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DEPARTMENT OF COMPUTER SCIENCE

COS 301

MINI PROJECT ASSIGNMENT 1

# Software Requirements Specification
# and
# Technology Neutral Process Design

TEAM BRAVO

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# Contents

## Bravo github repository link

For further references, please click on this link.

# 1   Introduction

This document aims to specify the functional and non-functional requirements of a document archiving system, as specified by Ms Vreda Pieterse of the Computer Science Department.

It will serve as a means of communication between the client and developers as well as providing an elaboration and a clear discription of it's implementation specifications.

# 2   Vision

We intend to create a system that will allow authors and their co-authors to work on their research papers in an environment that reassures collaborative work, which in turn diminishes the time spent on papers with multiple authors. The following are what we plan to achieve:

- Keep track of research papers.

- View meta-data of research papers.

- Allow multiple authors to collaborate on the same research paper.

- Different levels of authority, i.e. Admin, (Co)Author, User.

- View and edit the details, of a text based profile, of different researchers.

- Implemention as a website and an android application.

# 3   Background

We live in a world where time is valuable. We would like to do as much as we possibly can in the shortest amount of time. And if that's not possible, we work in teams to ensure that we achieve that goal.

Reseacher papers tend to be fairly lengthy, and if completed by only one author, it could be quite a tedious process. Hence we propose a system which would make the storage and collaboration of research articles and papers effortless by producing an archive system.

# 4 Architecture Requirements

## 4.1 Access channel requirements

The different access channels for the system will be as follows:

### 4.1.1 Web Application

The system can be used via a web application that uses RESTful web services and bootstrap technology. The system will be fully supported on the following web browsers:

- Chrome 7.0.517 and up

- Firefox 3.6 and up

- Safari 4 and up

- Edge

Bootstrap will be used so that the web application will also be accessible by mobile web browsers that support HTML5 and JavaScript technology.

### 4.1.2 Mobile Application

The system will also be accessible via a mobile application and will be operational on the following mobile operating systems:

- Android 4.0 (Ice Cream Sandwich) and up.

## 4.2 Quality requirements

- Security - The system shall identify all of its client applications before allowing them access to those enities. Possible measurement methods: Success rate in authentication, percentage of successful attacks, encryption level and probability/time/resources needed to attack the system.

- Usability - The degree of ease of use and training needed for end users. Possible measurement methods: Time it took a user to find a report (search functionality), percentage of deadlines met (notification functionality) and time it took a user to perform certain tasks.

- Auditability - The degree to which transactions can be traced. Possible measurement methods: The number and precision of logs generated in a period of time (metadata accessed/deleted/added).

- Portability - Measure ability of the system to run under different computing environments. Possible measurement methods: Number of targeted software environments (ie different browsers and operating systems) and proportion of platform specific functionality.

- Maintainability - Measures ability to make changes quickly and cost effectively. Possible measurement methods: Degree of complexity to make changes to the format of the metadata and mean time to add or change certain functionalities (ie new report types and new types of users).

- Availability - Percentage of time that the system is up and running correctly. Possible measurement methods: Length of time between failures and length of time needed to resume operation after a failure.

- Performance - Possible measurement methods: How well the system perform under high workload and number of events processed/denied in some interval of time.

## 4.3   Integration requirements

### 4.3.1   Integration channels

- System will be integrated on two platforms: a website and an android application.

### 4.3.2   Protocols

- Protocols needed for the website: HTTPS, Data Query Protocol
- Protocols needed for the application: Session Initiation Protocol (SIP)

### 4.3.3   API specification (UML form) and technology specific API specification

- UML diagram here

### 4.3.4   Integration quality requirements

- Reliability - The service must not crash, it must run effectively and efficiently allowing users to make use of the service at all times.

- Auditability - Have logs record all activity that occurs thus all actions and occurrences can be traced.

- Security - Giving the users reassurance that the system will protect their details and content. Allow secure and safe communication between user and the system.

- Maintainability - Provide easy, effective and efficient maintenance to the system allowing minimal or no downtime of the system.

- Usability - Allow users to use the system with ease and minimal need for tutorials. Ensure that the system is self-explanatory, efficient and effective.

- Portability - To provide compatibility with as many systems as possible without integration failure or function failure.

- Availability - Minimise downtime of the system. Quick recoveries from crashes, preventive measures to minimise chances of system crash.

