ottawa and activates the “create shipment” option 3. He selects Tamiflu from the list and inputs the quantity that he wishes to take out of inventory to send to Montreal and presses the submit button. 4. Bob packages up the Tamiflu and labels it appropriately for shipping, making sure the shipment number is documented on and in the package. Then hands it off to the appropriate authority.

FR-2.2.2.1, NFR-2.3.1.1,

SC-3

Scenario Name	receiveShipment
Participating actor instances	Alice:Clerk
Flow of events	1. Alice is logged into the C.E.T. System when she receives a shipment of Tamiflu from Ottawa 2. She activates the “receive shipment” option 3. Alice inputs the shipment number and confirms the quantity received and presses submit. 4. The system marks the shipment as received and adjusts the inventory accordingly

FR-2.2.2.1, NFR-2.3.1.1

SC-4

Scenario Name	addNewDisease
Participating actor instances	Joe:SystemAdministrator
Flow of events	1. Joe is walking down the hall at the office and meets Bob, a **Clerk**, who informs him that a new disease has appeared that they wish to track and that the information has been sent to him via email 2. joe turns on his computer and logs into the C.E.T. System 3. He activates the “add a disease type” function and looks at his information to determine if he has everything he needs 4. Joe then fills out the fields with the required information (Name) 5. Joe confirms that the information he input was accurate and presses the submit button to finalize his input.

FR2.2.4.2, NFR-2.3.1.1

SC-5

Scenario Name	addNewSupply
Participating actor instances	Joe:SystemAdministrator
Flow of events	1. Joe receives information that a new drug has been approved for treating SARS and is asked to input it into the system 2. joe turns on his computer and logs into the C.E.T. System 3. He activates the “add a supply type” function and looks at his information to determine if he has everything he needs 4. Joe then fills out the fields with the required information (Name) 5. Joe confirms that the information he input was accurate and presses the submit button to finalize his input.

FR2.2.4.3, NFR-2.3.1.1

SC-7

Scenario Name	addNewUser
Participating actor instances	Joe:SystemAdministrator
Flow of events	1. Joe is introduced to Shelley, a new employee who is to assist him as a system administrator 2. As he is already logged in he activates the “add new user” option 3. He sets the type of user (system administrator) and inputs the user name and generates a password. 4. He confirms the information and presents Shelley with her new login credentials

FR-2.2.4.1, NFR-2.3.1.1

SC-7

Scenario Name	generateReport
Participating actor instances	Angelina:MedicalAdministrator
Flow of events	1. Angelina has a meeting this afternoon and she wants to see a graph comparing the relative disease rates between the provinces 2. She logs in and activates the “generate report” option 3. She selects the type of report and the regions (provinces), and diseases (H1N1, SARS) that she wishes to see 4. She confirms her selection and the system displays the results on her screen

FR-2.2.3.1, NFR-2.3.1.1, NFR-2.3.1.3

SC-8

Scenario Name	changeSupplyLevels
Participating actor instances	Angelina:MedicalAdministrator
Flow of events	1. Angelia is examining their supply 2. Angelina logs into the C.E.T. System 3. She activates the “change supply levels” function and looks at her information to determine if she has everything she needs 4. Angelina then fills out the fields with the required information (Supply Type, Quantity) 5. Angelina confirms that the information she input was accurate and presses the submit button to finalize her input.

SC-9

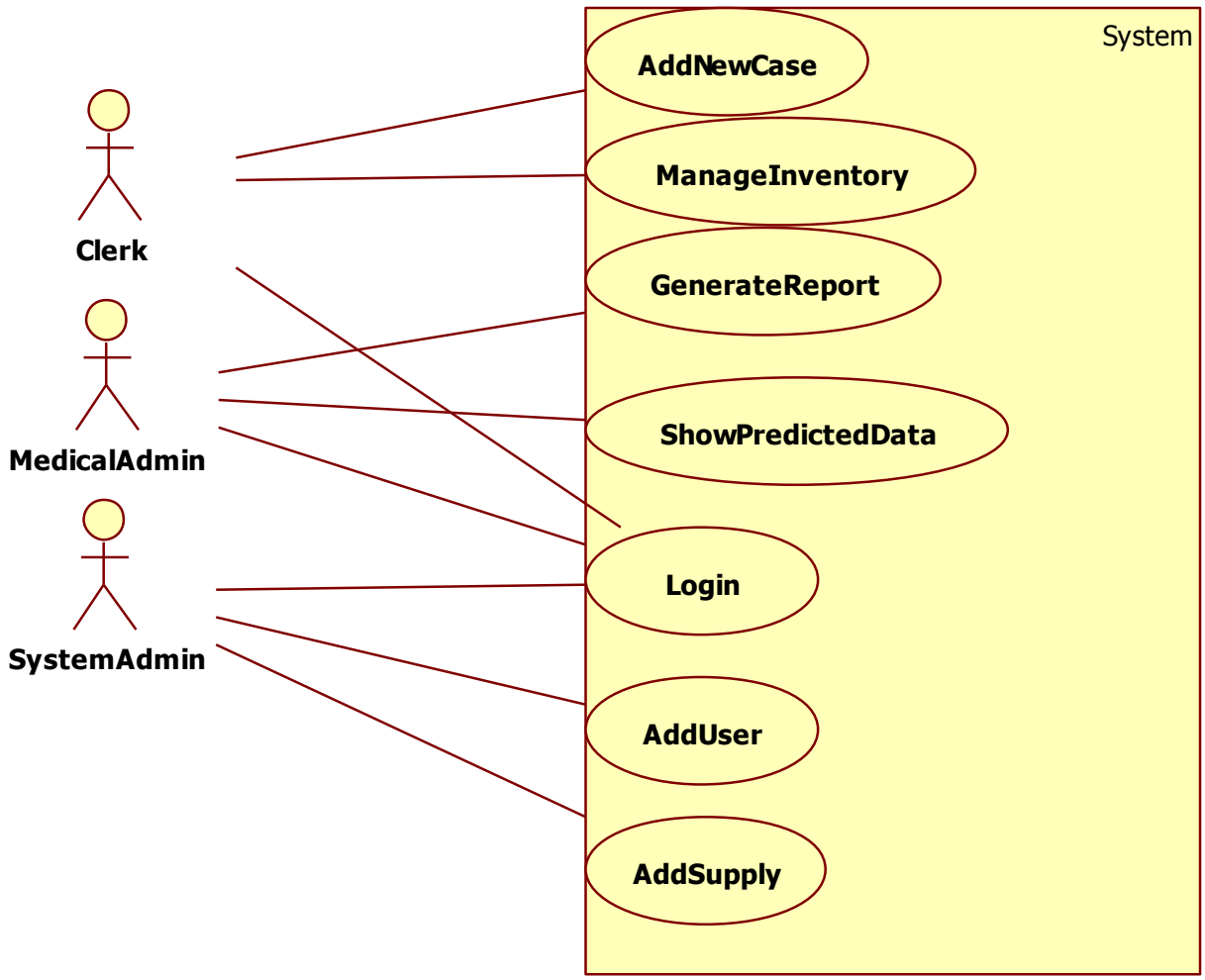
Scenario Name	viewMap
Participating actor instances	Bob:Clerk
Flow of events	1. Bob logs into the C.E.T. system 2. He selects a region from the region list 3. The map then changes its current view to the one that Bob specified 4. Bob selects his disease type to see the number of infected in that region 5. He confirms that the information he input was accurate and presses the submit button to finalize his input 6. Bob decides the map should be zoomed in a bit more to get a better view of the area and adjusts the zoom slider on the map.

2.4.2 Use case model

UC-1

Use Case Name	High Level
Participating Actors	All Users
Flow of Events	1.Users login 2.Users are presented with their individual options and select task to perform
Entry Condition	User starts up C.E.T. program
Exit Condition	User finishes their task and logout of C.E.T.
Quality Conditions	System is running and ready for input within 15 seconds

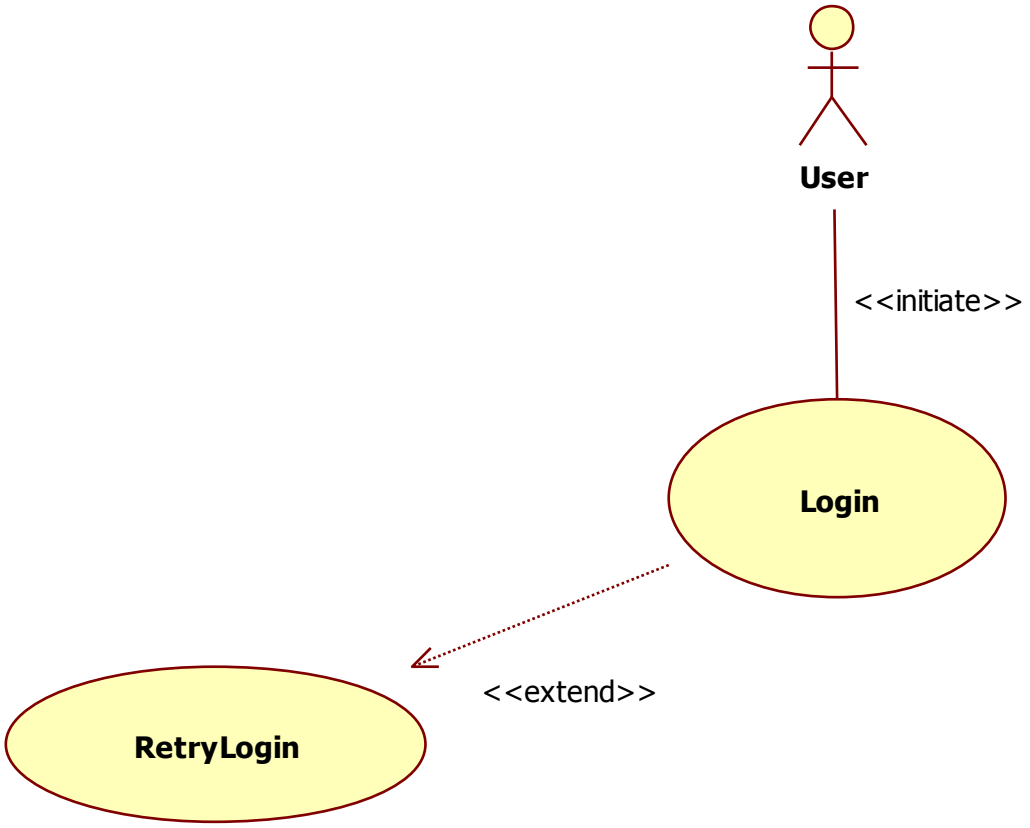
FR-all, NFR-2.3.1



UC-2

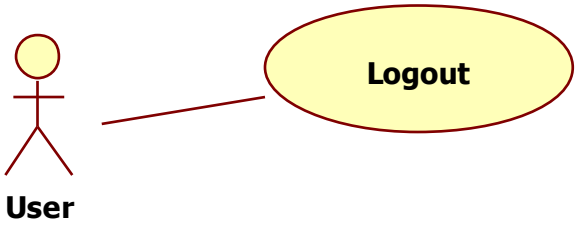
Use Case Name	Login
Participating Actors	Initiated by User
Flow of Events	1.The user enters in their username and password. 2.The user presses the login button. 3.If the users credentials are correct, a message is displayed and the appropriate menu is shown. 4.If the credentials are incorrect, then the RetryLogin message is displayed and the login screen is displayed again.
Entry Condition	The User has launched the C.E.T. application
Exit Condition	The User has pressed the exit button
Quality Requirements	User must be authenticated within 10 seconds of submitting correct login credentials C.E.T. must prevent multiple simultaneous logins from the same application instance

SC-1, NFR-2.3.3.1, NFR 2.3.2.6, UC-1



UC-3

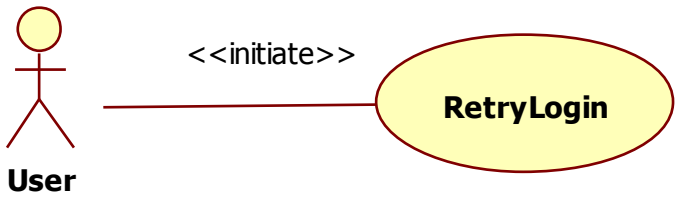
Use Case Name	Logout
Participating Actors	Initialized by User
Flow of Events	1. The user notifies the system to terminate the session 2. The user confirms that they wish to log out of the system
Entry Condition	The user is logged in to the C.E.T. System
Exit Condition	The session is terminated
Quality Requirements	All changes made by user must be correctly saved



UC-4

Use Case Name	RetryLogin
Participating Actors	Initiated by user, extends Login
Flow of Events	1. Message is displayed notifying user that their credentials cannot be validated 2. User retries entering name and password and submits again
Entry Condition	User has input invalid information on Login screen or user cannot be validated
Exit Condition	User is correctly validated
Quality requirements	User must be authenticated within 10 seconds of submitting correct login credentials

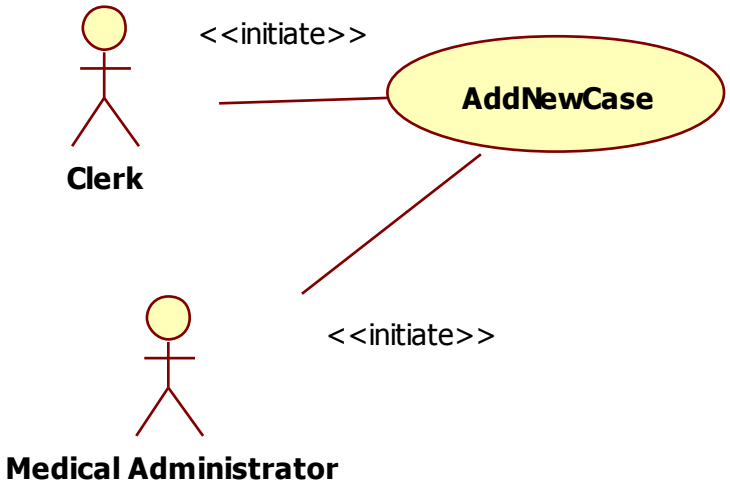
UC-2, NFR-2.3.3.1, NFR 2.3.2.6, UC-1



UC-5

Use Case Name	Add New Case
Participating Actors	Initiated by Clerk or Medical Administrator
Flow of Events	1. The Clerk or Medical Administrator selects the option to add another disease instance 2. The user then inputs the required information (disease type, date, quantity, location) 3. User has the option of confirming entered data or exiting from task without submitting changes
Entry Condition	User is logged in to C.E.T.
Exit Condition	User has confirmed input, or exited without making changes
Quality Requirements	Data must be validated before adding to database

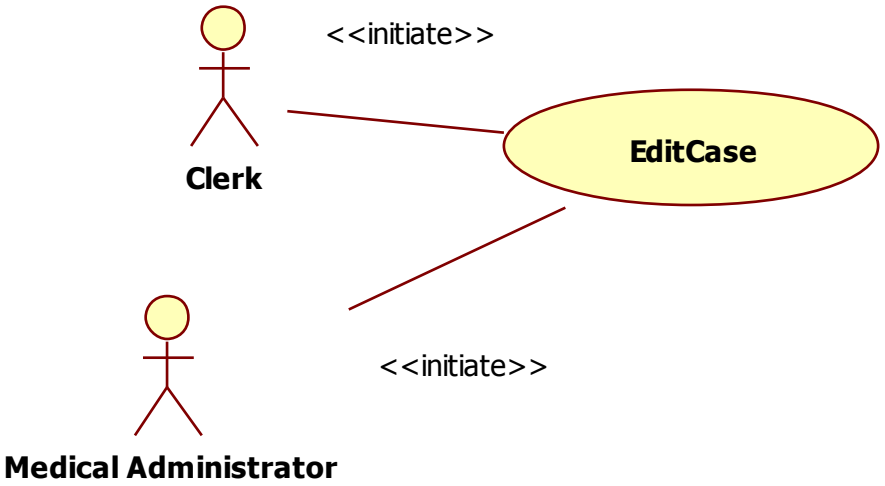
SC-1, FR-2.2.2.1, NFR-2.3.1



UC-6

Use Case Name	EditCase
Participating Actors	Initiated by Clerk or Medical Administrator
Flow of Events	1. The user selects a selects a disease case to modify 2. The user adjusts the information for the case 3. The user then chooses to confirm the new information and submit, or they may exit without committing any changes
Entry Condition	The user is logged into C.E.T.
Exit Condition	The user successfully submits the new information or exits without changes
Quality Requirements	Data must be validated before changes are added to the database

