Process MeNtOR 3.0

DAGraph
Requirements Model

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object
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Document Change Control

Version	Date	Authors	Summary of Changes
0.1	Feb 2nd	Jiawei Li and Liu Fan	Actor Diagram
0.1	Feb 3rd	Vivian Liang	Domain Diagram and Definitions
0.1	Feb 3rd	Caiya Zhang	Use Case Diagram
0.2	Feb 3rd	Jiawei Li and Liu Fan	Actors Definition
0.2	Feb 5th	Caiya Zhang	Business Scenario Descriptions
0.3	Feb 8th	Jiawei Li	Introduction
0.3	Feb 8th	Caiya Zhang	Activities Plan
1.0	Feb 8th	Li, Liang, Fan, and Zhang	Final Check
1.1	Feb 14th	Liu Fan	Non-functional Requirements
1.2	Feb 25th	Vivian Liang	Domain Diagram and Definitions Modification
1.2	Feb 26th	Caiya Zhang	Actor Use Case Model Modification
1.3	Feb 28rd	Vivian Liang	Sequence Diagrams
1.3	Mar 1st	JIawei Li and Caiya Zhang	Activity Diagrams
1.3	Mar 1st	Caiya Zhang	Test Driven Development
1.3	Mar 1st	Caiya Zhang	Activities Plan
2.0	Mar 1st	Li, Liang, Fan, and Zhang	Final Check

Document Sign-Off

Name (Position)	Initials	Date
Manager	LF	Jan 18th
Manager	VL	Jan 18th
Worker	CYZ	Jan 18th
Worker	JWL	Jan 18th

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1   Introduction

1.1   Purpose

This document details the requirements of a prototype system that allows for retrieving demographic and other data for one selected country from the database. It processes the data with different types of analyses. It also renders the retrieved data or the processed data with different categories of visualization means which are selected by the user.

1.2   Overview

The aim of the project is to implement a prototype system which allows the invocation of Web Services. The JAVA will be used.

The Data Visualization Client Agent User visualizes the system login entry and asks users to enter passwords and checks on them. If the user is the first time to login the system, it will help users create their passwords.

The objectives of the project include: a) to allow the Registry Server to add and store his/her account and information; b) to allow the Data Server to retrieve the specific data which are chosen by the users from the database; c) to allow the user to update to the newest version.

Non-functional requirements such as security and performance are also considerations within the context of platform deployment

1.3   References

Eclipse: http://www.eclipse.org/downloads/index.php
WSDP: http://java.sun.com/webservices/jwsdp/index.jsp
JAXR: http://java.sun.com/webservices/jaxr/index.jsp
JAXRPC: http://java.sun.com/webservices/jaxrpc/index.jsp
WSIF: http://ws.apache.org/wsif
UDDI: http://www.uddi.org/
WSDL: http://www.w3schools.com/wsdl/default.asp
Java Server: http://java.sun.com/j2ee/1.4/download.html#sdk
GANTT: http://wiki.phprojekt.com/index.php/Gantt-diagram
UMLet: https://www.umlet.com
WBOD: https://data.worldbank.org

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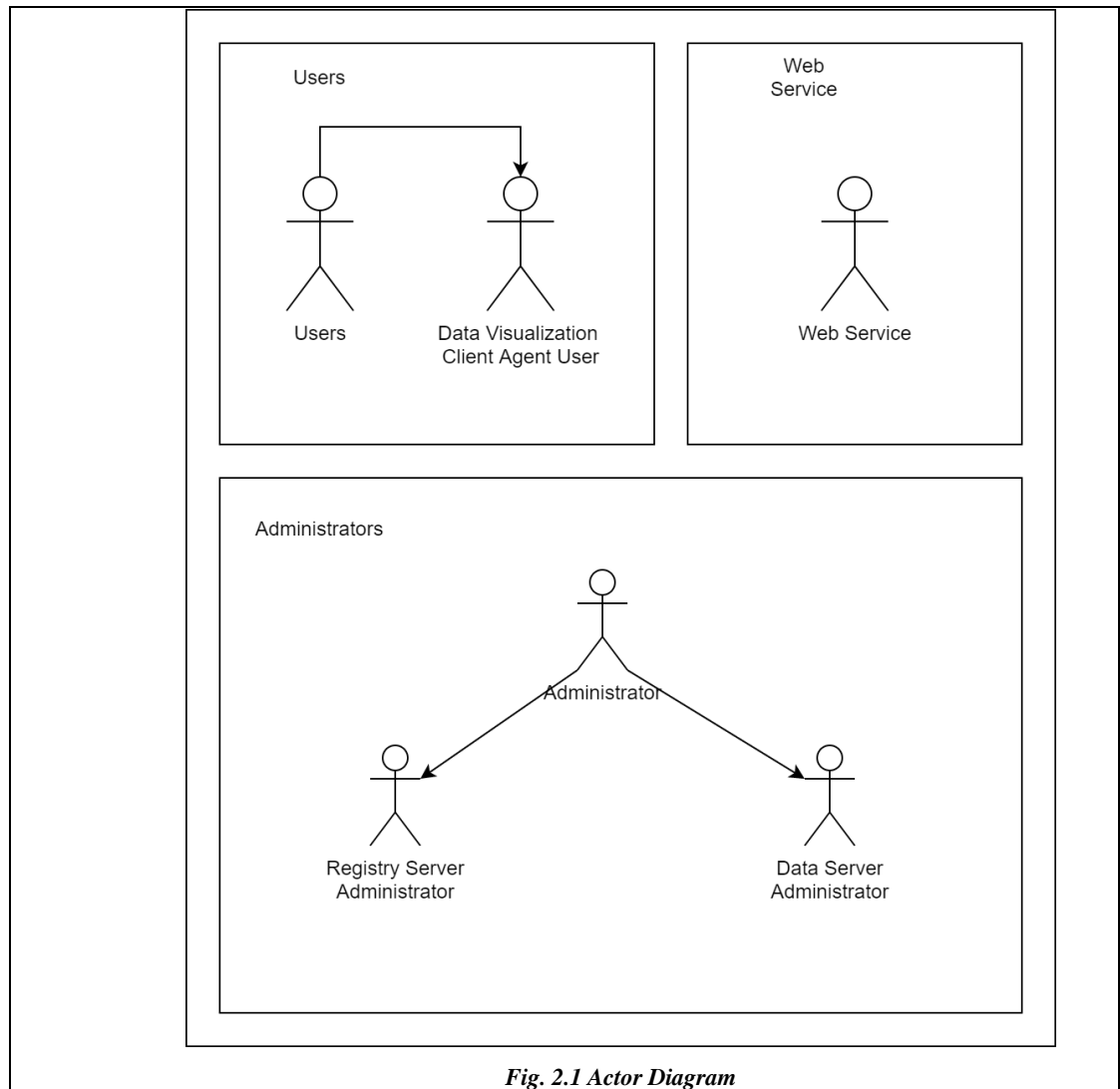
2 Business Scenario Model