- Performance - The rate of work done when the system has either a high or low workload and minimise amount of denied events.

- Seamless transitions between platforms - Implementation between the integrated platforms must not vary greatly to avoid confusion and allow ease of use.

## 4.4   Architecture constraints

- The platform must exist in 2 mediums, namely web and android application.

- It is an internal network to be used by the Computer Science department, so it need not to source any information from the web.

- Any form of database can be used, but the team has decided that MySQL would be the best option from the current skillset.

- PHP and JavaScript will be used for the web and Android Studio for the android application.

- The system should cater for and including 100 users as a maximum.

- There should be a log that records all activity on the system

# 5 Functional requirements and application design

## 5.1 Use case prioritization

This section specifies the level of importance of different use cases, prioritized in terms of the following 3 catogories: Critical, Important and Nice-To-Have. Each of which has a lesser importance than the previous one.

### 5.1.1 Critical:

- User gateaway

  - Register user
  - Login user

- Research paper management

  - View paper
  - Publish paper
  - Terminate paper
  - Assign research paper's conference venue
  - View research paper's venue

- User account management

  - View user account
  - Remove account
  - Create new account
  - Search user
  - Modify account
  - Assign co-author

- Log services

  - View recent activities
  - System events
  - Determine date and time
  - Identify user

- Other

  - System should only allow one primary author for each research paper. The rest should be co-authors
  - Superuser, one to be above all other users to have complete control and access to the entire system
  - Only metedata of the document will be posted, no documents will be posted
  - Research documents are archived rather than deleted

### 5.1.2 Important:

- Notification Services

    - Create notification

- Archival Services

    - Terminate paper
    - Revive paper

- Units accumulated from work on papers is reflected on the user's profile

### 5.1.3 Nice-To-Have:

- Users can search for other users attending the same conference

- Data representation via bar charts of the units accumulated by researchers throughout the past years

## 5.2 Use case/Services contracts

- Server Connection

    - **Description:** The ability for a user to make a connection to the server
    - **Pre-Condition:** The user must be attempting to begin using the service and must not be already using it
    - **Post-Condition:** The service must now be displayed to the user and an option to login must be available

- Database Connection

    - **Description:** The ability for the program to connect to the database
    - **Pre-Condition:** The program must be in a state where database connection is required. Eg a user is attempting to login to the system
    - **Post-Condition:** The program should be able to interact with the database at this point.

- User gateway

    - **Description:** The ability for a user to login to the system
    - **Pre-Condition:** The user must have provided login details that match those found in the database system.
    - **Post-Condition:** The user must be considered logged in by the system.

- Research paper management

- **Description:** The ability to interact with the research paper e.g. edit/delete it
  - **Pre-Condition:** A research paper must be specified
  - **post-Condition:** The research paper needs be modified in the desired way

- User Account Management

  - **Description:** The user should be able to view and edit his account details
  - **Pre-Condition:** The user must be considered logged in
  - **Post-Condition:** The user has edited part of his profile, or is able to see the details regarding his profile.

- Log services

  - **Description:** The ability for logs to be created of the work done on the various papers
  - **Pre-Condition:** A paper must be edited or otherwise modified in some way
  - **Post-Condition:** The action is recorded in a log

- Notification Service

  - **Description:** The ability to notify the user of various actions that have taken place on a paper they are an author of
  - **Pre-Condition:** The paper has been modified in some way, and the user must be an author of said paper
  - **Post-Condition:** An email is sent to the user notifying him/her

- Search Services

  - **Description:** The ability to search for papers that will be presented at the same conference
  - **Pre-Condition:** There must exist papers within the database that are related in that way
  - **Post-Condition:** The paper/s in question are displayed for the user