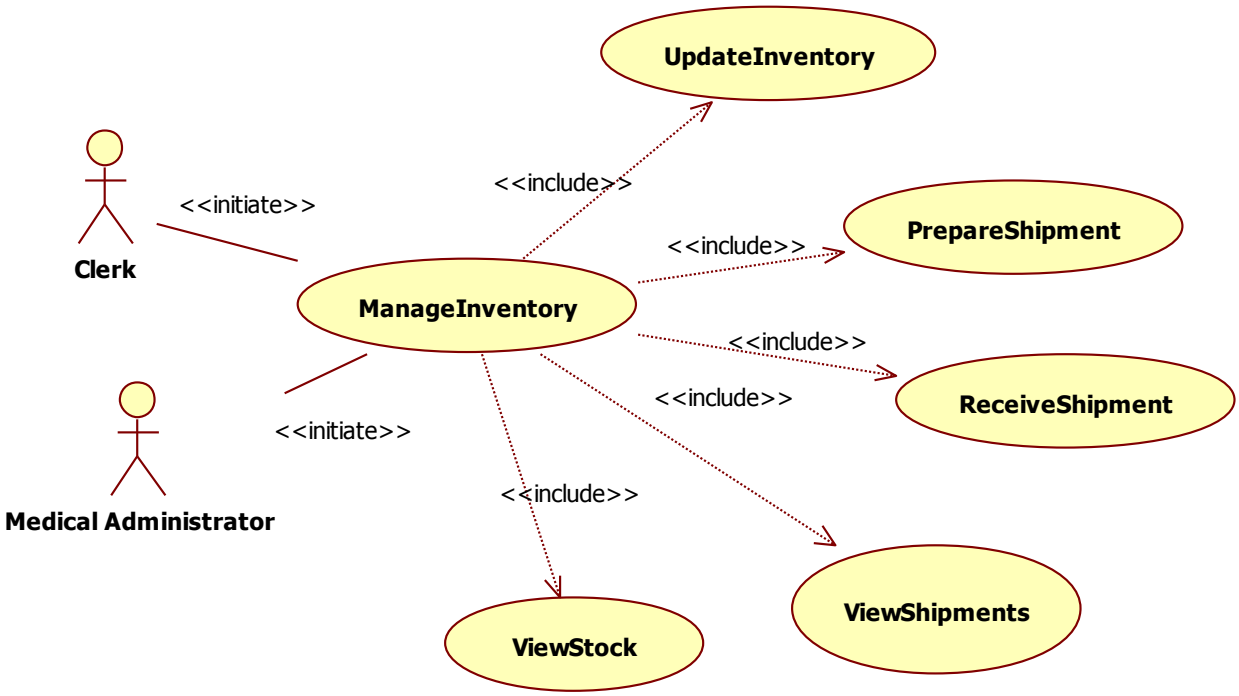
FR-2.2.1.2



UC-7

Use Case Name	ManageInventory
Participating Actors	Initiated by Clerk or Medical Administrator
Flow of Events	1. The user selects the option to manage inventory 2. If the user wishes to adjust inventory quantities then the *UpdateInventory* case is used 3. If the user wishes to ship supplies to another location then the *PrepareShipment* case is used 4. If the user wishes to acknowledge receipt of supplies from another location then *ReceiveShipment* will be used 5. The user may wish to view the list of outstanding shipments in which case the *ViewShipments* case would be used 6. Otherwise, if the user may want to view the current stock levels and so would use the *ViewStock* case
Entry Condition	The user is logged into C.E.T.
Exit Condition	The user choses another button or tab
Quality Requirements	System must allow user to back out of the option

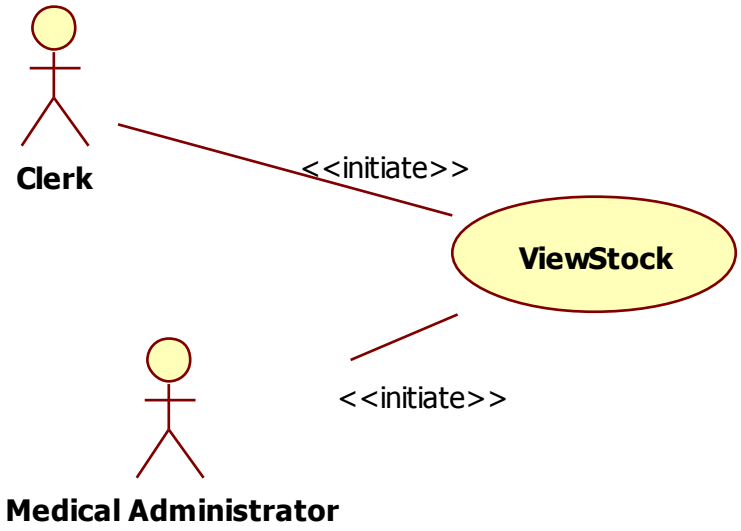
FR-2.2.2.1, SC-2, SC-3, SC-8, UC-1



UC-8

Use Case Name	ViewStock
Participating Actors	Initiated by Clerk or Medical Administrator
Flow of Events	1. The user selects a Supply type 2. The user selects a region or province
Entry Condition	The user is logged into C.E.T.
Exit Condition	The user exits
Quality Requirements	The view must display correct stocks

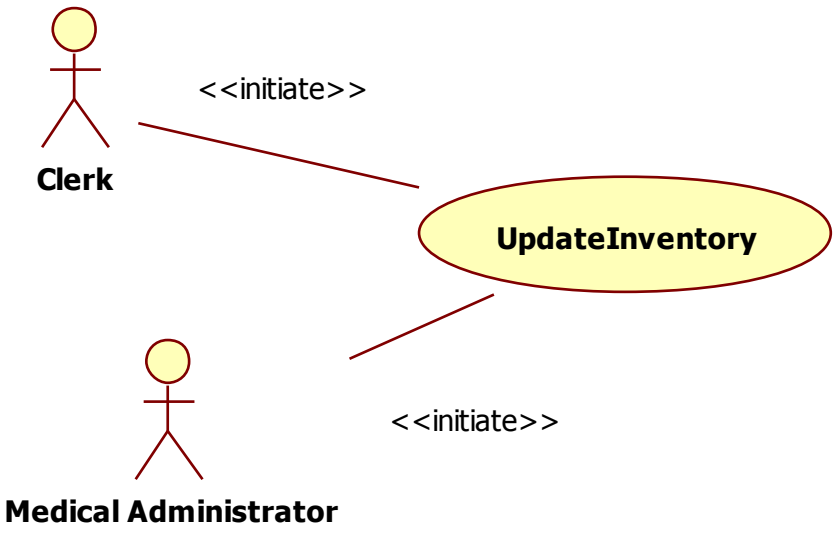
FR-2.2.2.1, UC-7



UC-9

Use Case Name	UpdateInventory
Participating Actors	Initiated by Clerk or Medical Administrator
Flow of Events	1. The user selects a Supply type and region 2. The user adjusts the inventory level 3. User submits the information and confirms when requested 4. The user can chose to Clear the supply type
Entry Condition	The user is logged into C.E.T.
Exit Condition	The user submits the update or cancels request
Quality Requirements	The adjustment must be a valid quantity i.e. no negative stock

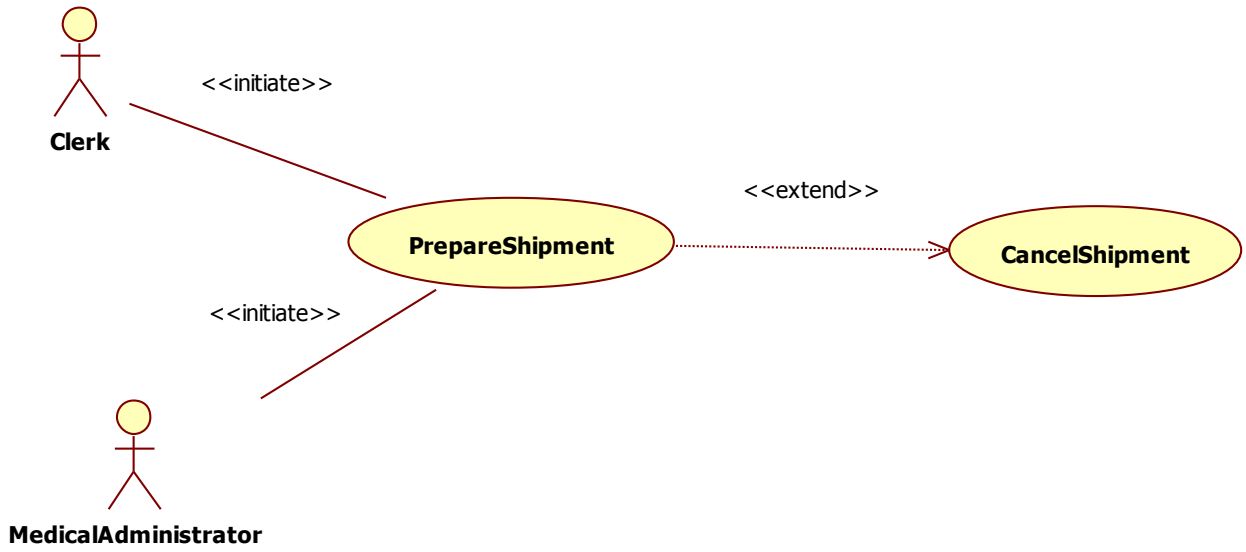
FR-2.2.2.1, SC-8, UC-7



UC-10

Use Case Name	Prepare Shipment
Participating Actors	Initialized by Clerk or Medical Administrator
Flow of Events	1. The user selects the supply type 2. The user selects the source 3. The user selects the destination 4. The user enters the quantity to transfer 5. The user can *CancelShipment*
Entry Condition	The user is logged into C.E.T. and the shipment exists if they wish to *CancelShipment*.
Exit Condition	The user clicks the Submit or Cancel button
Quality Requirements	The Shipment must have valid quantities i.e. no negative inventory

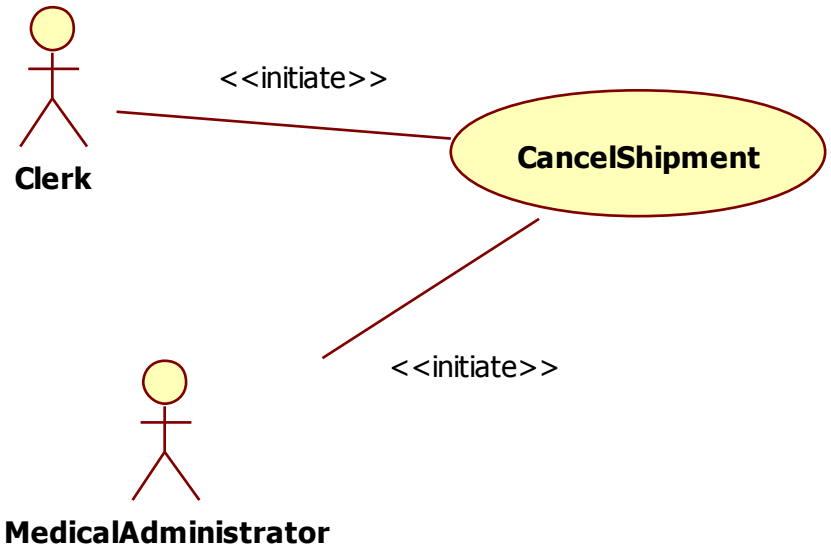
FR-2.2.2.1, SC-2, UC-7



UC-11

Use Case Name	CancelShipment
Participating Actors	Initialized by Clerk or Medical Administrator
Flow of Events	1. The user can chose to CancelShipment 2. The quantities adjusted by the shipment will be reversed
Entry Condition	The user is logged into C.E.T.
Exit Condition	The user clicks the Submit or Cancel button
Quality Requirements	The shipment must exist

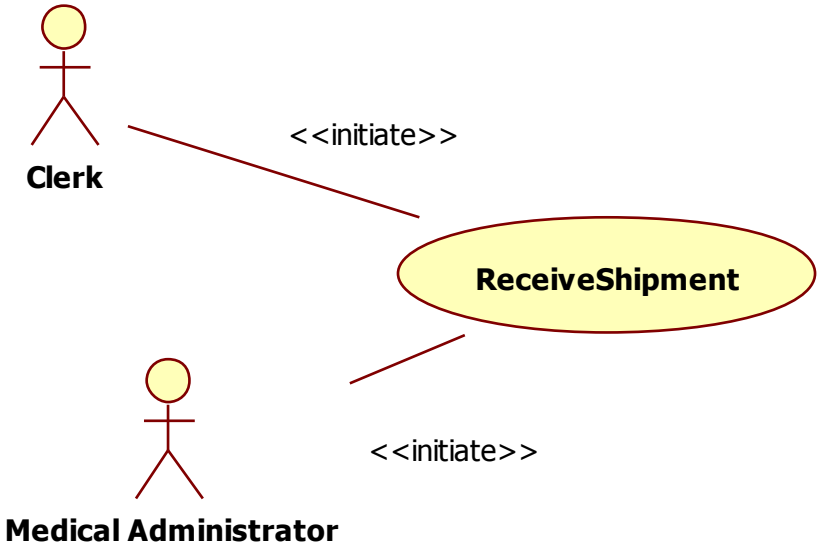
FR 2.2.2.1, UC-7, UC-10



UC-12

Use Case Name	ReceiveShipment
Participating Actors	Initialized by Clerk
Flow of Events	1. User selects a shipment. 2. The user can choose to receive shipment or cancel 3. The shipment amount is added to the destination's inventory.
Entry Condition	The user is logged into C.E.T.
Exit Condition	The user submits or cancels completing the shipment.
Quality Requirements	The Shipment has to exist in order to be received.