2.1 Actors

2.1.1 Overview

The actors in our System include end users of software, data visualization client agent, administrators of the server components and the web service. End user actors exist in an environment that allows connection to the Data Visualization client agent user, and their use of the full software functionally is contingent on proper connectivity between the components of the system. Administrator actors have full access (read, write, and execute permissions) on their respective servers, as well as any physical access required for maintenance purposes. Web services are described by .wsdl files linked by the Service Bindings in their respective Web Service Entries in the Web Service Registry.

2.1.2 Actor Diagram

The figure below represents the actors in our system. Based on their interactions with the system, the actors are characterized into three general groups: a) Users, b) Web Service, and c) Administrators. As demonstrated in the diagram, the data visualization client agent serves for the end users, while the Administrator is a generalization of the Registry Server Administrator and the Data Server Administrator.(Please see next page for diagram)

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Fig. 2.1 Actor Diagram

2.1.3 Actor Definitions

● **User**

Description	The User is a human actor that uses the software after it has been fully developed, marketed and installed. The role of this actor in the context of the system including registering into account, receiving data from database and graph and Web Service registration/invocation features of the system
Aliases	User A
Inherits	None
Actor Type	Active
Contact Person	Person who login to the system. The username or first name + last name
Contact Details	Telephone number and email address of the contact person

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● **Data Visualization Client Agent User**

Description	The Data Visualization Client Agent User is a human actor that is responsible for indicating graphs. The role of this actor is to offer users the visualization of the login system and access, process and visualize the data which are chosen by the users into graphic models.
Aliases	None
Inherits	None
Actor Type	Active
Contact Person	Person who login to the system. The username or first name + last name
Contact Details	Telephone number and email address of the contact person

● **Web Service**

Description	The Web Service is an external agent that is invoked through the system. Invoking a Web Service executes the actions that download new patches and update the version series and invocation result status back to the system.
Aliases	None
Inherits	None
Actor Type	Passive
Contact Person	Person who login to the system. The username or first name + last name
Contact Details	Telephone number and email address of the contact person

● **Administrator**

Description	The administrator is a human actor who is in charge of a certain part of the system (i.e. Registry Server or Data Server). His roles include the smooth operation, maintenance and updating of the respective servers
Aliases	None
Inherits	None
Actor Type	Active
Contact Person	Person who login to the system. The username or first name + last name
Contact Details	Telephone number and email address of the contact person

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- **Registry Service Administrator**

Description	The Registry Server administrator is a human actor who is in charge of the system Registry Server. His roles include the smooth operation, maintenance and updating of the server which consists of all the registered services.
Aliases	None
Inherits	Administrator
Actor Type	Active
Contact Person	Person who login to the system. The username or first name + last name
Contact Details	Telephone number and email address of the contact person

- **Database**

Description	The Database is in charge of the Data Server whose role includes capacity planning, installation, configuration, database design, migration, performance monitoring, security, troubleshooting, as well as backup and data recovery.
Aliases	None
Inherits	Administrator
Actor Type	Active
Contact Person	Person who login to the system. The username or first name + last name
Contact Details	Telephone number and email address of the contact person

2.2   Use Case Descriptions

This section documents the complete business scenarios within the scope of this project.

2.2.1   XXXX-0001 Normal Operation Scenario with Subsidiary Web Services

In this business scenario, a user (User A) registers in and uses the system to invoke a data visualization service. Particularly, the web service mainly works for system and data updating.

Goal in Context:

This scenario depicts the invocation of a data visualization service by a user. The progress starts off by user A successfully registering and logging into the system by his/her unique username

and password pair. Once user A has selected required options, the system will display both text and graphs as a result. Then the status result of the invocation will be returned to the system, and user A can choose to re-invoke the service.

Actors:

The actors associated with this business scenario are as follows:

1. User (User A).

2. Web Service.

The details of the above-mentioned actors can be found in Section 2.1.3 (Actor Definitions).

Preconditions:

Before this scenario can be performed:

1. The service repository must be on and functioning.
2. User A's local server must be on and functioning.

Trigger:

The user successfully logs into the client agent.

Scenario Text:

1. Log into the system.

    1.1 Register an account

    1.2 Validate username and password pair

2. Select required options.

    1.1 Select data-related options

    1.2 Select analysis-related options

    1.3 Check if options are valid

3. Display results

4. Invoke web service

    1.1 Select update type

    1.2 Download new packages

Alternative Scenario Courses:

None.

Constraints:

1. Number of data types and graphs that can be analyzed and presented are limited.

2. Options beyond preset combinations will be considered invalid and not be met.

Questions:

None.

2.3   Use Case Diagrams

This section presents the business scenarios of the subject area in a graphical form.