- Archival Services

  - **Description:** The ability to find all papers worked on, or currently being worked on
  - **Pre-Condition:** The user doing so must be the head of department also the paper in question must exist in the database
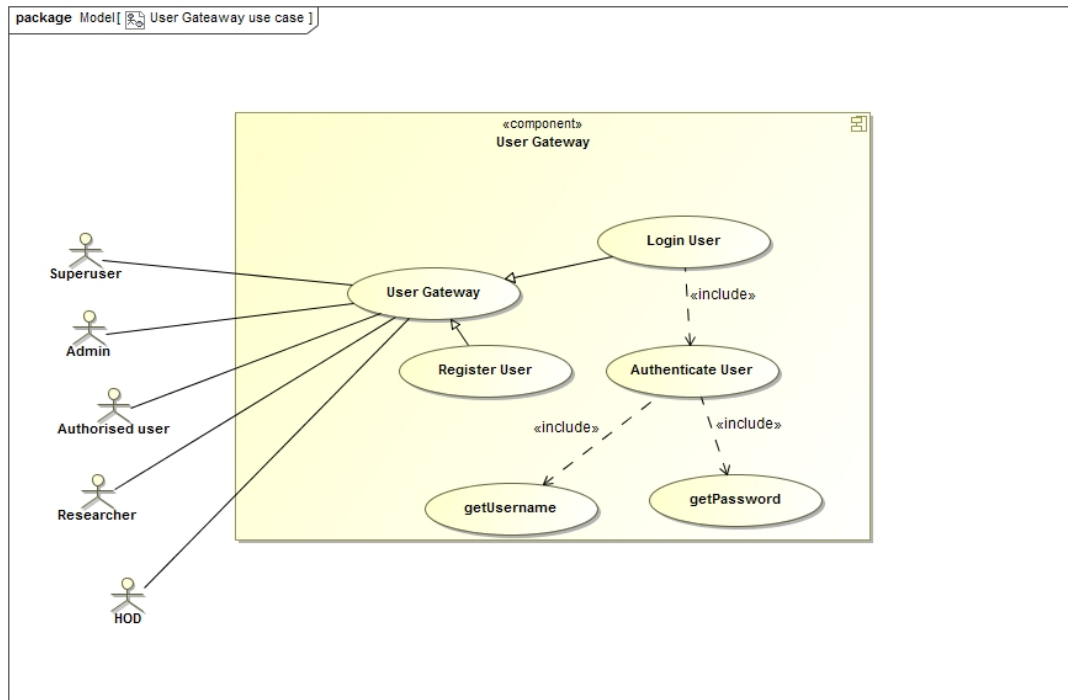  - **Post-Condition:** The paper being searched is displayed for the user