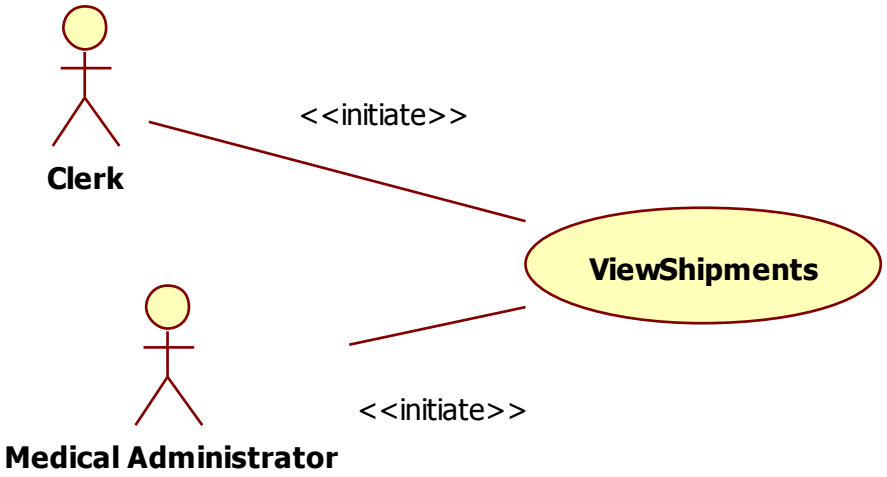
FR-2.2.2.1, SC-3, UC-7, UC-10



UC-13

Use Case Name	ViewShipments
Participating Actors	Initialized by Clerk or Medical Administrator
Flow of Events	1. The user selects a supply type. 2. The user selects a region. 3. The list is populated based on the criteria.
Entry Condition	The user is logged into C.E.T.
Exit Condition	The user exits view shipment screen
Quality Requirements	The view must be in the correct format and have relevant data

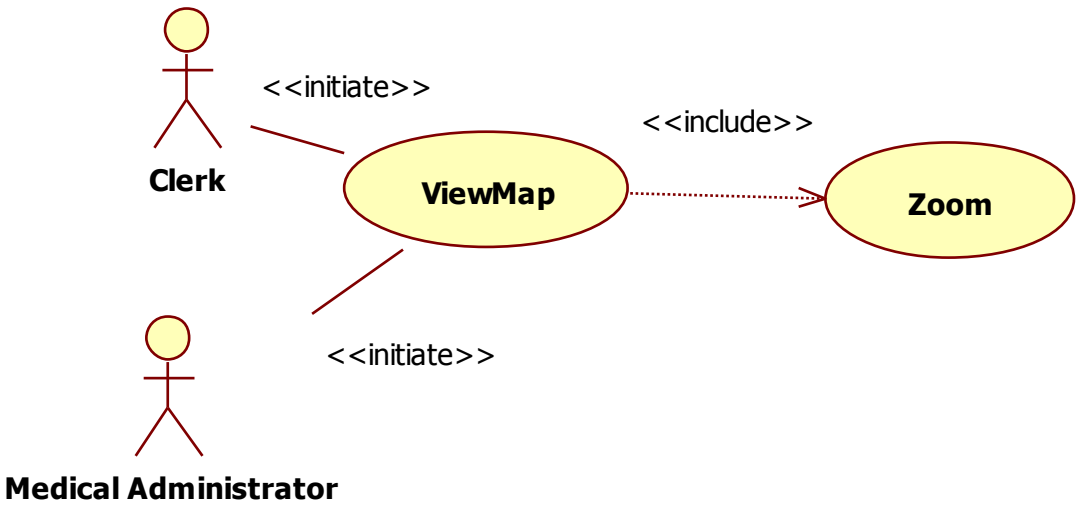
FR-2.2.2.1, SC-2, UC-7



UC-14

Use Case Name	ViewMap
Participating Actors	Initialized by Clerk and Medical Administrator
Flow of Events	1. The user selects a disease type 2. The user selects a supply type 3. The user selects a region 4. The user can chose to Zoom In or Out of the map
Entry Condition	The user is logged into C.E.T.
Exit Condition	The user selects another button or tab
Quality Requirements	The appropriate cases are displayed on the current map view within two seconds

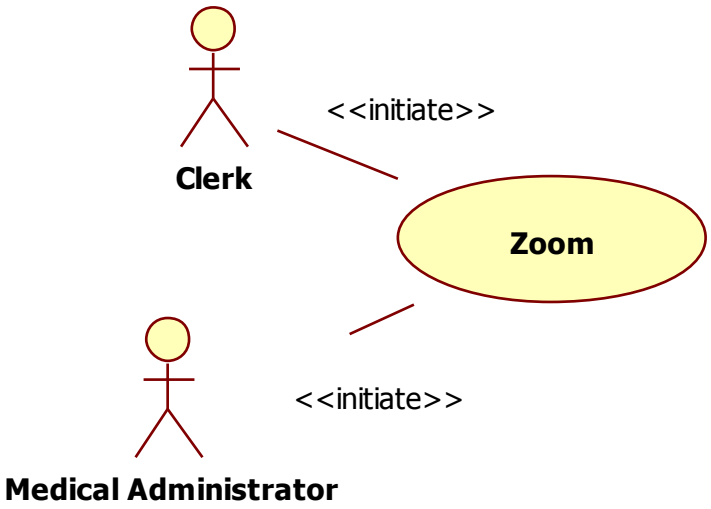
SC-9, FR-2.2.2.2



UC-15

Use Case Name	Zoom
Participating Actors	Initialized by Clerk or Medical Administrator
Flow of Events	1. The user is given the option to Zoom In or Out via a slider 2. The map adjusts granularity
Entry Condition	The user us logged into C.E.T.
Exit Condition	The user finishes zooming
Quality Requirements	The map needs to display correct granularity

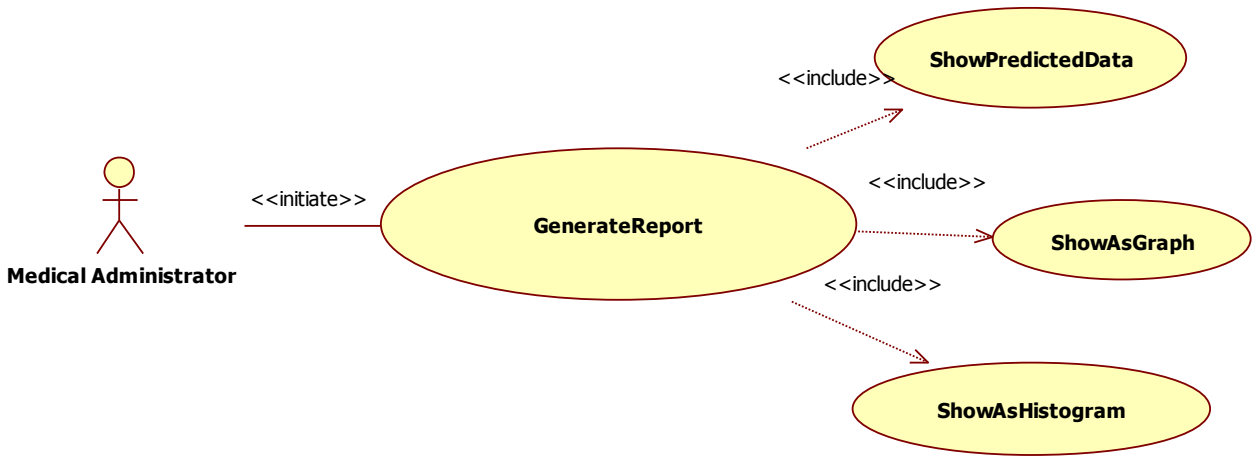
SC-9, FR-2.2.2.2 UC-14



UC-16

Use Case Name	Generate Report
Participating Actors	Initialized by Medical Administrator
Flow of Events	1. If the user wants to import predicted data then they select the *ShowPredictedData.* 2. If the user wants to create a new report then they either select *ShowAsGraph* or *ShowAsHistogram*. 3. They enter criteria they wish to view: the date range, disease type(s), and region(s). 4. When the MedicalAdministrator typed in the necessary information he gets the choice to reset the fields, cancel the operation or submit the information to generate a report.
Entry Condition	The user is logged into the C.E.T.
Exit Condition	The user finishes zooming
Quality Requirements	The information is verified before it is compiled.

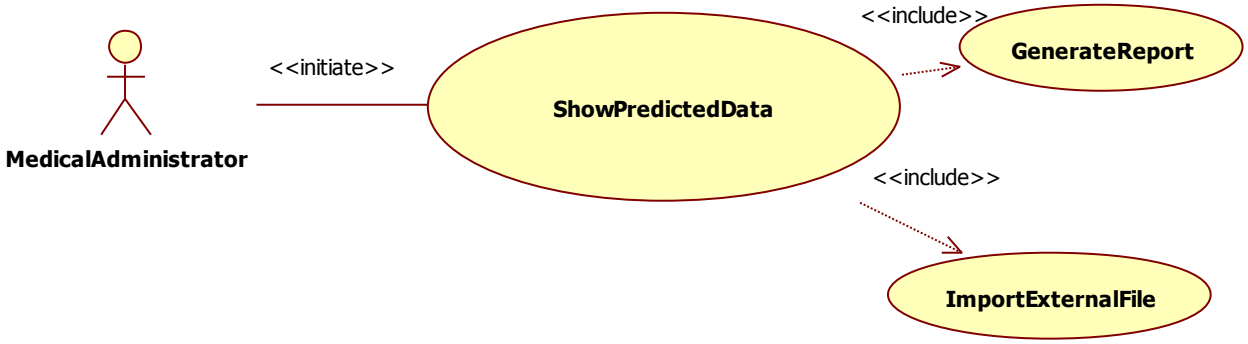
FR-2.2.3.1, NFR-2.31.4, SC-7, UC-1



UC-17

Use Case Name	ShowPredictedData
Participating Actors	Initialized by Medical Administrator
Flow of Events	1. Medical Administrator decides that they wish to import a file consisting of modeled data, and so selects the option 2. The File Chooser opens and the Medical Administrator selects the file containing the data 3. The modeled data is imported into the database and displayed alongside the true data with a clear differentiation between them 4. Medical Administrator completes the reporting task using the *generateReport* use case
Entry Condition	User is logged in to C.E.T using the report generation option
Exit Condition	The file is loaded and imported into the C.E.T. system
Quality Requirements	File must be verified for consistency before being loaded

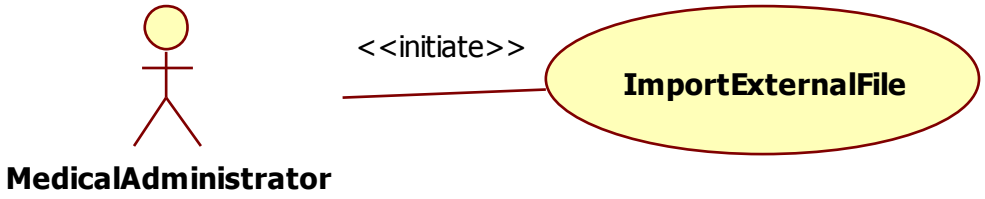
FR-2.2.3.2, NFR-2.3.1.4, SC-7, UC-1, UC-16



UC-18

Use Case Name	ImportExternalFile
Participating Actors	Initialized by Medical Administrator
Flow of Events	1. Medical Administrator selects the option to load a file consisting of modeled data 2. A file chooser opens and Medical Administrator selects the file containing the data 3. Medical Administrator confirms selection and file is loaded in
Entry Condition	Medical Administrator is logged into C.E.T.
Exit Condition	File has completed loading
Quality Requirements	File must be verified for consistency before being loaded

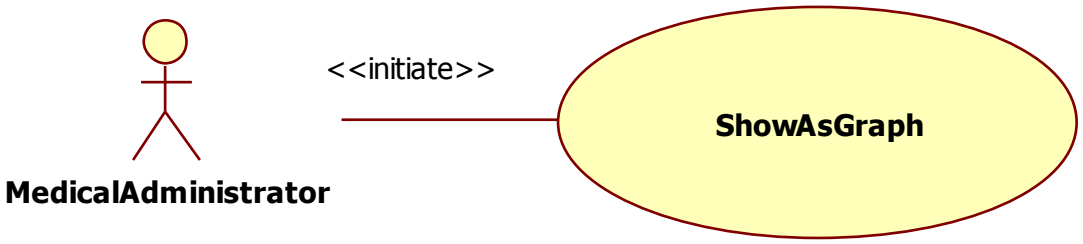
FR-2.2.3.2, NFR-2.3.1.4, SC-7, UC-1, UC-16



UC-19

Use Case Name	ShowAsGraph
Participating Actors	Initialized by Medical Administrator
Flow of Events	1. Medical Administrator chooses to generate a graph report 2. M.A. Fills in the graph criteria and submits the form 3. A graph is generated based on the submitted criteria and displayed on the M.A.'s screen
Entry Condition	M.A. is Logged into C.E.T. and
Exit Condition	The graph is completed or user cancels

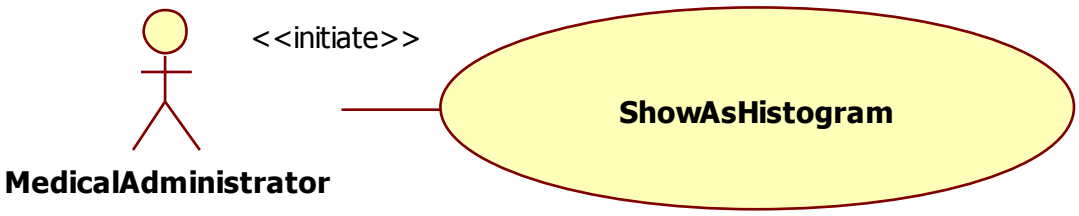
FR-2.2.3.2, NFR-2.3.1.4, SC-7, UC-1, UC-16



UC-20

Use Case Name	ShowAsHistogram
Participating Actors	Initialized by Medical Administrator
Flow of Events	1. Medical Administrator chooses to generate a graph report 2. M.A. Fills in the graph criteria and submits the form 3. A graph is generated based on the submitted criteria and displayed on the M.A.'s screen
Entry Condition	M.A. is logged into C.E.T. and in the Report section of the GUI
Exit Condition	Report is generated and displayed on screen or M.A. changes to a different tab in the GUI
Quality Requirements	Histogram must be scientifically valid

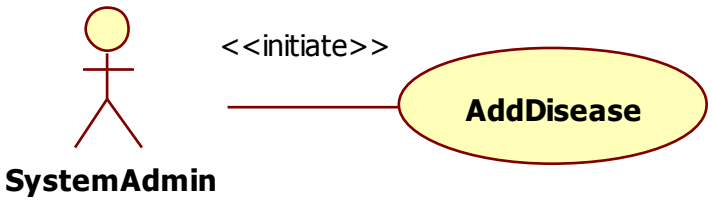
FR-2.2.3.2, NFR-2.3.1.4, SC-7, UC-1, UC-16



UC-21

Use Case Name	AddDisease
Participating Actors	Initialized by System Administrator
Flow of Events	1. S.A. is requested to add a new disease type to the list of diseases 2. S.A. selects the Add Disease function 3. S.A. fills in the field with the name of the new disease to track and submits
Entry Condition	S.A. is logged into the C.E.T
Exit Condition	Disease is submitted or S.A. has exited
Quality Requirements	The disease must not appear in the list of already tracked diseases

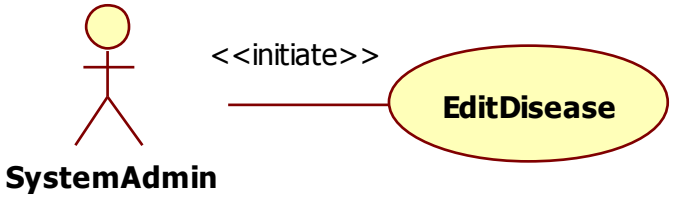
FR-2.2.4.2, SC-4, UC-1



UC-22

Use Case Name	EditDisease
Participating Actors	Initialized by System Administrator
Flow of Events	1.The S.A. has determined that the disease name has been entered incorrectly and so selects it from list of diseases 2. the S.A. corrects the information and submits the information
Entry Condition	The S.A. is logged into C.E.T.
Exit Condition	S.A. completes the entry or chooses another option

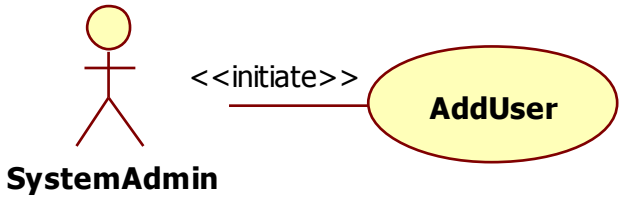
FR-2.2.4.2, UC-1



UC-23

Use Case Name	AddUser
Participating Actors	Initialized by System Administrator
Flow of Events	1. The system administrator is requested to add a new user to the list of users for C.E.T. 2. S.A. navigates the Add User option and fills in the form with the required data 3. S.A. submits request and waits for validation
Entry Condition	S.A. is logged into C.E.T
Exit Condition	The user finishes zooming
Quality Requirements	The userID created for the new user must be unique

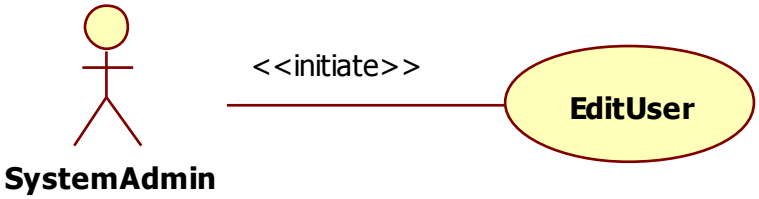
FR-2.2.4.1, SC-7, UC-1



UC-24

Use Case Name	EditUser
Participating Actors	Initialized by System Administrator
Flow of Events	1. The S.A. has determined that the users information has been entered incorrectly or the users type needs to be adjusted and so selects it from list of users 2. the S.A. corrects the information and submits the information
Entry Condition	The S.A. is logged into C.E.T. has selected the edit user option
Exit Condition	S.A. has finished entry or switched to another option