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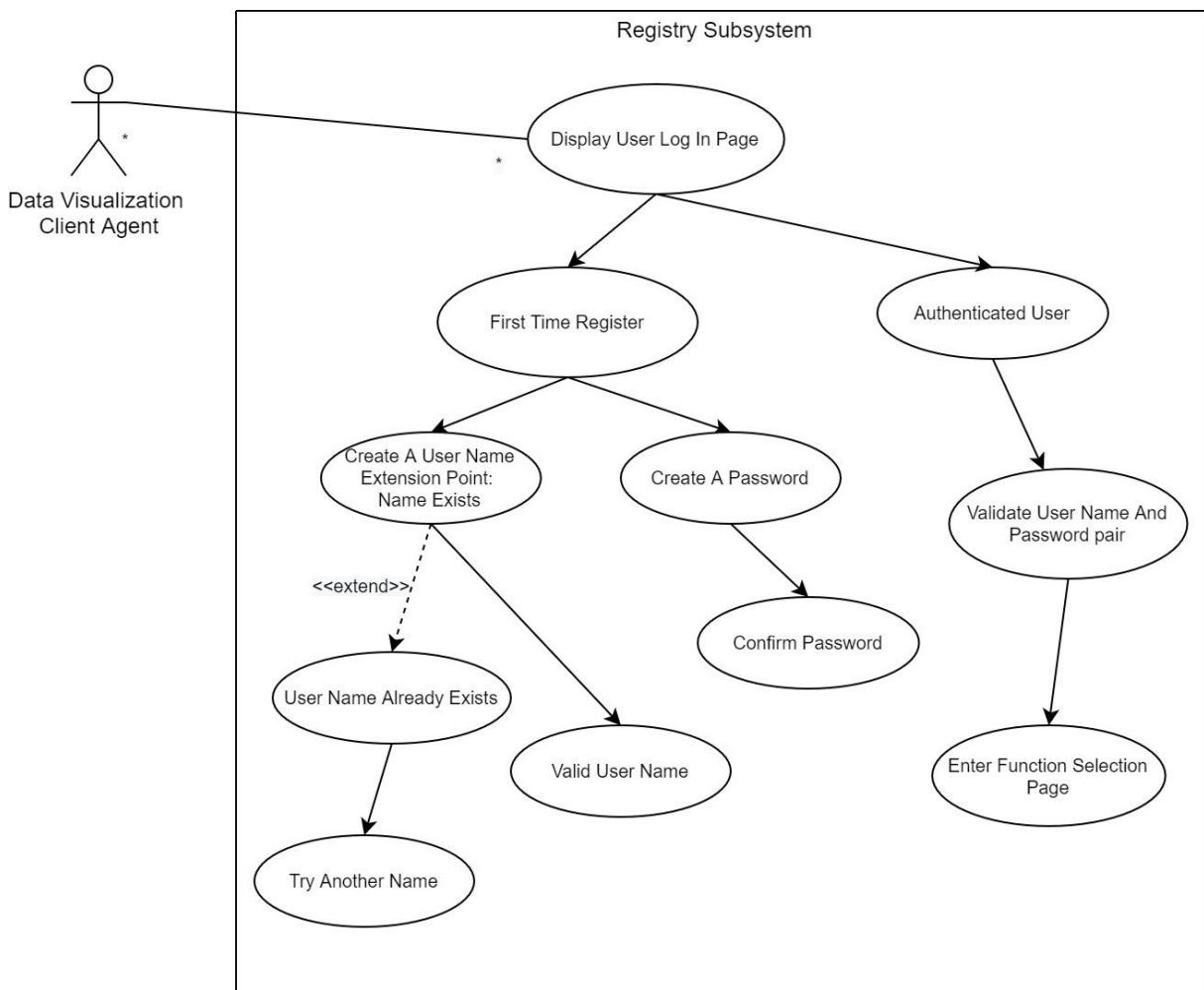
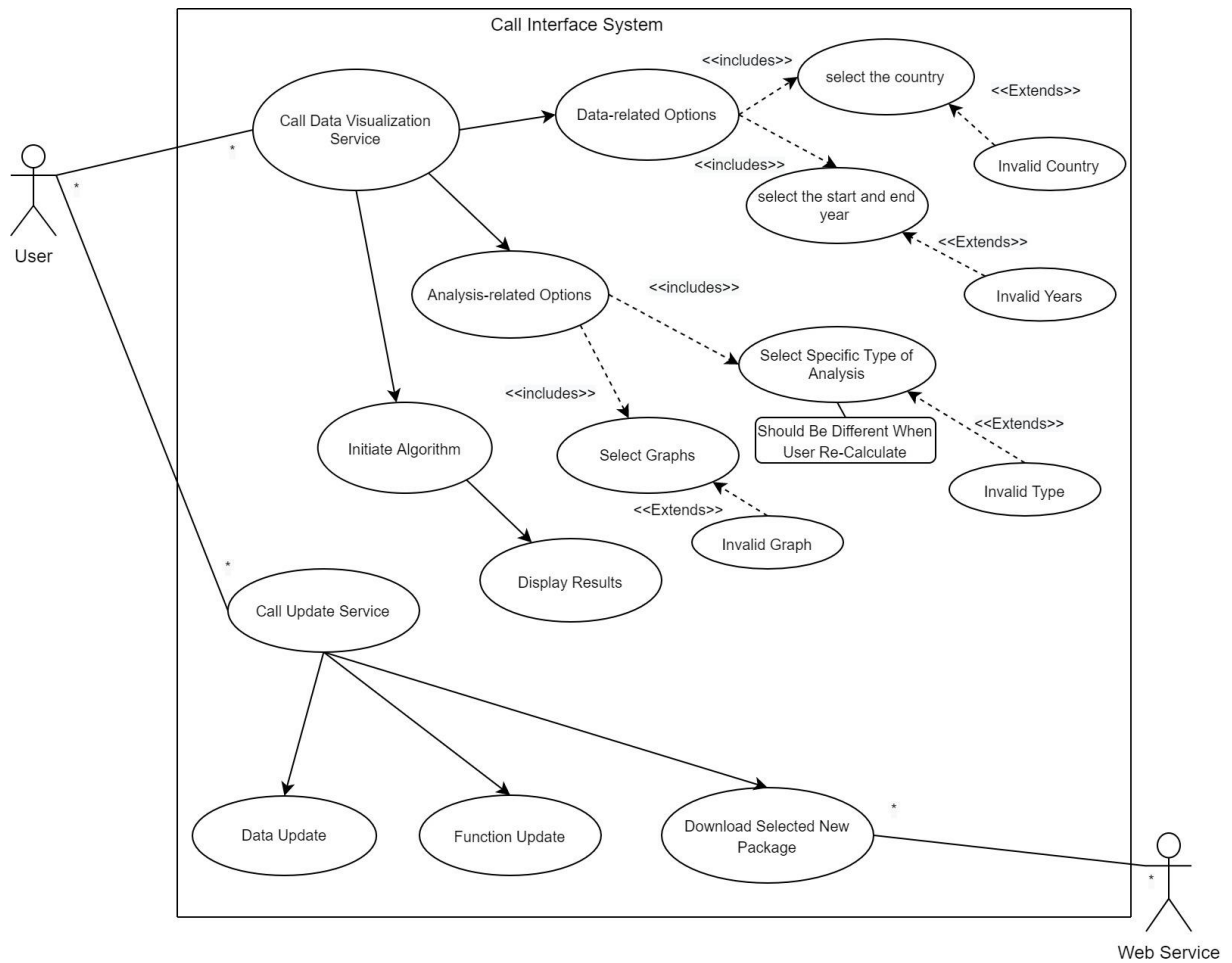Fig. 2.3.1 Use Case Diagram for User Registry Subsystem