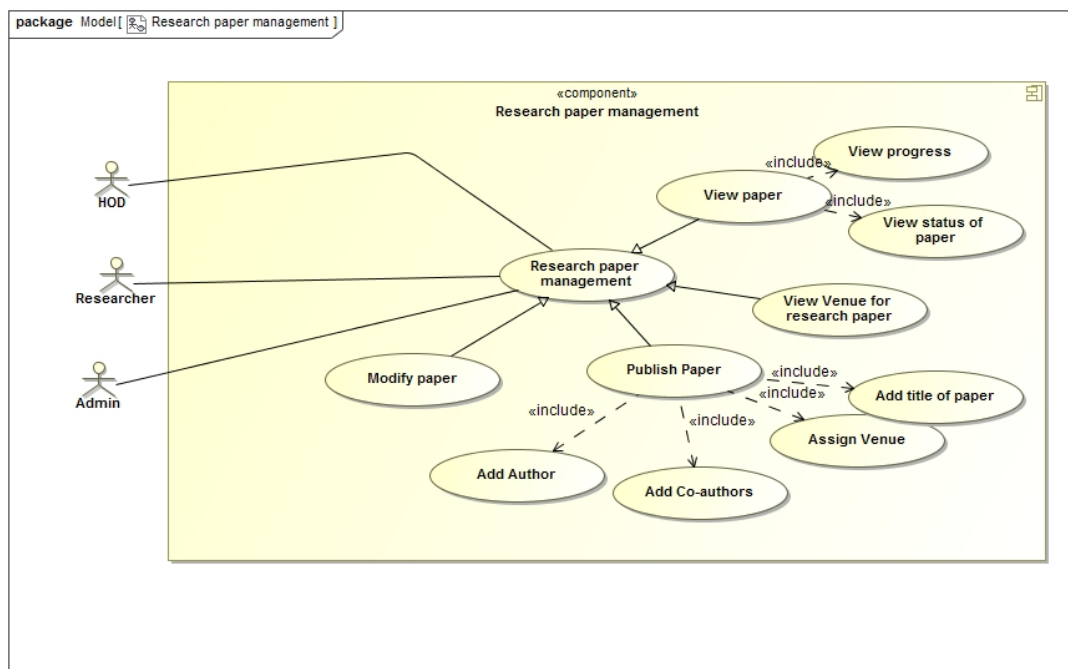## 5.3  Required functionality

### 5.3.1  Server Connection
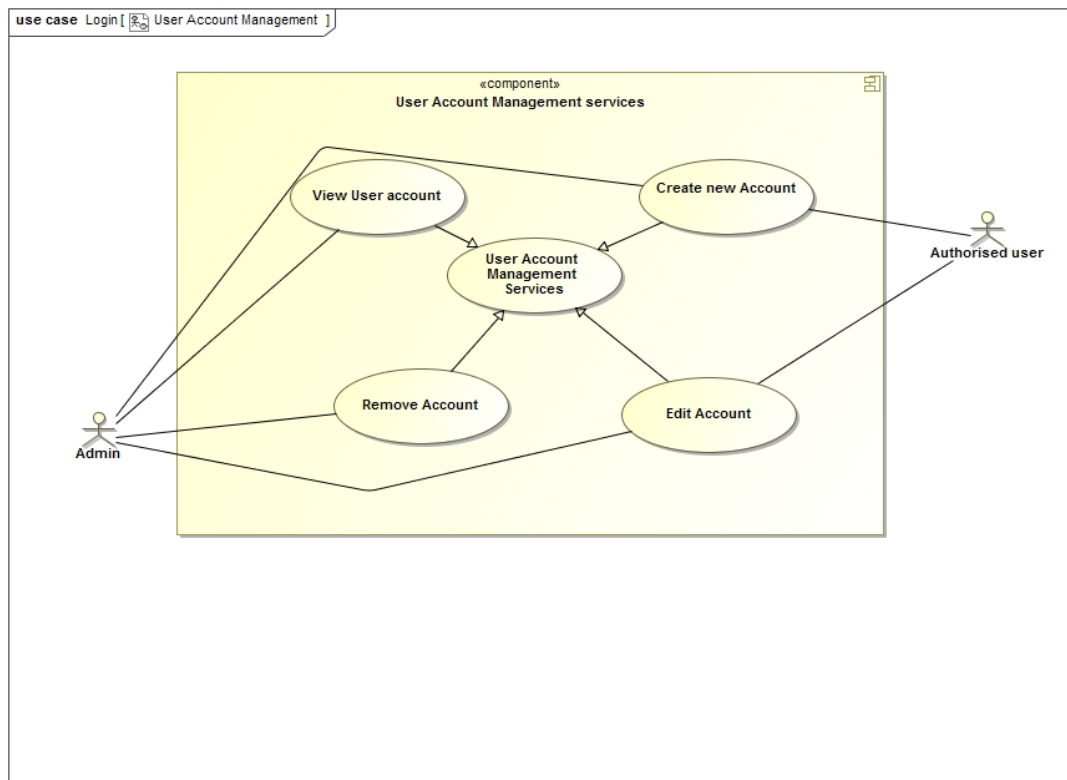