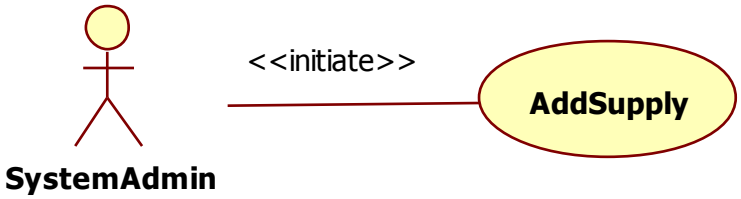
FR-2.2.4.2, UC-1



UC-25

Use Case Name	AddSupply
Participating Actors	Initialized by System Administrator
Flow of Events	1. The system administrator is requested to add a new supplyType to the list of users for C.E.T. 2. S.A. navigates the Add SupplyType option and fills in the form with the required data 3. S.A. submits request and waits for validation
Entry Condition	The S.A. is logged into C.E.T. and has selected the Add Supply option
Exit Condition	S.A. has finished entry or switched to another option

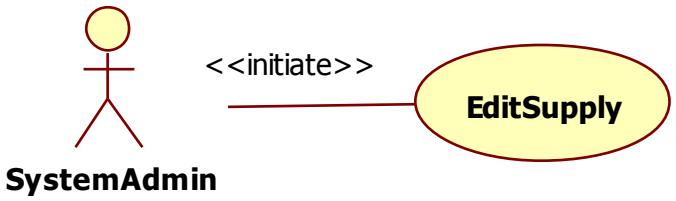
FR-2.2.4.3, SC-5, UC-1



UC-26

Use Case Name	EditSupply
Participating Actors	Initialized by System Administrator
Flow of Events	1. The S.A. has determined that the supply type information has been entered incorrectly 2. the S.A. corrects the information and submits the information
Entry Condition	The S.A. is logged into C.E.T. has selected the edit supply option
Exit Condition	S.A. has finished entry or switched to another option

FR-2.2.4.3, UC-1



2.4.3 Object Model

2.4.3.1 Data dictionary

Entity Objects	Attributes/Association	Description
User	Clerk Medical Administrator System Administrator	A user can be created by the System Administrator. The only users which can be created are Clerks and Medical Administrators.
Clerk	Medical Administrator System Administrator Server Account	The user who can manage inventory and add cases to the system. A Clerk can access the Inventory allowing him/her to view the supply levels in each location desired and send or receive supplies to or from other regions. It is able to add new diseases to the system. The Clerk must specify a Region in order to see inventory levels.
Medical Admin.	Clerk System Administrator Server Account	The user who can generate reports and also perform all Clerk functionalities. Reports contain supply or disease levels in a region and can also see required the required supply levels or disease types for a region. The Clerk functionalities are the ability to manage inventory and add cases to the system.
System Admin	Clerk Medical Administrator Server Account	The user who can add/delete/edit accounts, disease and supply types and perform all Clerk and Medical Administrator functionalities. Clerk and Medical Administrator Accounts can be created, modified or deleted by the account settings. Diseases can be introduced into the system and removed if they no longer exist. Full control over the supply levels allowing supply types to be created or removed. The Medical Administrator properties are the ability to generate reports. The Clerk functionalities are the ability to manage inventory and add cases to the system.

Entity Objects	Attributes/Association	Description
Inventory	Case Region	Inventory allows updates, the preparation/procuration of shipments. Updates from the server will change the supply levels of all locations over time as they send, receive, or use supplies. Shipments can be sent to any location if they are in need of your supplies and you currently have excess altering both regions supply levels. Shipments can be received as well, updating your supply levels.
Region	Inventory Location Map	A general area, a province, or a large city. The system will have a list of known regions.
Case	Inventory	Cases are people infected by a disease known to the system. If they are not known, a System Administrator is required to add it. Diseases have many different types and quantity numbers which can be updated and added to.
Map	Inventory Region Disease Location	The map will be visible at almost all times and will give notifications at to which regions you have selected on the map along with inventory details. Multiple regions can be selected at once, the map will adjust accordingly. Inventory details can be disease or supply levels depending on which is selected.
Account	Clerk Medical Administrator System Administrator	An account can be created by the System Administrator. The only accounts which can be created are Clerks and Medical Administrators.
Supply	Inventory Region Report Map	Supplies are part of inventory and can be updated received or shipped. In addition, the System Administrator can add or remove supply types and edit their quantity when needed.
Shipment	Map Supply Location Inventory Date	Shipments can be shipped or received from one location to another. It will contain supplies and will subtract inventory if shipping and increase inventory if receiving. In transit shipments are marked on the map.

Entity Objects	Attributes/Association	Description
Report	Inventory Supply Disease Date	Reports can be generated by the Medical and System Administrator. They can be viewed in histogram or graph format. Reports portray supply and disease levels based on the region currently selected.
Disease	Region Report Map	Diseases are used with Reports to contrast the current Supply level with the current number of infected. The Map will show the number of infected above the Region if specified.
Location	Region Map	An area on the Map, associated with Region.
Date	Report Shipment	An unspecified point in time. Attached to Report and Shipment information.
File	Inventory Supply Disease	Used to store data locally after grabbing information.
DataSet	Supply Disease	A cluster of either supplies or diseases.
ViewConfig	Users Clerk Medical Administrator System Administrator	Configuration to control what each user can see depending on the permissions of their account.

Control Objects	Attributes/Association	Description
EnterCaseControl	Disease	Opens a window and places the forms for the new disease case.
CorrectCaseControl	Disease	Opens a new window and places the forms for a disease case and fills them with the appropriate information. Destroys self.
UserLoginControl	Clerk Medical Admin. System Admin.	When the user presses Login, the UserLoginControl is created to verify Login information. If it is correct a MainViewControl object is created and passed permission type. The client control is then passed to MainViewControl and then destroys self.
UserLogoutControl	Clerk Medical Admin. System Admin.	When the user presses Logout, the UserLogoutControl is created to signify that the session is being terminated. Destroys self and MainViewControl.
MainViewControl	Clerk Medical Admin. System Admin.	After the user logins, the MainViewControl will set itself up based on the permission type it was passed so that not all users have the same accessibility of the program.
ZoomControl	Map	The ZoomControl is accessed when the user presses the plus or minus button within the map. It will enable the ability to zoom in and zoom out. Destroys self.
SelectLocationControl	Map Shipment Disease Supply	SelectLocationControl allows the map location to be changed, switching to that location's diseases, supplies, and shipments. Destroys self.
SetDateControl	Report Shipment	Sets the date for a report or shipment statement. Destroys self.

Control Objects	Attributes/Association	Description
UpdateDiseaseControl	Disease	Opens a new window and places the forms for a disease case and fills them with the appropriate information. Destroys self.
CreateSupplyControl	Supply Disease	Creates a new supply type adding to the current library of supply types. Destroys self.
CreateAccountControl	User	Creates a new account based on parameters. Account can be Clerk, Medical Administrator, or System Administrator. Destroys self.
CreateDiseaseControl	Disease	Creates a new disease type adding it to the current library of disease types. Destroys self.
UpdateSupplyControl	Supply	Creates a new window and populates it with the appropriate boundary objects then destroys self.
CreateShipmentControl	Shipment	Creates a new window and populates it with the appropriate boundary objects then destroys self.
SendShipmentControl	Shipment	Submits queued shipments, opens new window indicating received supplies and alters supply values to reflect changes. Destroys self.
ReceiveShipmentControl	Shipment	Receives queued shipments, opens new window indicating shipped supplies and alters supply values to reflect changes. Destroys self.
ModifyShipmentControl	Shipment	Opens a new window and places the forms for a shipment fills them with the appropriate boundary object information. Destroys self.
PredictedDataControl	Report	Allows use of report data instead of real data. Destroys self.
CancelShipmentControl	Shipment	Cancel the current shipment in queue. Destroys self.

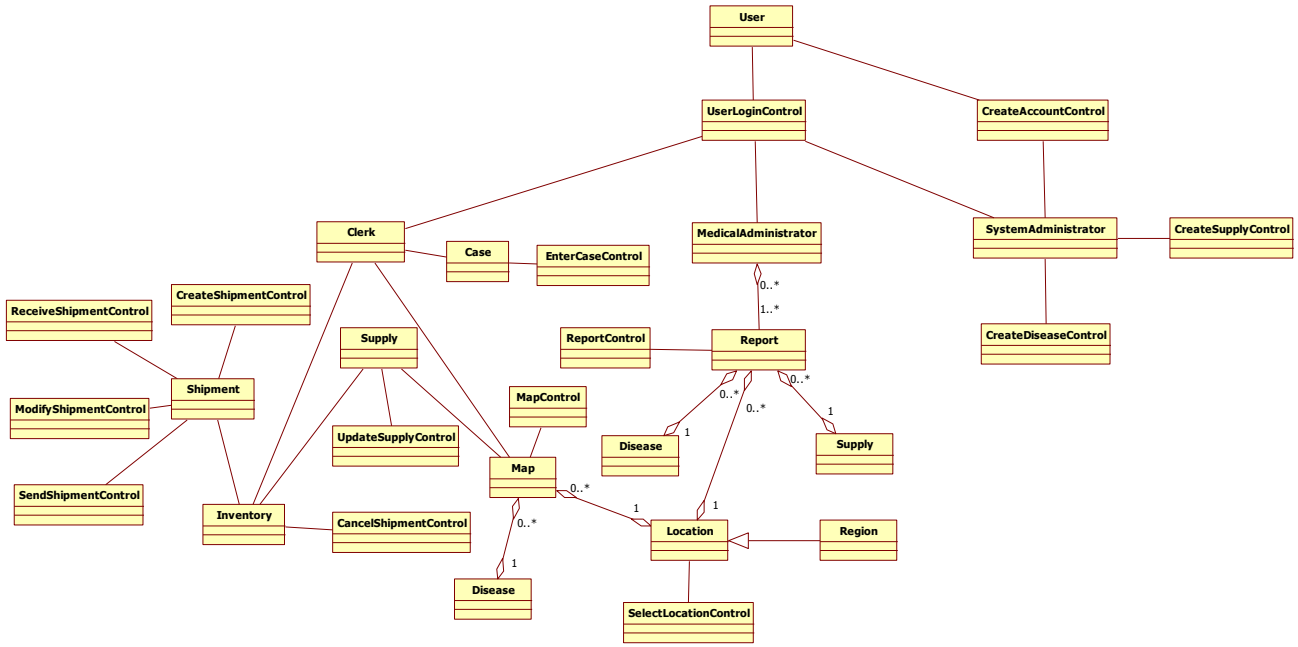
Control Objects	Attributes/Association	Description
ViewShipmentRequest	Shipment	Displays information on the shipment with the appropriate boundary object information. Destroys self.
ViewSupplyRequest	Supply	Displays information on the supply type with the appropriate boundary object information. Destroys self.
ViewDiseaseRequest	Disease	Displays information on the disease type with the appropriate boundary object information. Destroys self.
ViewPredictedDateRequest	Report	Displays information on the report type with the appropriate boundary object information. Destroys self.
ReportControl	Report	Creates a new window and populates it with the appropriate boundary objects based on report type then destroys self.
MapControl	Map	Populates panel with the appropriate boundary objects. Destroys self.

Boundary Objects	Description
CETMainMenu	Main Menu which is context dependent
LoginForm	Form for obtaining User Name and Password to start up system
UserList	List of all users
EnterCaseForm	Enter a new case obtaining Disease Type and Location
UpdateDiseaseForm	Alter Disease Form possibly changing Disease Type or Location
DiseaseTypeList	List of all Disease Types
UpdateSupplyForm	Alter Supply data possibly changing Supply Quantity or removing it
SupplyTypeList	List of all Supply Types
CreateShipmentForm	Form for obtaining Supply Type, Location(To and Form), and Quantity
ModifyShipmentForm	Alter unsent Shipment Form possibly changing Supply Type, Location(To and Form), or Quantity
ShipmentList	List of all Shipments

Boundary Objects	Description
UnconfirmedShipmentList	List of all unsent Shipments
ZoomSlider	Tool to allow adjustment of map granularity
ViewMapForm	Form for obtaining Location
FilterDataForm	Form for obtaining Data Type desired
FilterDiseaseForm	Form for obtaining Disease Type desired
RegionList	List of Regions across Canada
ProvinceList	List of Provinces
ChangeDateForm	Form for obtaining a Date
GenerateReportForm	Form for creating a Report based on obtained Data Type and Report Type
DisplayReportControl	Display Report information
CaseReportControl	Display Case information
CreateUserForm	Form for creating a new User based on obtained User Type, Name and Password
CreateDiseaseForm	Form for creating a new Disease based on obtained Disease Name/Type
CreateSupplyForm	Form for creating a new Disease based on obtained Supply Name/Type