Fig. 2.3.2 Use Case Diagram for Call Interface System

3 Domain Model

3.1 Domain Model Class Diagram

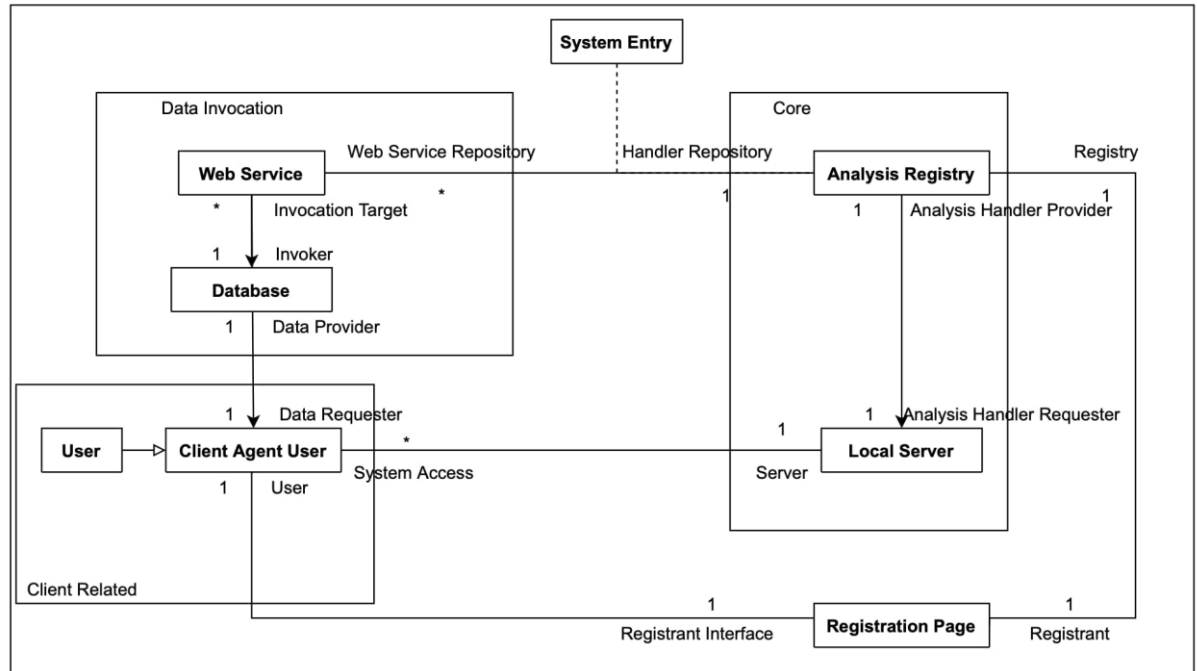The domain model class diagram for the DAGraph System appears below:

Fig. 3.1 Domain Model Class Diagram

3.2 Domain Model Class Definitions

3.2.1 Web Service

Description	This object represents an external agent that is invoked during operation scenarios that involve the invocation of relative data. Invoking a Web Service executes the actions that download new patches and update the version series and invocation result status back to the system.
Attributes	Year (int), Type(char), Country(char)
Responsibilities	The web service object can allow Database to retrieve data from the World Bank
Business Rules	The data must be retrieved from World Bank

3.2.2 Client Agent User

Description	This object represents the application that allows User to interface with the rest of System and represents the User of System in the context of the domain. This object associates with the rest of the system through the Local Server. It serves as an interface between the User and the data from Web Service that the User may choose for invocation.

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Attributes	Username (char), SYear (int), EYear (int), Type(char), Graphs(char), Country(char)
Responsibilities	This user is responsible for registering by adding them to the Analysis Registry using the Registration Page object as an interface. And it uses invocation parameters to actually invoke a selected Web Service. It is also responsible for forwarding the result of this invocation back to the Local Server once received.
Business Rules	Users can select country, year, analysis type, and views which they like to fetch and visualize data. They can use "recalculate" bottom to initiate the analysis.

3.2.3   Local Server

Description	Provides selection details of the User. It is connected to the Client Agent User and the Analysis Registry. It can authenticate and authorize users for analysis, implement data, and provide features to users.
Attributes	SYear (int), EYear (int), Type(char), Graphs(char), Country(char)
Responsibilities	Checks whether the User has registered with the Analysis Registry. Receives request for Analysis handlers and forwards the handler back. If no handler is returned (i.e. the client has not registered), the system terminates.
Business Rules	Users can select which analysis and data they want the system to display, the local server can process and fetch the visualization data, then display the result. Users can use "recalculate" bottom to initiate the analysis.

3.2.4   User

Description	This object represents the role of the Client Agent User when it interacts with the system. User is generalized by the Client Agent User, and interacts only with the system software in performing its role.
Attributes	Username (char), Password (char)
Responsibilities	This object is responsible for instructing the Client Agent User to initiate the analysis (i.e. year, country, graphs). It is also responsible for selecting data for invocation from the list of Analysis Handlers in scenaria.
Business Rules	Users can select country, year, analysis type, and views which they like to fetch and visualize data. They can use "recalculate" bottom to initiate the analysis.

3.2.5   Analysis Registry

Description	The Registration Page contacts the Registry to register. The Local Server queries it to check whether a Client Agent User has registered.
Attributes	Username (char), Password (char)
Responsibilities	Stores all information about the analysis, analysis handlers and registry that correspond to the registered users
Business Rules	If the combination of username and password is not correct or no such user exists in the system's database, a pop-up window or a notification in the form will notify them that there is an error with the provided credentials and the application will terminate.