### 5.3.2  Database Connection
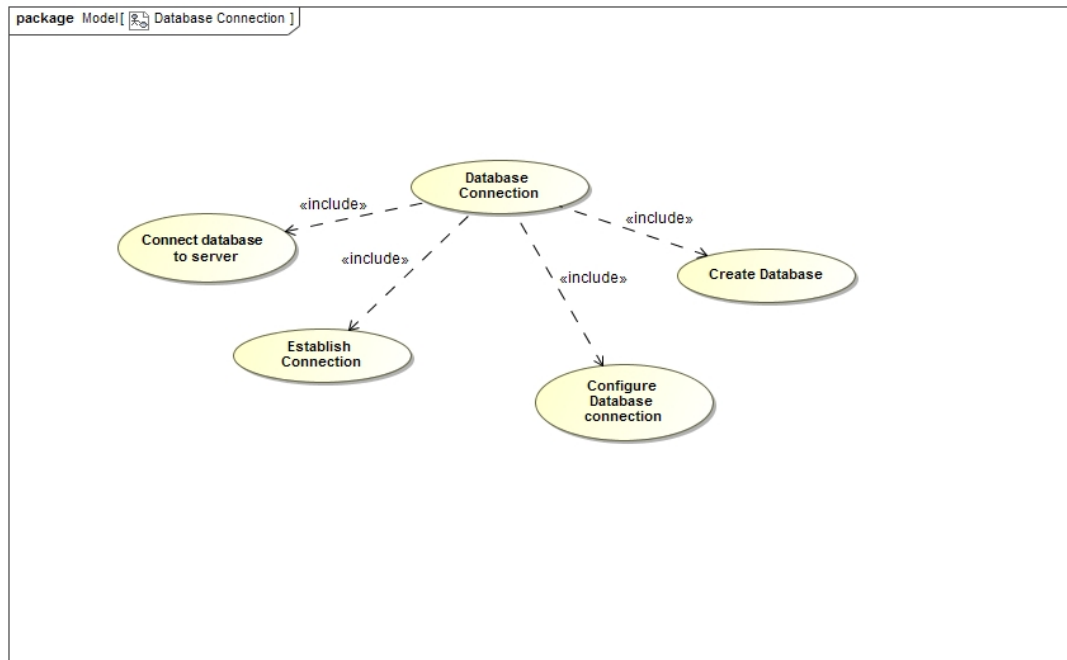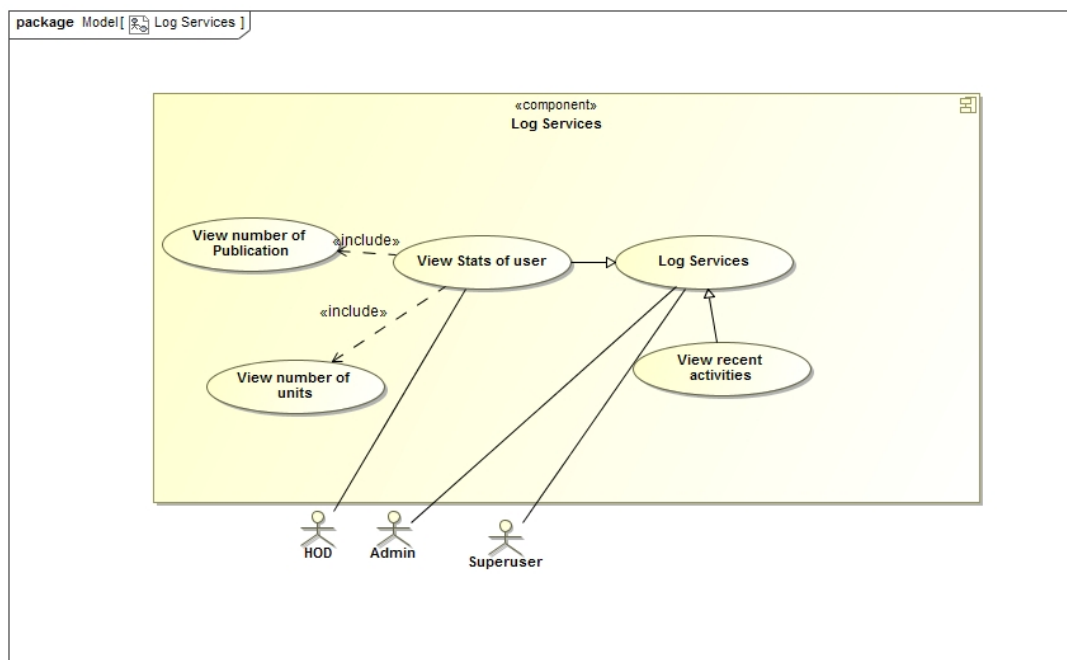
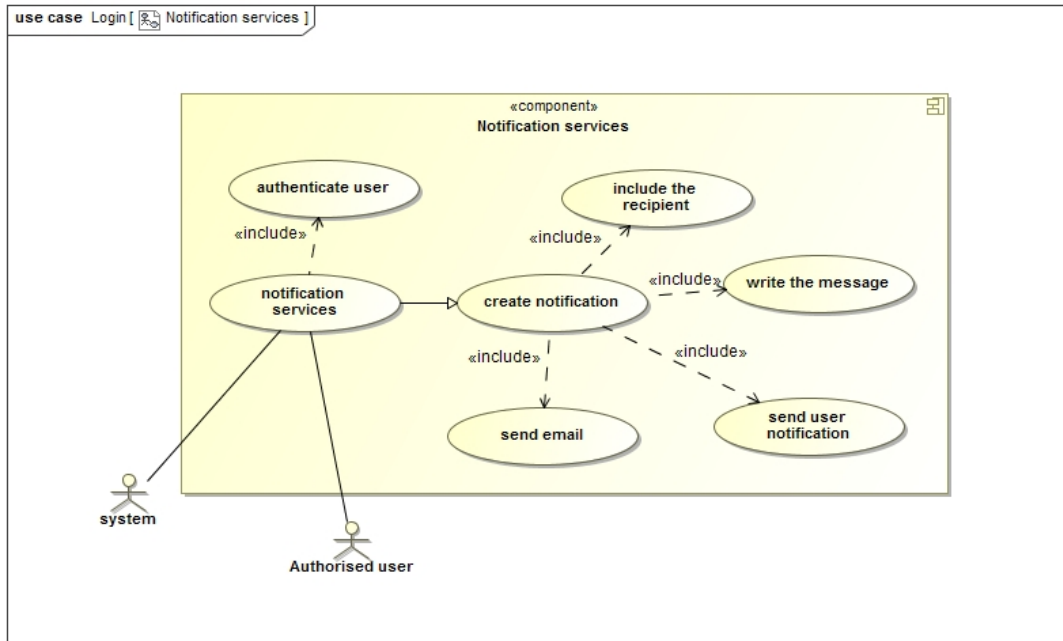### 5.3.3 User Gateaway