2.4.3.2 Class diagram

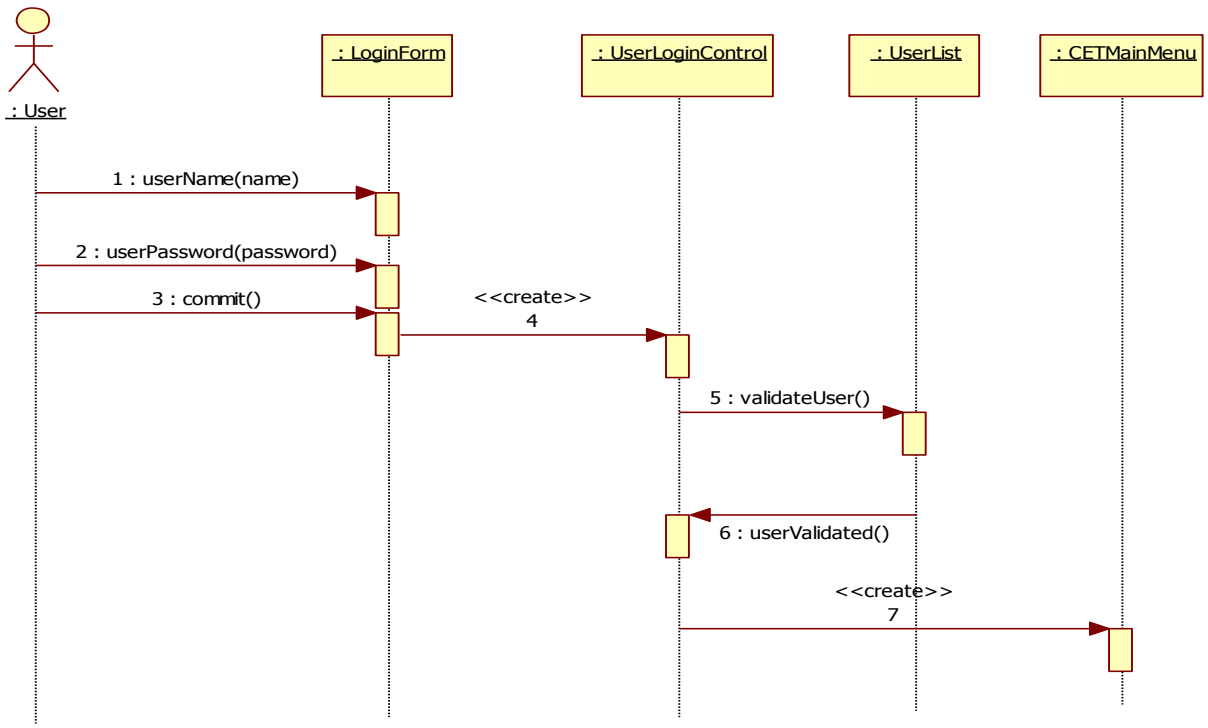
2.4.3.2 Class diagram



2.4.4 Dynamic model
2.4.4.1 Sequence diagrams

SQ-1

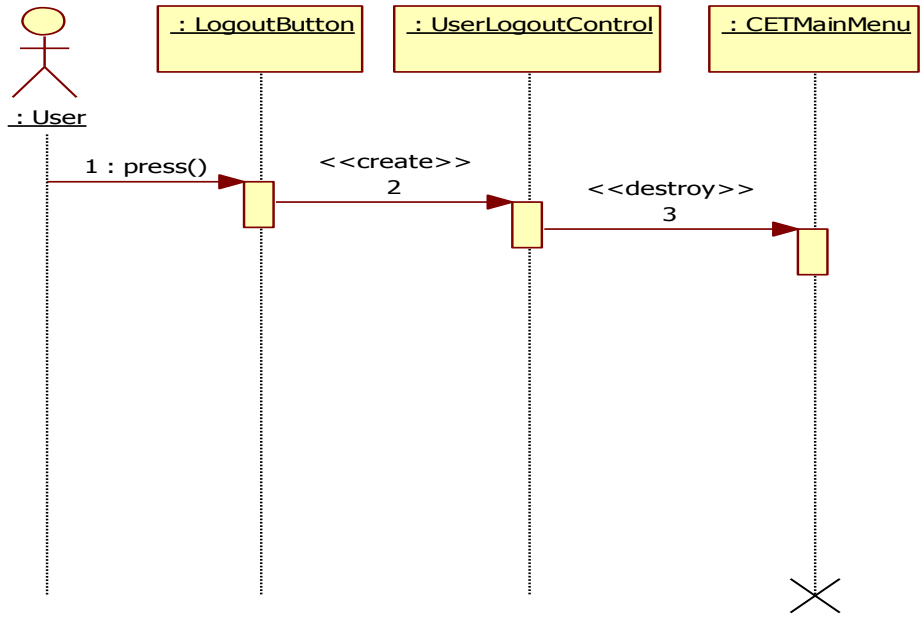
Sequence diagram for User Login



SC-1, NFR-2.3.3.1, NFR 2.3.2.6, UC-1, UC-2

SQ-2

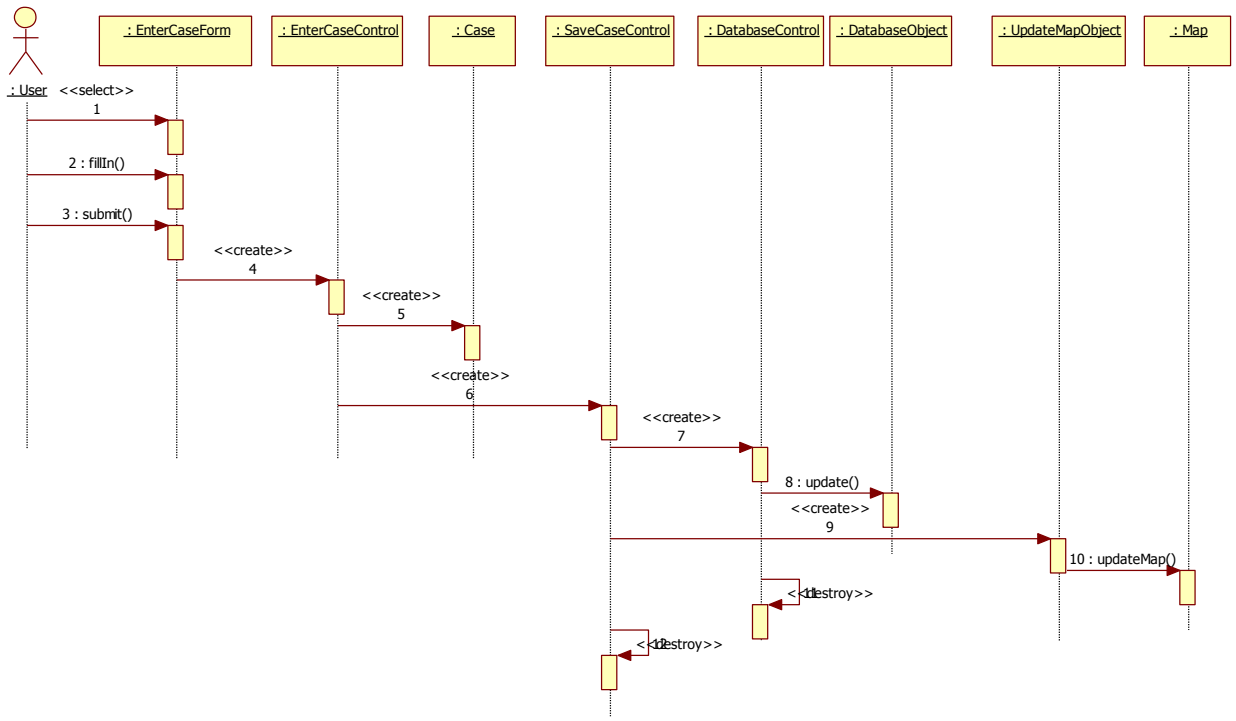
Sequence diagram for User Logout



SC-1, NFR-2.3.3.1, NFR 2.3.2.6, UC-3

SQ-3

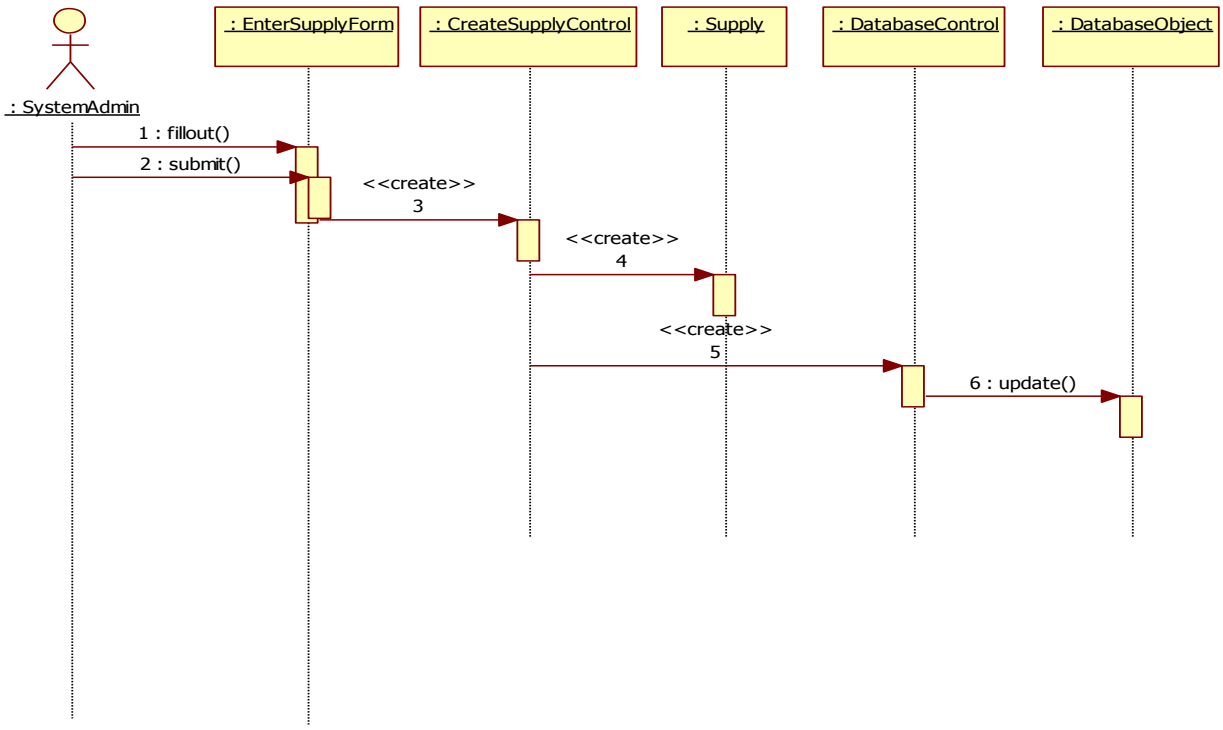
Sequence diagram for adding a disease case



SC-1, FR-2.2.2.1, NFR-2.3.1, UC-5

SQ-4

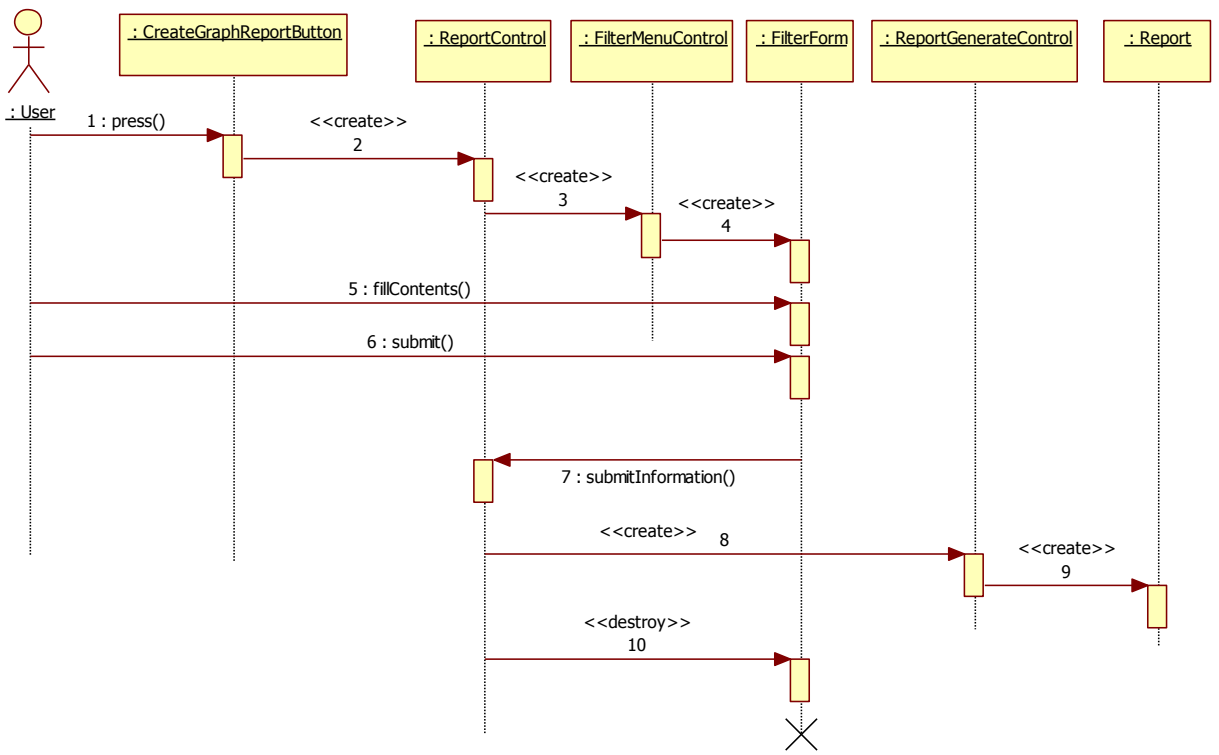
Sequence diagram for adding a supply type



FR-2.2.4.3, SC-5, UC-1, UC-25

SQ-5

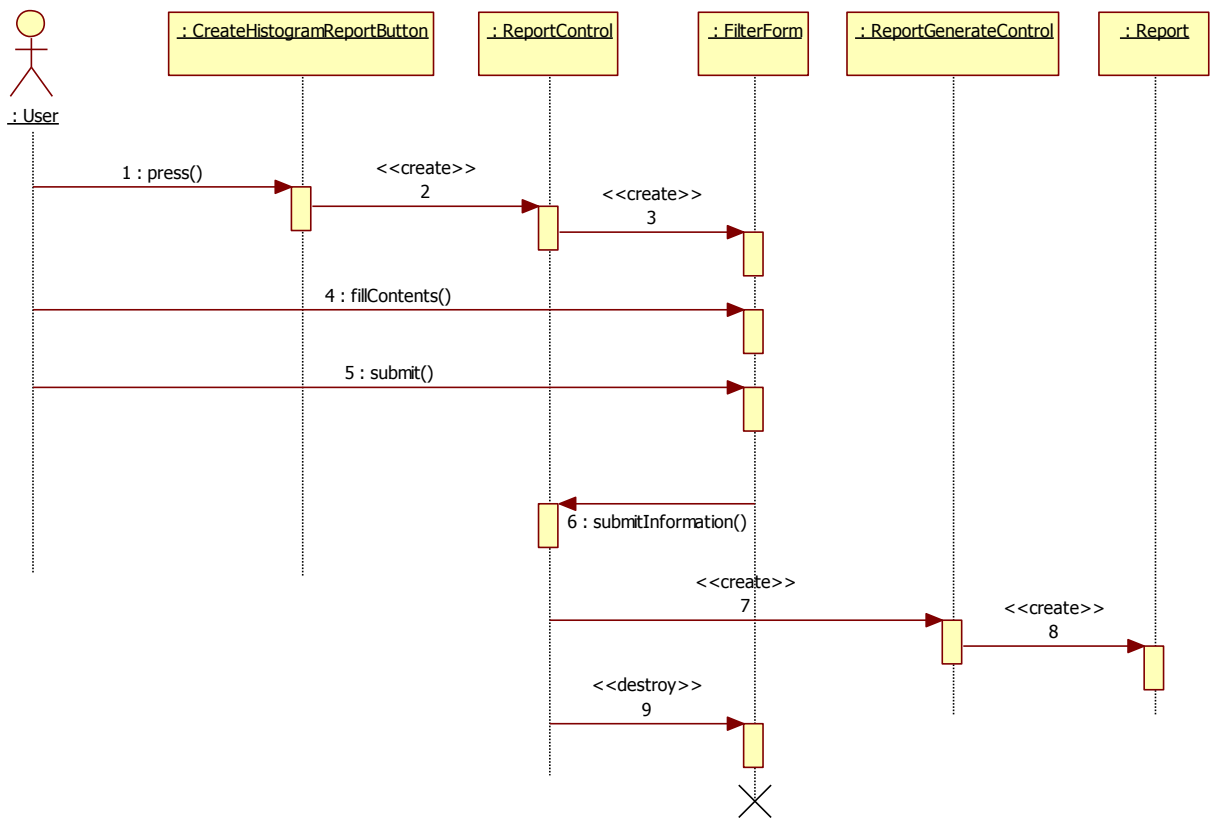
Sequence diagram for graph generation



FR-2.2.3.2, NFR-2.3.1.4, SC-7, UC-1, UC-16, UC-19

SQ-6

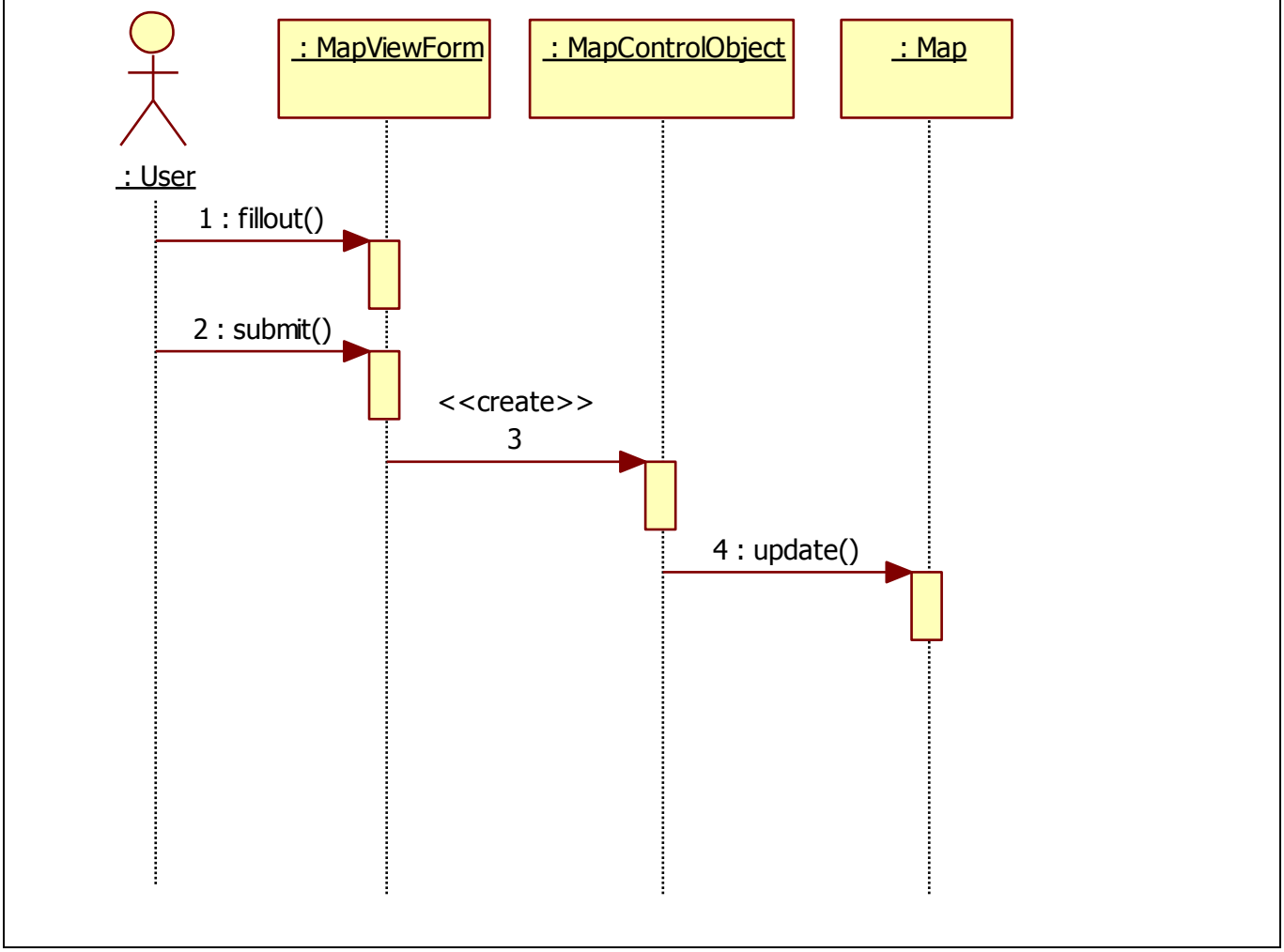
Sequence diagram for Histogram generation