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3.2.6　　　System Entry

Description	This object represents an entry in the Registry corresponding to the Web Service. It is an association class, serving as a link between a Web Service and the Analysis Registry.
Attributes	Year (int), Type(char), Country(char)
Responsibilities	A System Entry object is responsible for providing information regarding the Web Service associated with it.
Business Rules	Start the system and the user are greeted with a login form

3.2.7　　　Registration Page

Description	An interface which allows the user to register. Users have direct access to it. It is also connected to the Registry to retrieve Service informatio
Attributes	Username (char), Password (char)
Responsibilities	Authorized users to login. Allows users to register through the Registry.
Business Rules	If the combination of username and password is not correct or no such user exists in the system's database, a pop-up window or a notification in the form will notify them that there is an error with the provided credentials and the application will terminate.

3.2.8　　　Database

Description	A storage which store the data from World Bank, and provide specific data to analysis when user request
Attributes	Year (int), Type(char), Country(char)
Responsibilities	The Database object must be configured to allow invocation of specific data from the World Bank by the Client Agent User using the information provided.
Business Rules	The data must be retrieved from World Bank

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4   Sequence and Activity Diagrams

4.1   Sequencing Diagrams.

Fig. 4.1.1 Sequencing Diagram for Scenario

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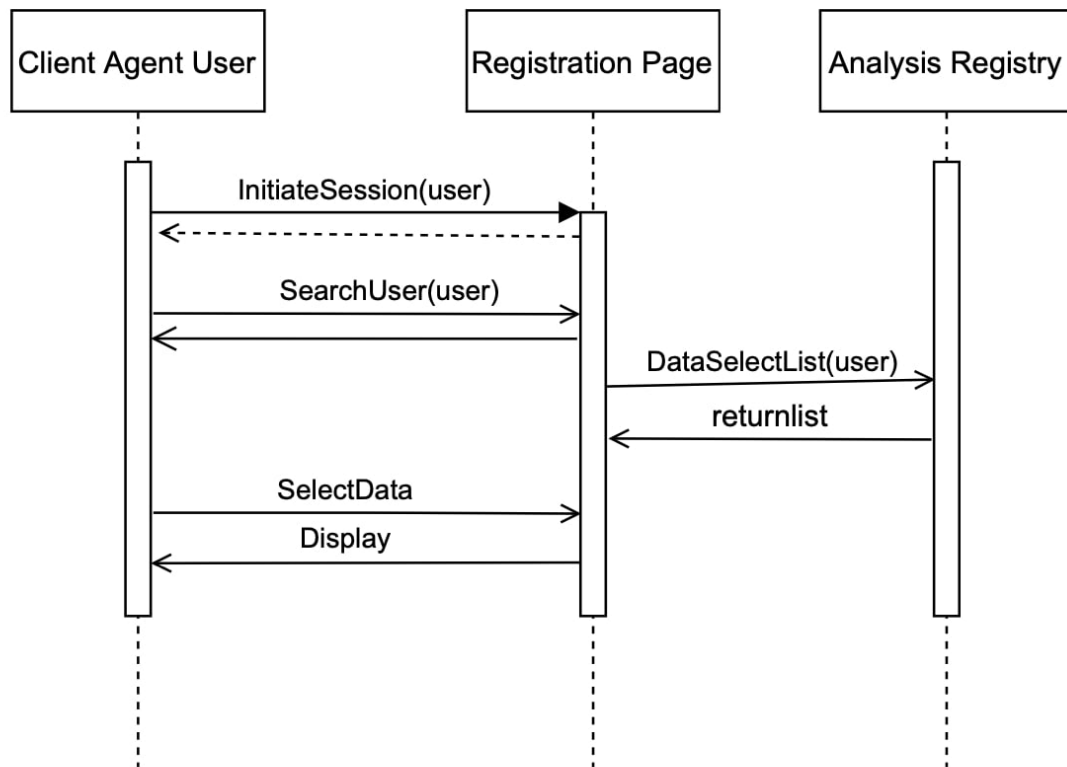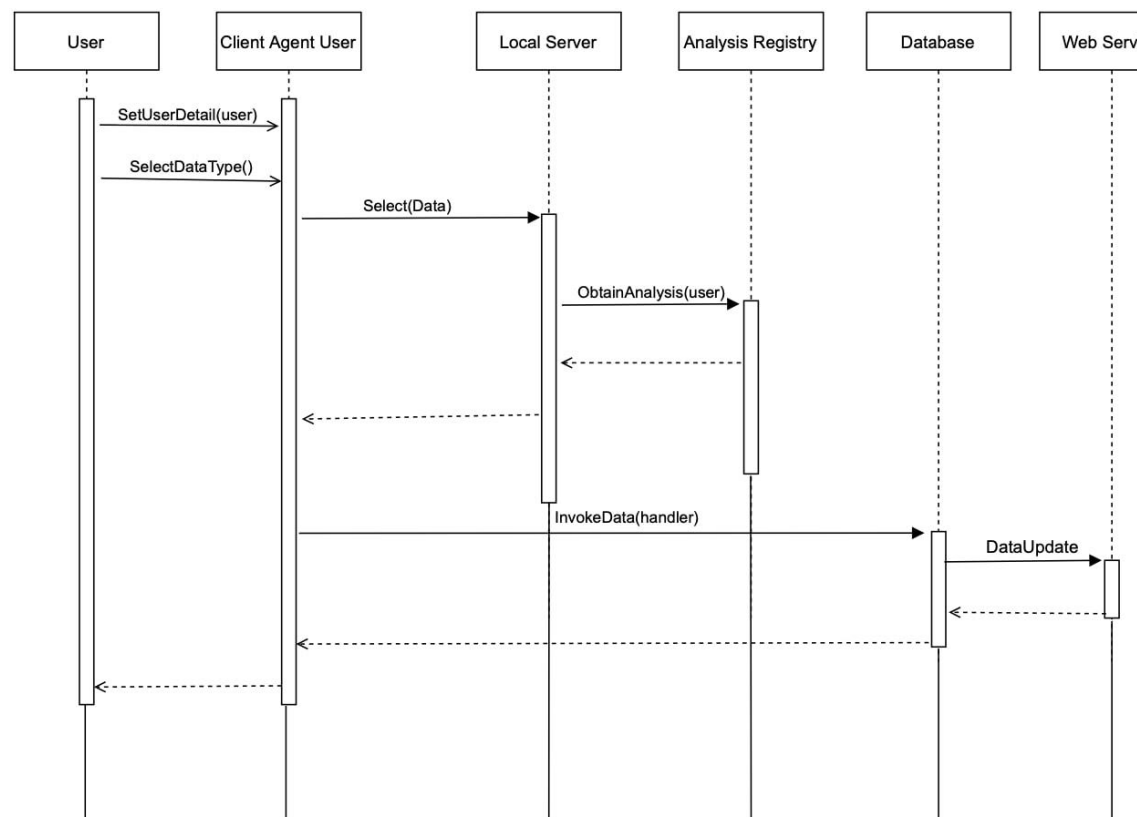
Fig. 4.1.2 Sequencing Diagram for Scenario

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4.2 Activity Diagrams
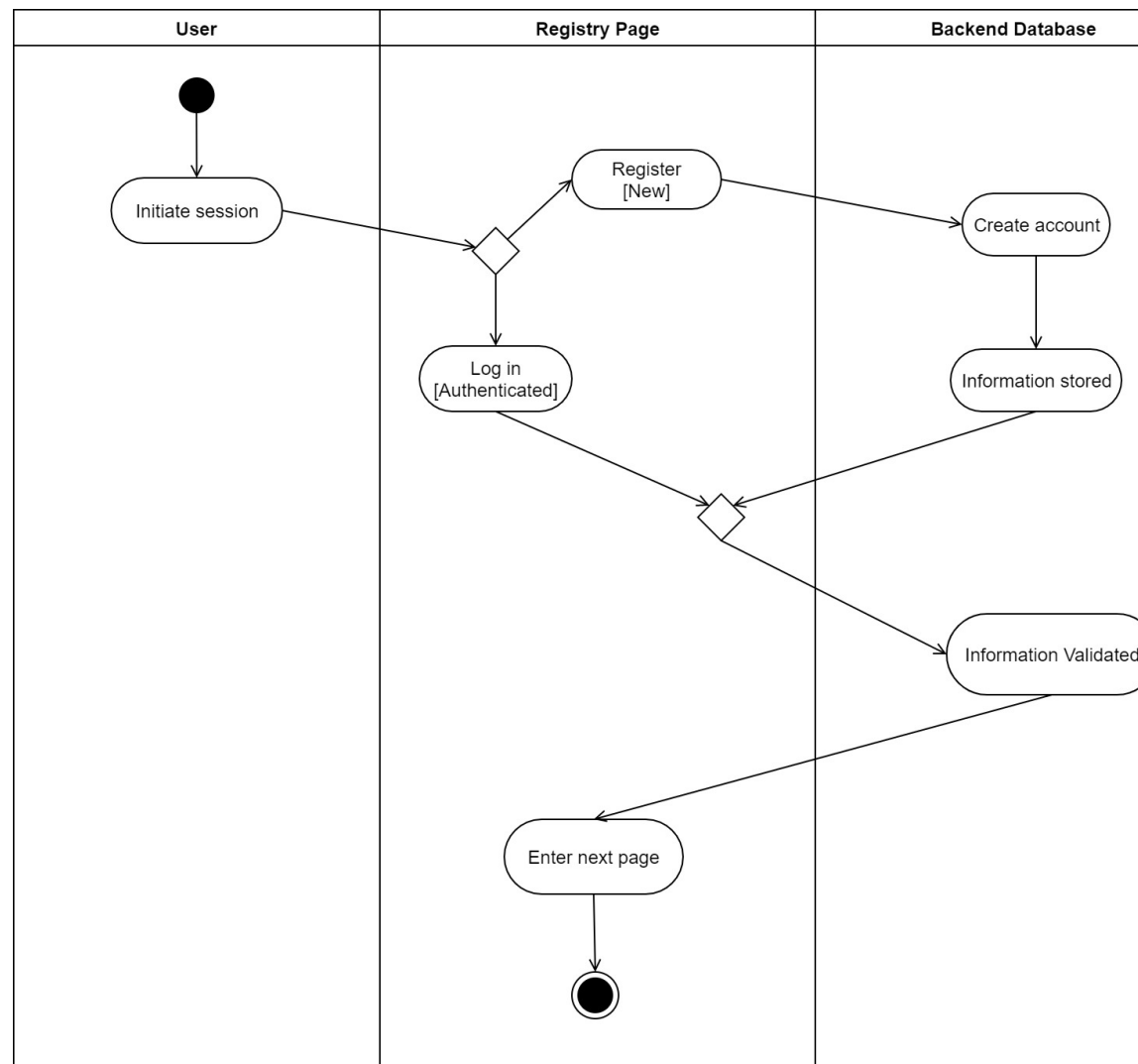
Fig. 4.2.1 Activity Diagram for Registry Page