FR-2.2.3.2, NFR-2.3.1.4, SC-7, UC-1, UC-16, UC-20

SQ-7

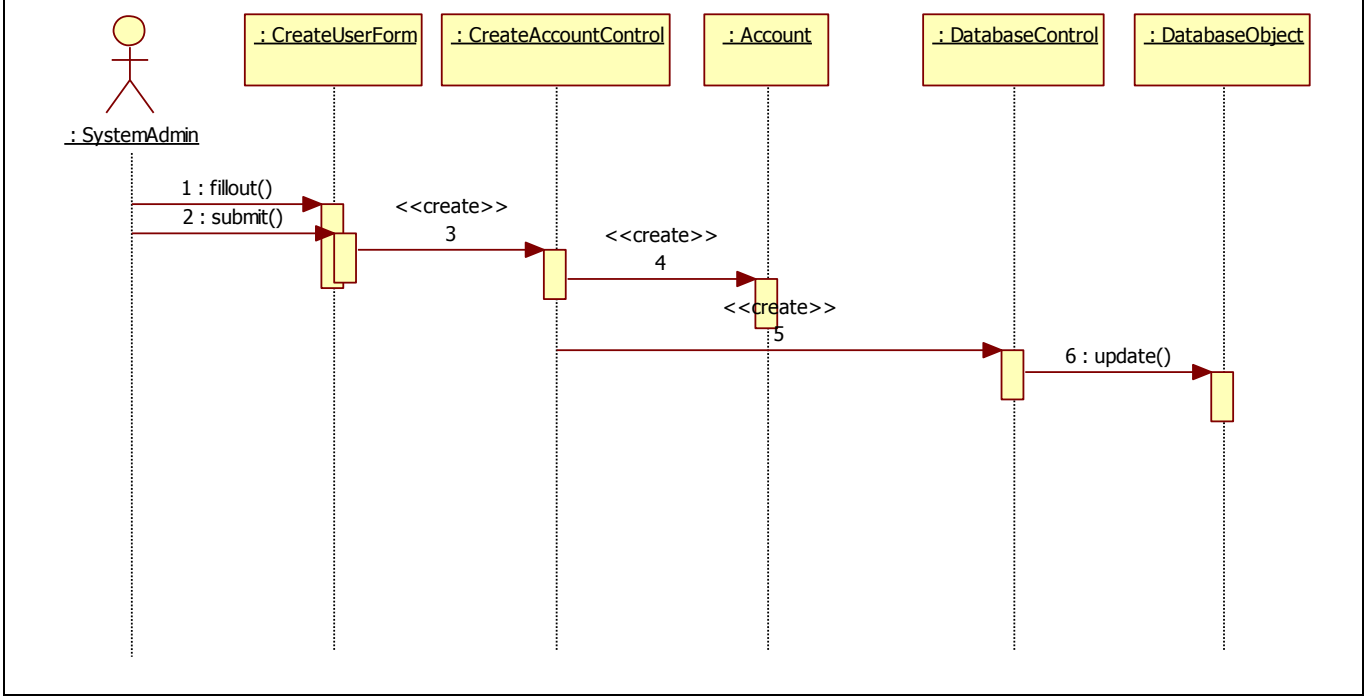
Sequence for Changing Map



SC-9, FR-2.2.2.2 UC-14, UC-15

SQ-8

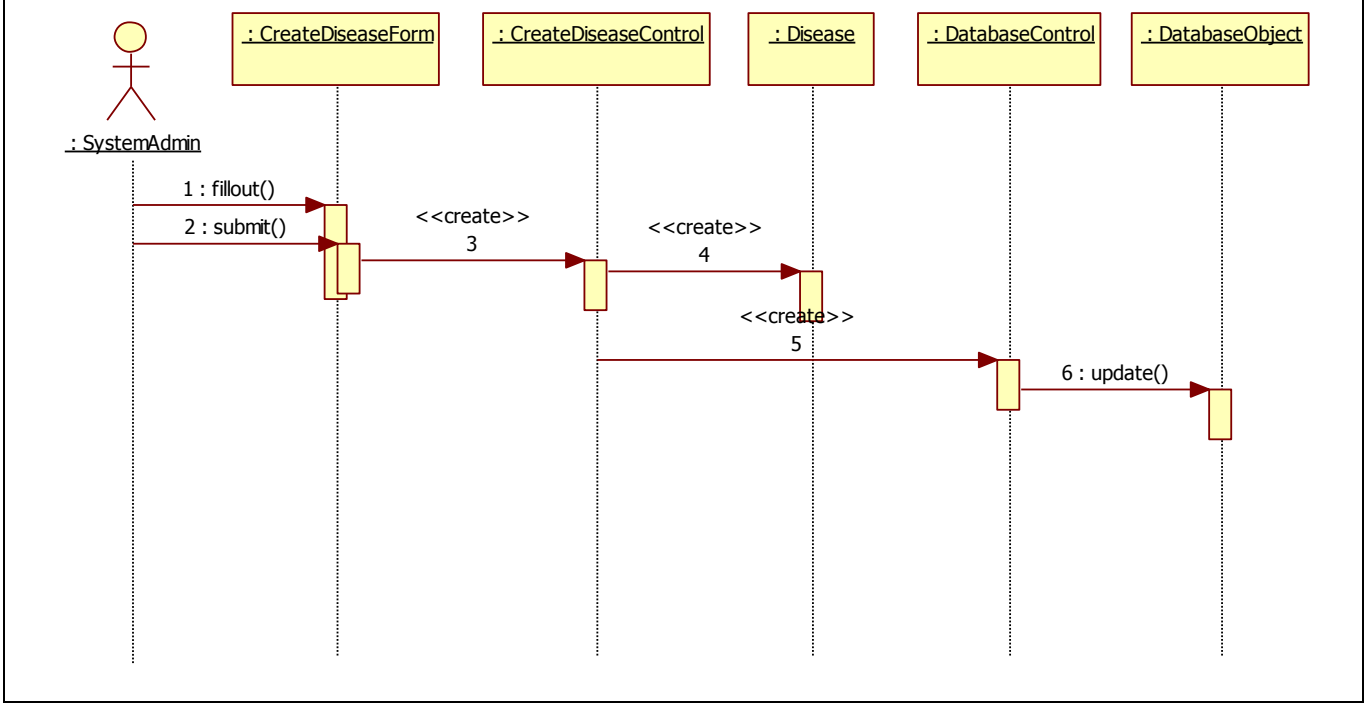
Sequence Diagram for Creating Account



FR-2.2.4.1, SC-7, UC-1, UC-23

SQ-9

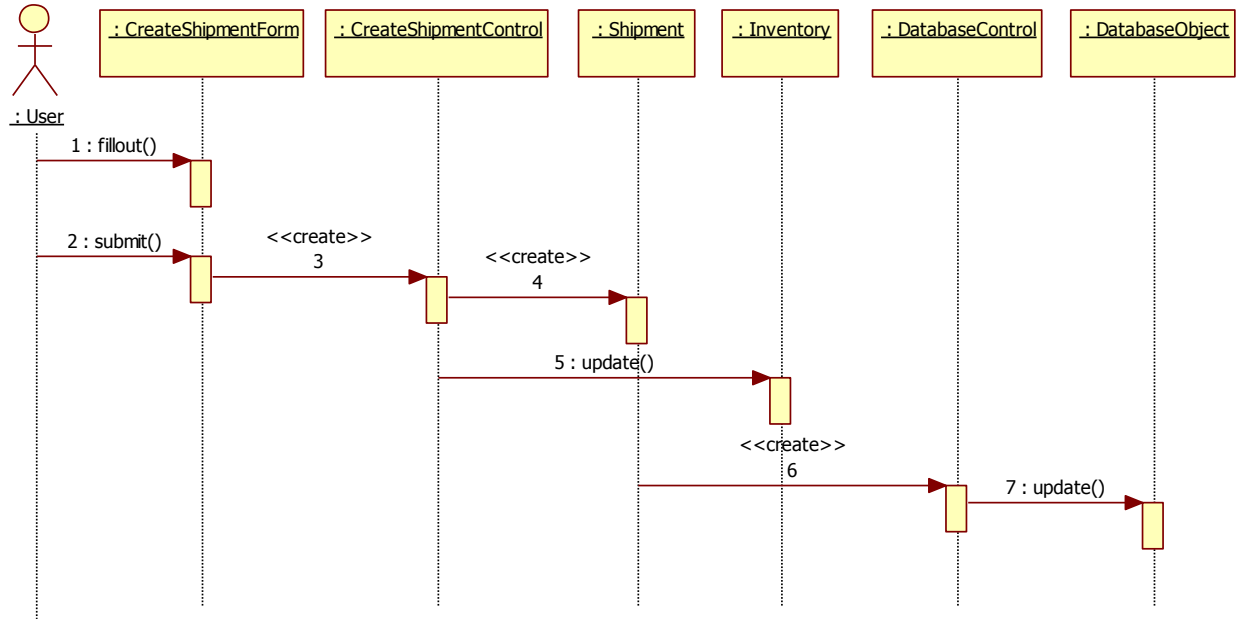
Sequence Diagram for Entering New Disease Type