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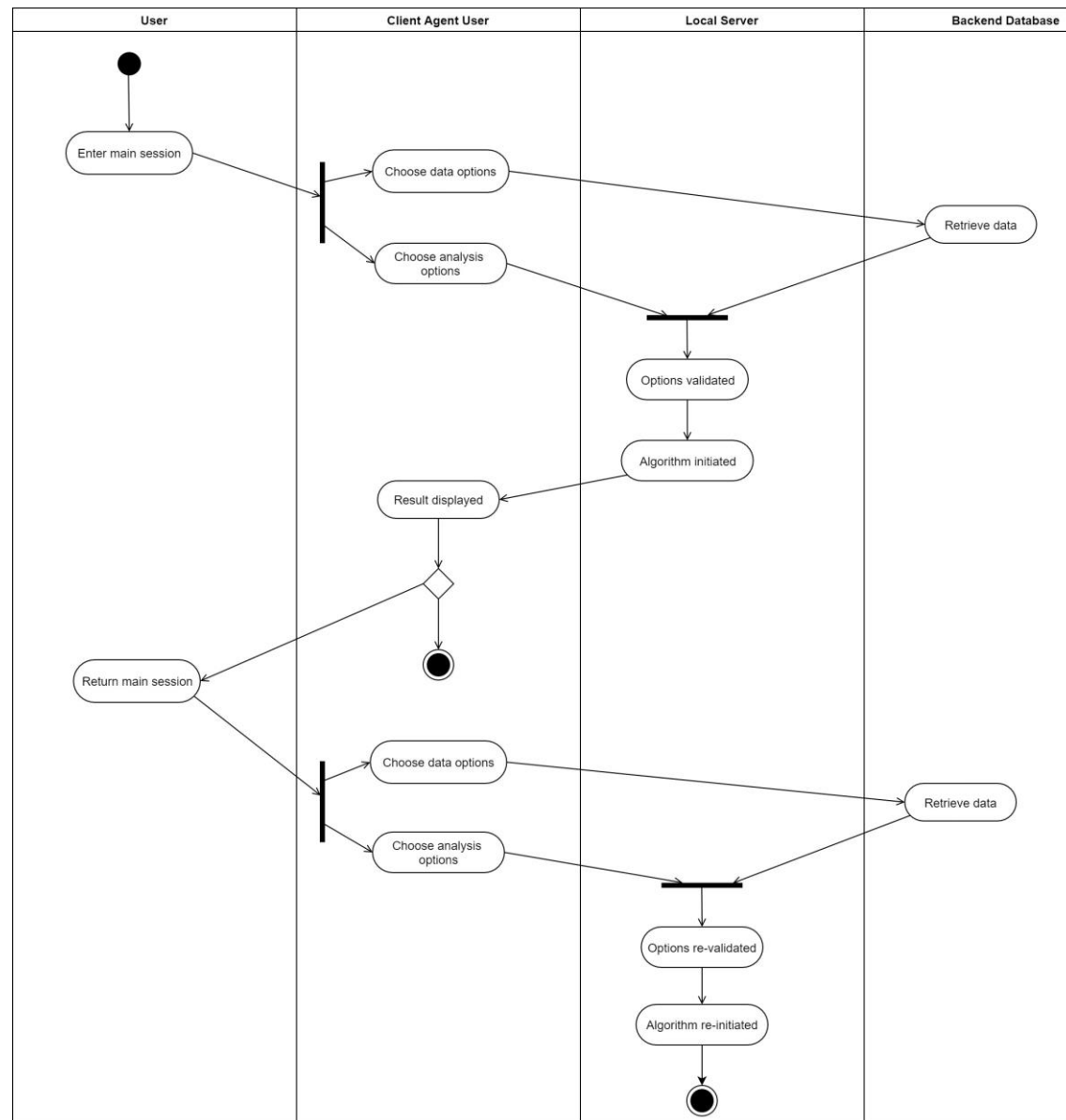
Fig. 4.2.2 Activity Diagram for Main session

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5 Non-Functional Requirements Specification

5.1 Overview

The non-functional requirements of the system comprise of utilities, environments and other specifications that are necessary for the smooth operation of the system as a whole. This includes interfaces, development environment, capacity specifications, network and operational parameters.

5.2 Enabling Technologies

5.2.1 Target Hardware & Hardware Interfaces

Since the application must run over the internet, all the hardware shall require connecting to the internet will be a hardware interface for the system. As for e.g. Modem, WAN – LAN, Ethernet Cross-Cable.

5.2.2 Target Development Environment

The system can be developed in any kind of environment using Java. Eclipse 3.1 as the Integrated Development Environment (IDE) used for coding purposes.

5.2.3 System Interfaces

Sample code to query the World Bank's API and get a response; and the indicator IDs are provided. The data for analysis and visualizations will be required to either be retrieved from one or more data pools from the World bank's base remote issuing http GET request from the Java application. The sample java code will call a URL. The retrieved data can be in xml and json formats.

5.3 Capacity Planning

5.3.1 Permanent Storage

In order to be reliable RAID 1 mirroring will be used on the server. This ensures that if one of the disks fails the other disk functions as a single hard drive until the faulty one is replaced. For system installation and activity logging, the disk size used will be 30 GB. Most of that space would be occupied by client information such as number of web services registered, names of the web services and their descriptions, the .wsdl files and user activity logging.

5.4 Network

The system should have connectivity to the Internet with bandwidth sufficient enough to carry audio signals. Furthermore, the network should possess efficient packet switching data from data pools of the World Bank's database URL (API) with the indicator IDs without skips or delays.

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5.5   Workstations

The minimum system requirements and configurations for the computers used for the development, deployment and execution of the system are:

A hard disk space of 5GB to install Operating System, Eclipse software and a Java Virtual Machine. A processor speed of 300 MHz and memory of 64 MB is sufficient. A display setting of 1024 x 768 resolution and a 16-bit color palette should be used. The computer should have connectivity to a LAN with bandwidth high enough to carry data transmission.

5.6   Operational Parameters

5.6.1   Useability

The system should be learnable and usable by the average computer user. The GUI will be designed in such a way that the buttons are conspicuous and meaningful making it easy to access all the functions of the system.

5.6.2   Reliability

The backup and recovery functions of the system will consist of snapshots which will be taken at regular intervals and stored somewhere external to the system. The Mean Time To Repair should be minimized which will in turn minimize Mean Time Between Failures. The system should always be available to the user.

5.6.3   Maintainability

Maintainability measures the ease and speed with which a system can be restored to operational status after a failure occurs. The system will have at least 75 percent maintainability for 24 hours. Considering the analyzed data is time-efficient, the system should also be maintainable in the data updating aspect.

5.6.4   Portability

The system should conform to portability standards including transferring installed program files to another computer of basically the same architecture. The system allows reinstalling from distribution files on another computer of basically the same architecture. There is no limitation on the operating system, but the Java Virtual Machine will be needed.

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6   Activities Plan

6.1   Gantt Chart
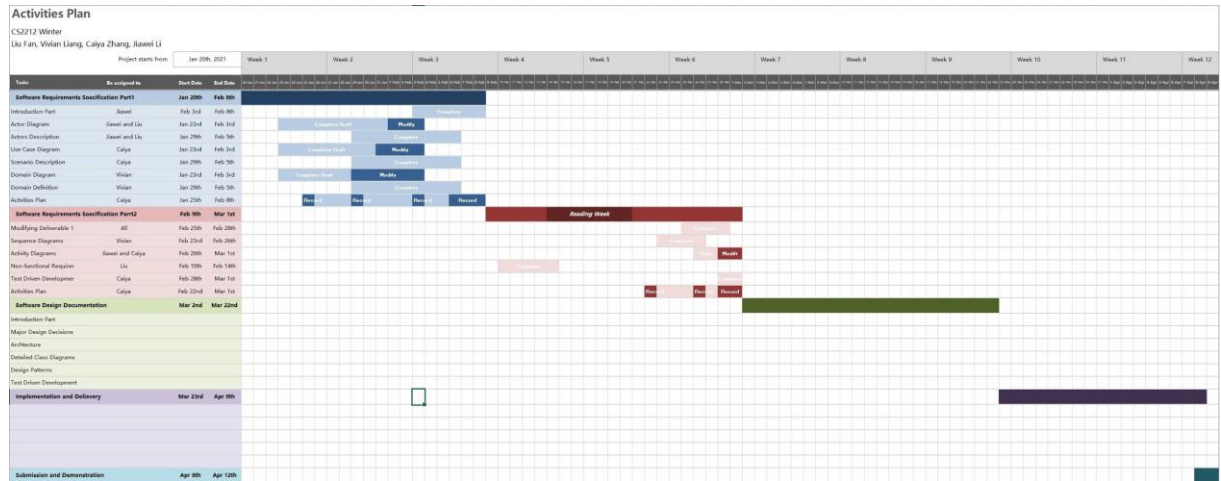

Fig.6.1 Gantt Table

6.2   Project Backlog and Sprint Backlog

1. Software Requirements Specification Part1
   a. Actor Diagram:
      i. most urgent
      ii. should be firstly confirmed
   b. Actor Definition:
      i. should be completed after modifying the Actor Diagram
   c. Use Case Diagrams:
      i. urgent
      ii. a general flow should be confirmed after actors are confirmed
      iii. a draft should be modelled after the general flow is confirmed
      iv. should be modified after group discussion
   d. Business Scenario Description:
      i. should be completed after modifying the Use Case Diagram
   e. Domain Diagram:
      i. urgent
      ii. should be discussed together with use case flow
      iii. a draft should be modelled after discussion
      iv. should be modified referring to the use case diagram
   f. Domain Model Definition:
      i. should be completed after modifying the Domain Diagram
   g. Final Check

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2. Software Requirements Specification Part2
    a. Modifying Deliverable 1:
        i. urgent
        ii. changes in the three diagrams should be discussed first
        iii. deficiencies in actors and flows should be changed before modelling Sequence and Activity Diagrams
    b. Sequence Diagrams:
        i. a general flow should be confirmed after confirming the deficiencies in Use Case Model and Domain Model
        ii. should be completed after the general flow is confirmed
    c. Activity Diagrams:
        i. a general flow should be confirmed after confirming the deficiencies in Use Case Model and Domain Model
        ii. a draft should be completed after the general flow is confirmed
        iii. should be modified referring to the Sequence Diagram
    d. Non-Functional Requirements:
        i. not urgent but can be discussed first (before Deliverable 1 been returned)
        ii. specific parameters and proper names should be discussed first
        iii. should be completed before due date
    e. Test Driven Development:
        i. can be discussed when confirming the activity flow
        ii. should be done before due date
    f. Final Check

6.3 Group Meeting Logs

Present Group Members	Meeting Date	Issues Discussed / Resolved
Vivian Liang, Jiawei Li, Liu Fan, Caiya Zhang	Jan.20	Topic: Generally Identify Tasks for Assignment1 (150mins) 1. Schedule weekly meetings; 2. Identify which models are needed for Assignment 1; 3. Discuss the main functions, structure and the general coupling relationship of each part of our data visualization software;
Vivian Liang, Jiawei Li, Liu Fan, Caiya Zhang	Jan.25	Topic: Preparation for Part 2-4 (40mins) 1. Sort out the emphasis that each model needs to reflect and the progressive relationship between actor diagram, uses case diagram and domain diagram basing on the given SRS Example ;

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		2. Confirm the systems, subsystems, libraries, servers and other objects required by our data visualization software;
		3. Jiawei Li and Liu Fan were assigned to draw the actor diagram and fill in related descriptions, Caiya Zhang was assigned to draw the uses case diagram and fill in the corresponding scenario, and Vivian Liang was assigned to draw the domain diagram and fill in related descriptions;
Vivian Liang, Jiawei Li, Liu Fan, Caiya Zhang	Jan 29th	Topic: Discussion for Details of the Three Models (60mins) 1. Discuss the correlation and logical consistency of the three completed diagrams; 2. Discuss the correctness of the coupling relationship between objects in each diagram; 3. Arrate each member to revise his/her responsible part according to the content discussed after the meeting;
Vivian Liang, Jiawei Li, Liu Fan, Caiya Zhang	Feb 3rd	Topic: Preparation for Part1 and Part6 (40mins) 1. Do the final check for diagrams' details; 2. Discuss some details of completed text parts corresponding to the three diagrams; 3. Jiawei Li will complete the introduction part, and Caiya Zhang will be responsible for filling in the Activities Plan;
Vivian Liang, Jiawei Li, Liu Fan, Caiya Zhang	Feb 10th	Topic: Discussing Content of Part 5 (30mins) 1. Discuss about specific parameters and proper names used in Enabling Technologies, Workstations and Capacity Plannings; 2. Confirm general requirements in this part; 3. Liu Fan will be responsible for non-functional requirements writing, and the other three members will learn lectures about Activity and Sequence Diagram individually;
Vivian Liang, Jiawei Li, Liu Fan, Caiya Zhang	Feb 22nd	Topic: Preparation for the Two Diagrams and the First Test (60mins) 1. Discuss about deficiencies in Deliverable 1, based on the marking sheet. 2. Group members are assigned to modify previous works;

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| | | 3. Confirm the flow of sequence diagram, and Vivian is assigned to complete diagram drawing; |
| | | 4. Confirm the flow of activity diagram , and Jiawei is assigned to drawing a draft diagram. |

7   Test Driven Development

Initial test cases will be provided in the form of a table as follows:

Test ID	testDAG
Category	evaluation of user credentials stored in database
Requirements Coverage	user called "testDAG"
Initial Condition	the login page is displayed
Procedure	1. The user selects login option 2. The user provides a user name 3. The user provides corresponding password 4. The page of main session displayed and log out 5. The user re-initiates the login page and selects login option 2. The user provides a user name

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	3. The user provides a wrong password 6. A warning popup is displayed
Expected Outcome	The user can log into the system with correct username and password, but there displays a warning popup if the user entered wrong login information
Notes	The user should provide only alphanumeric usernames and passwords without any special characters

8 Domain Dictionary (optional and as required)

8.1 Terms and Abbreviations

Term	Definition
Place term here	Place a definition of the term here. Make the definition short and concise and consistent with other terms. Only used terms defined elsewhere in the domain dictionary.
Place synonym here	This is a synonym of <another term>

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