FR-2.2.4.2, SC-4, UC-1, UC-23

SQ-10

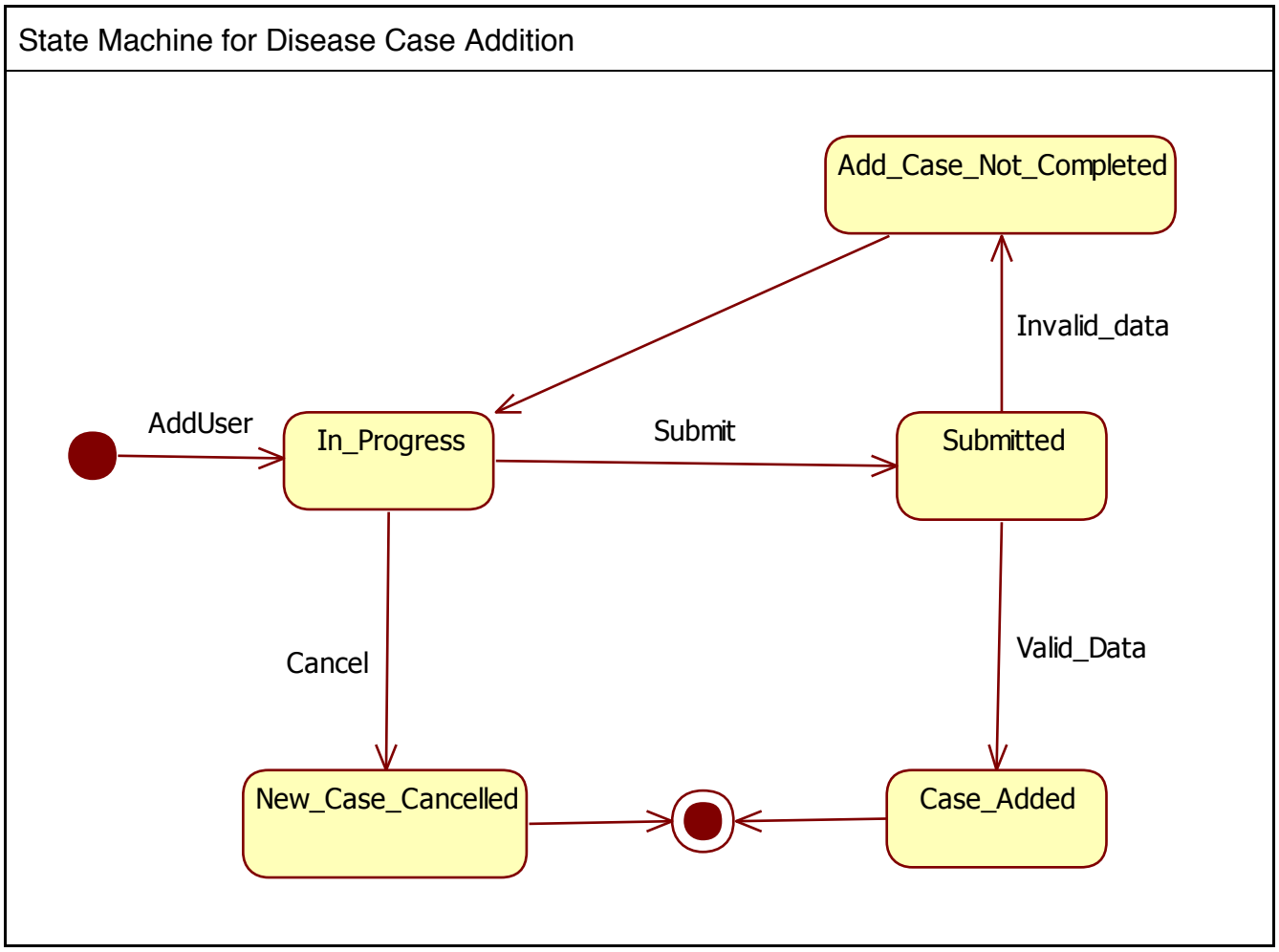
Sequence Diagram for Shipment Creation



FR-2.2.2.1, SC-2, UC-7, UC-10

2.4.4.2 State Machine diagrams

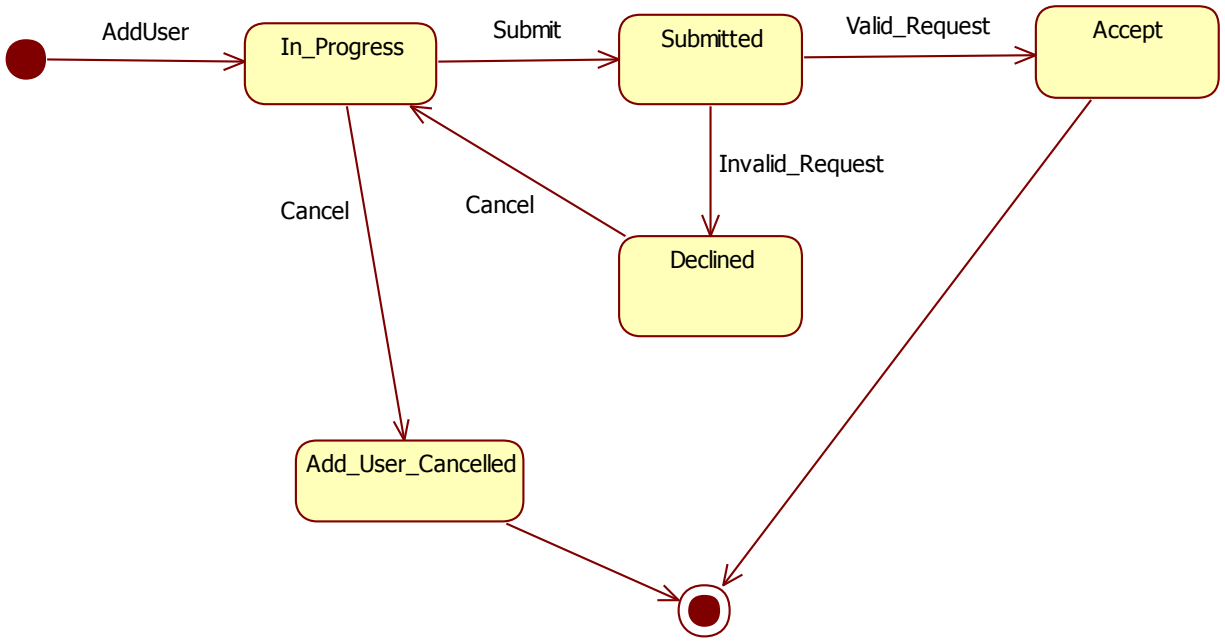
SM-1



SC-1, FR-2.2.2.1, NFR-2.3.1, UC-5, SQ-3

SM-2

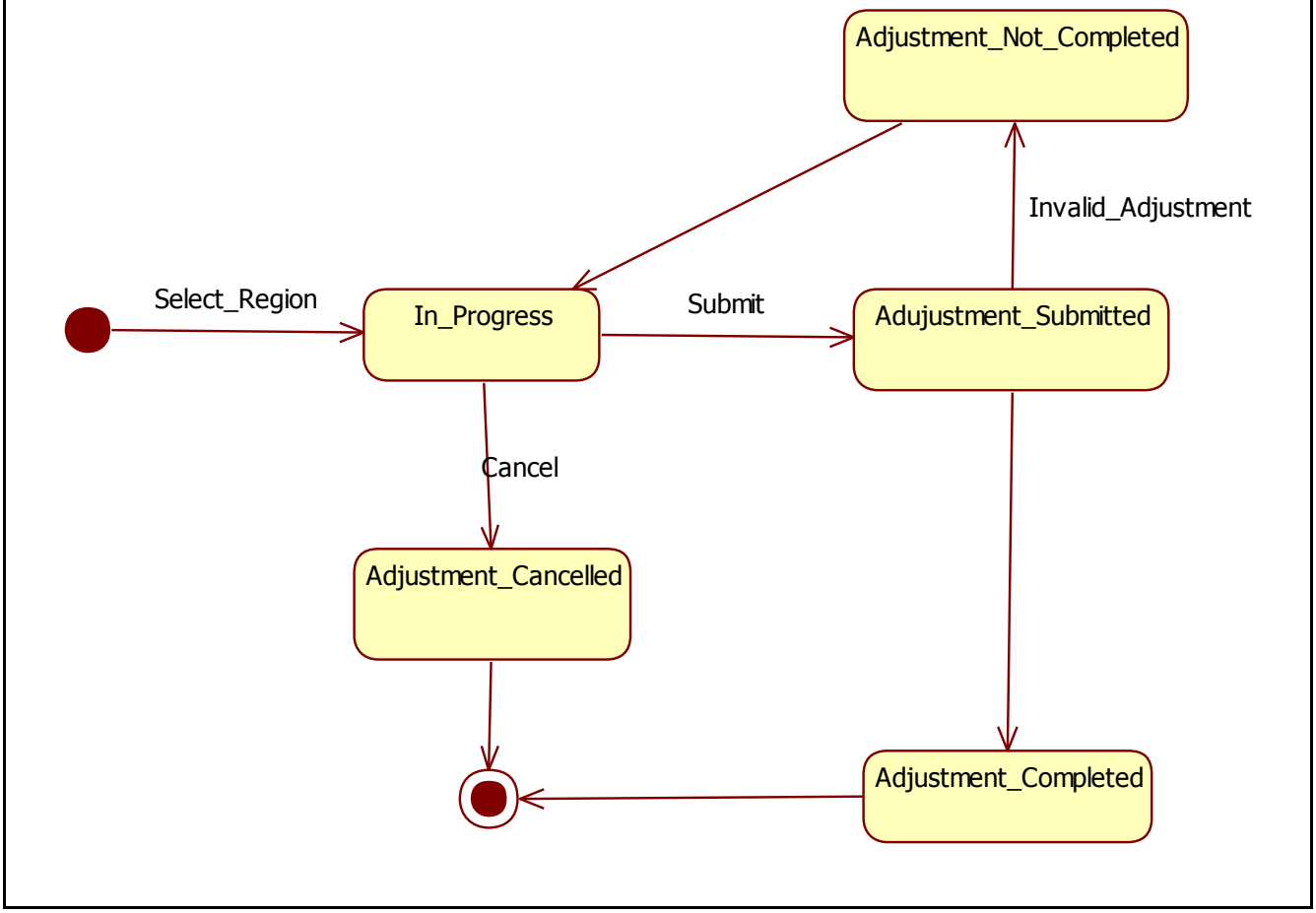
State Machine for Add User



FR-2.2.4.1, SC-7, UC-1, UC-23, SQ-8

SM-3

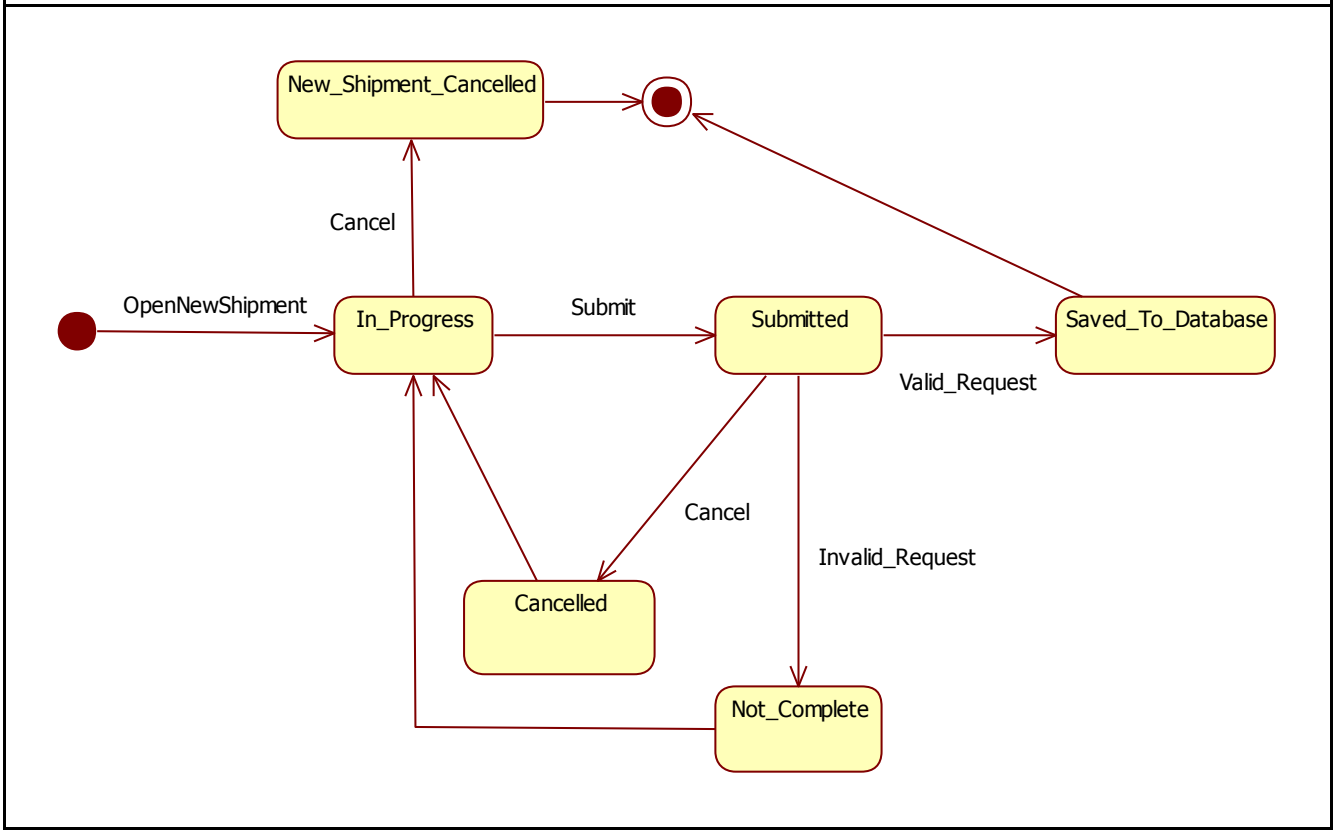
State Machine for Supply Adjustment



FR-2.2.2.1, SC-8, UC-7, UC-9

SM-4

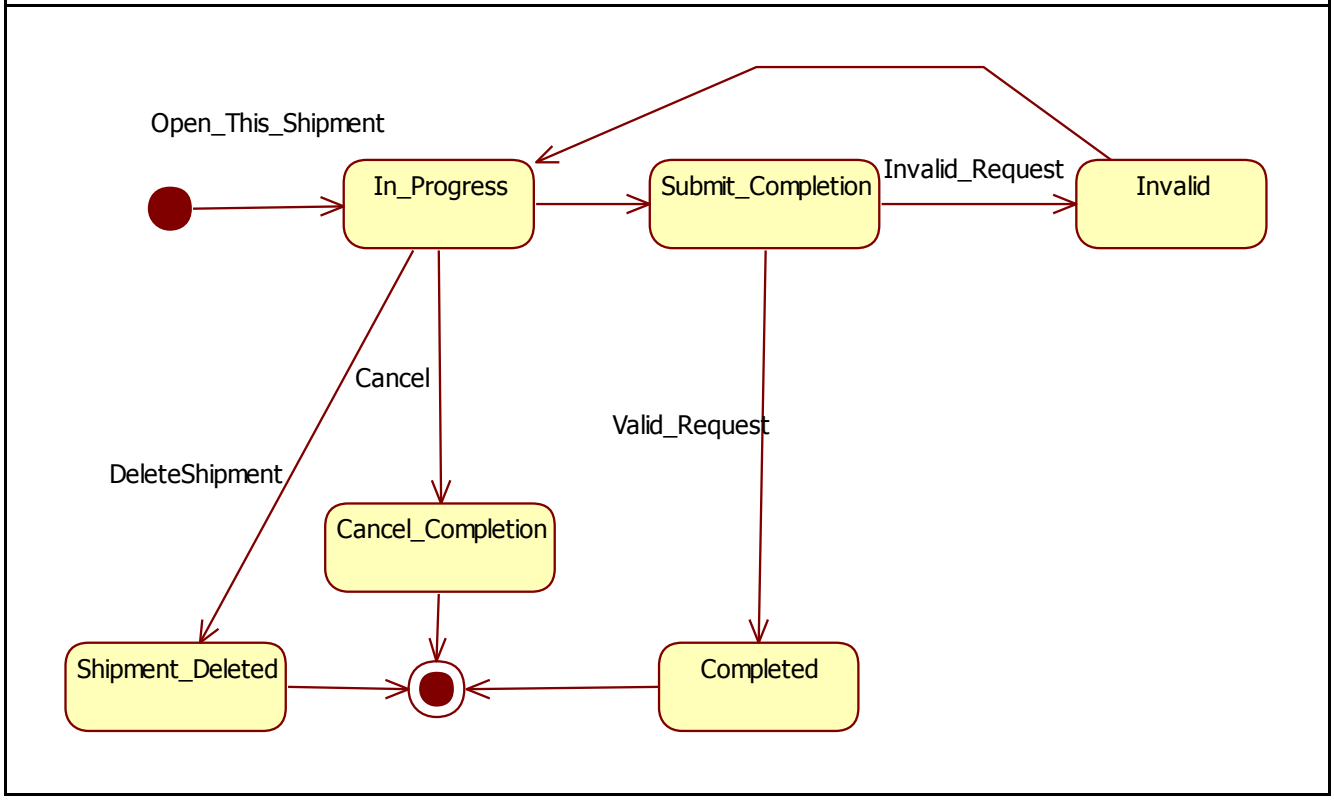
State Machine for Shipment Creation



FR-2.2.2.1, SC-2, UC-7, UC-10, SQ-10

SM-5

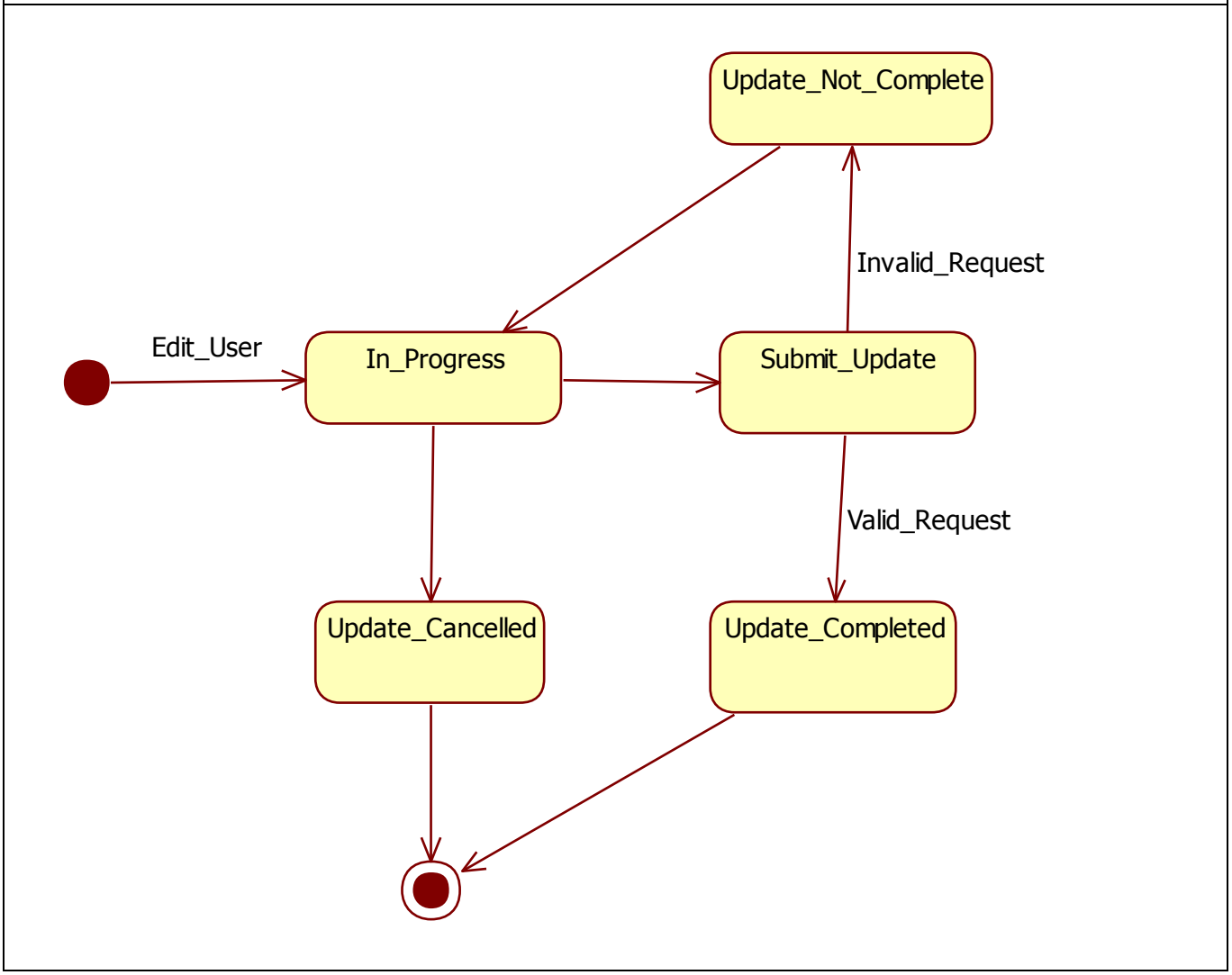
State Machine for Shipment Completion



FR-2.2.2.1, SC-3, UC-7, UC-10, UC-12

SM-6

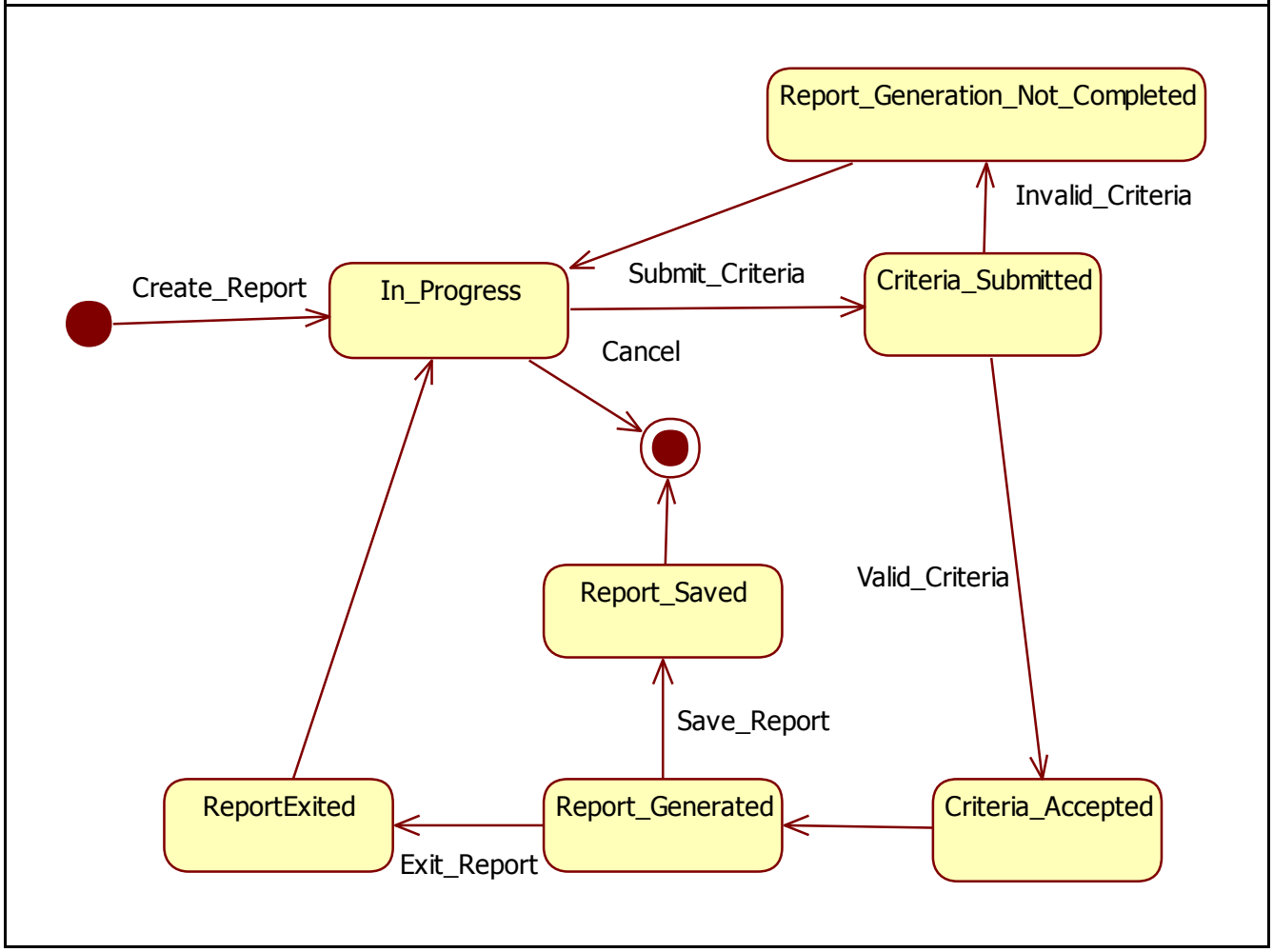
State Machine for Updating User information



FR-2.2.4.2, UC-1, UC-24

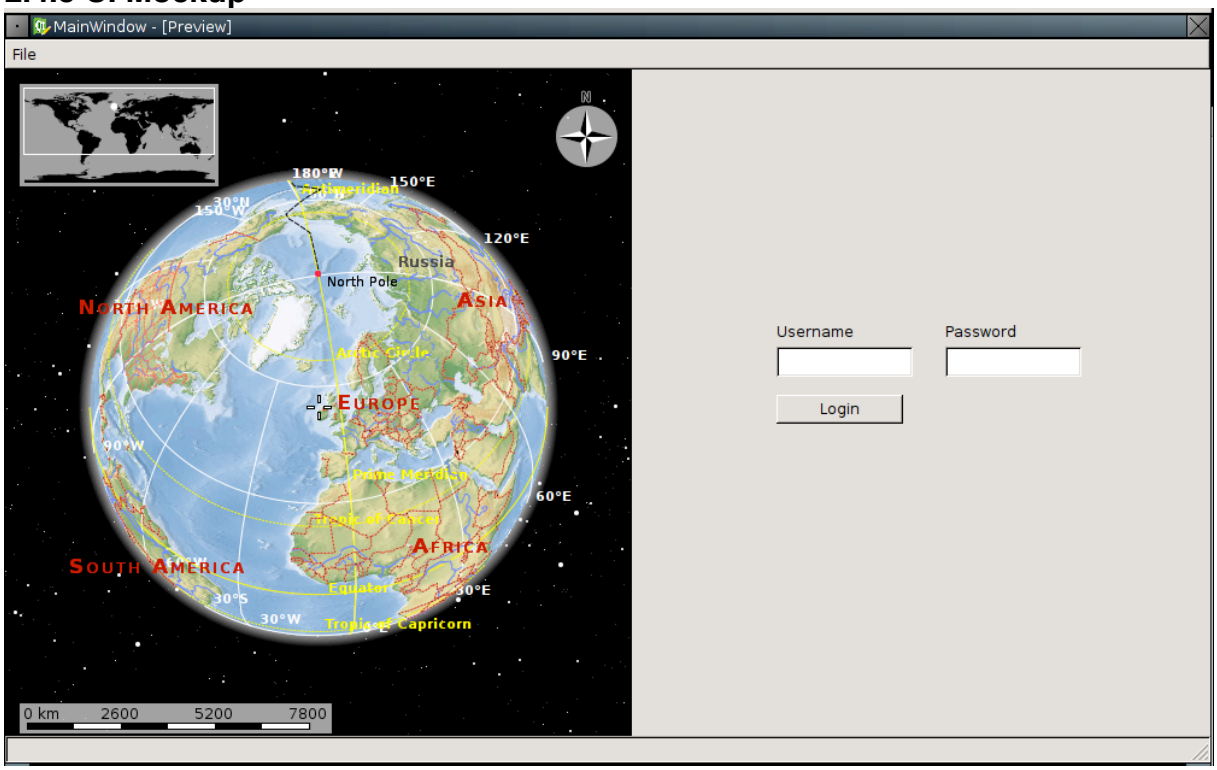
SM-7

State Machine for Report Generation

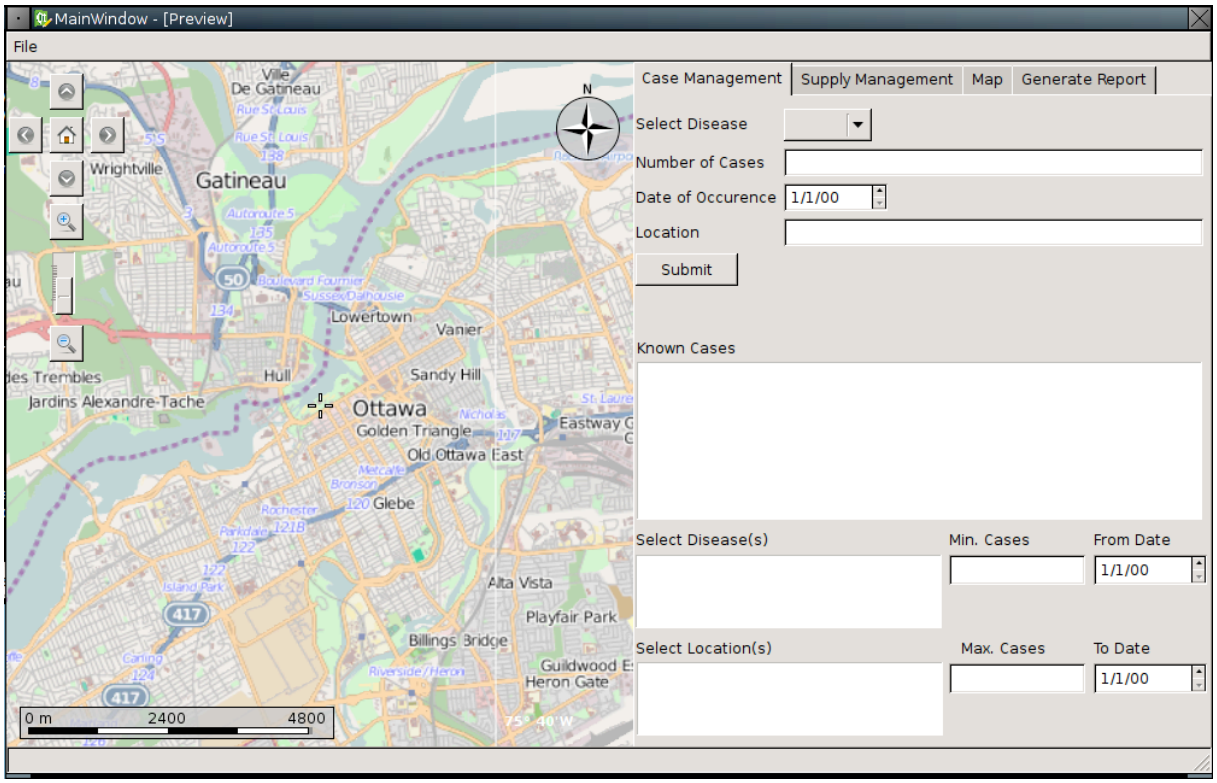


FR-2.2.3.2, NFR-2.3.1.4, SC-7, UC-1, UC-16, UC-20, SQ-5, SQ-6

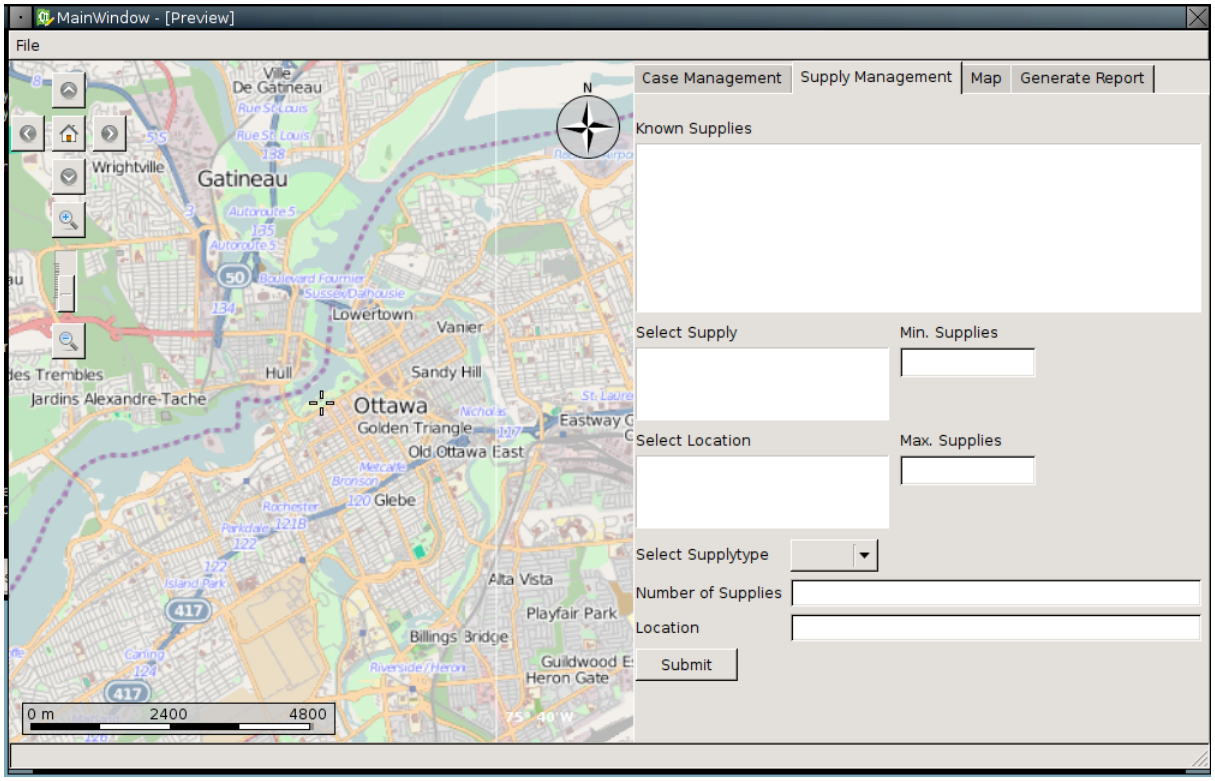
2.4.5 UI Mockup



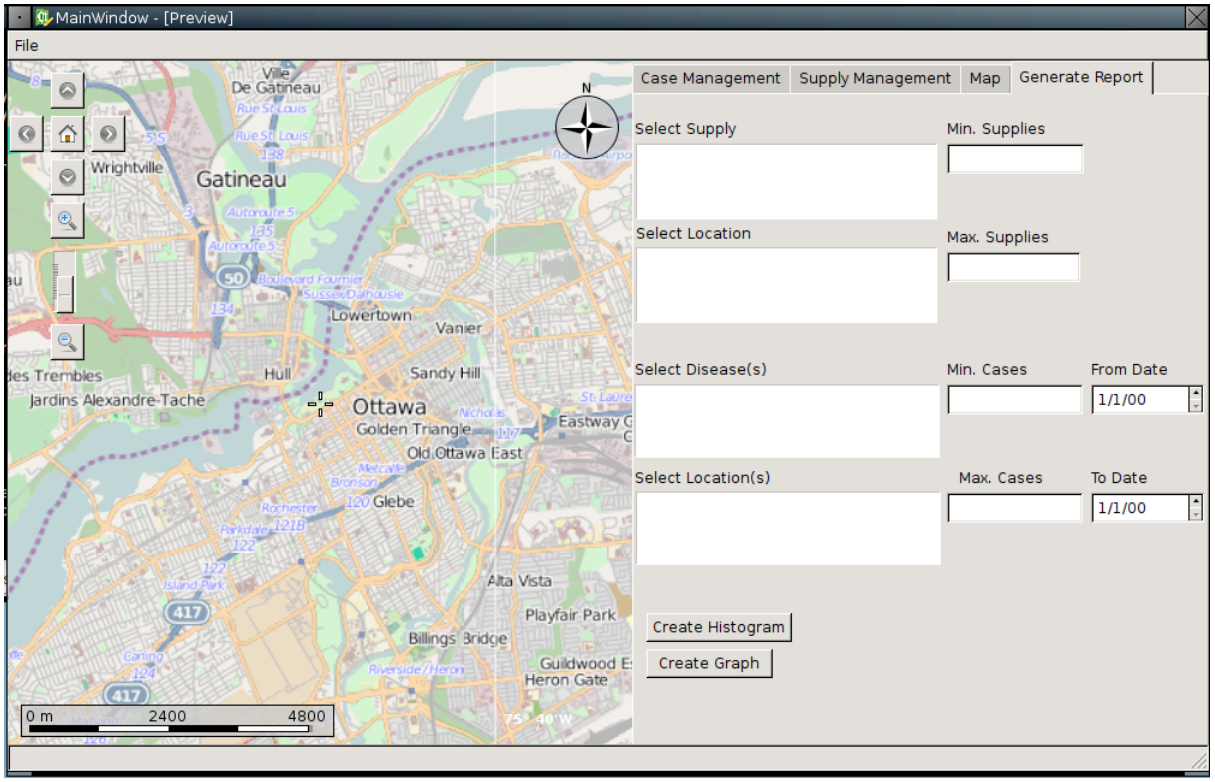
Main Login view (SC-1, NFR-2.3.3.1, NFR 2.3.2.6, UC-1, UC-2, SQ-1)



View for Case Management (SC-1, FR-2.2.2.1, NFR-2.3.1, UC-5, SQ-3, SM-1)



Supply Management View (FR-2.2.2.1, SC-8, UC-7, UC-9, SM-3)



Report Generation View (FR-2.2.3.2, NFR-2.3.1.4, SC-7, UC-1, UC-16, UC-20, SQ-5, SQ-6)

3. Glossary

Account	An account specifies what rights a user has
Clerk	A basic user of the software
CET	Canadian Epidemic Tracker
H1N1	Swine Flu, a variant of influenza A
Inventory	A system which stores items such as supplies
Map	An overview of a Canada map
Medical Administrator	A basic user with the abilities to create reports
SARS	Severe Acute Respiratory Syndrome
System Administrator	An advanced user to have full control over the software
Zoom Slider	A slider to adjust the scale of the map