### 5.3.4 Research paper management

### 5.3.5   User Account management



### 5.3.6   Log Services

### 5.3.7    Notification Services
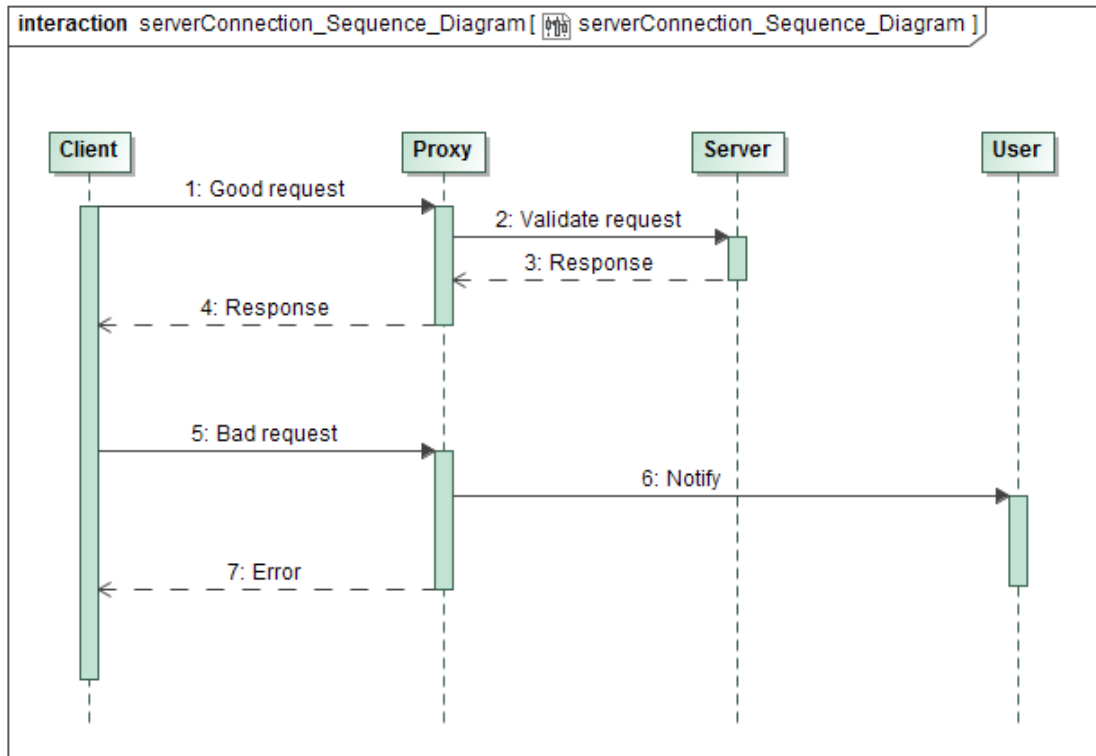


use case Login [ Notification services ]

«component»
Notification services

authenticate user

include the
recipient

«include»

«include»

notification
services

create notification

«include» write the message

«include»

«include»

send email
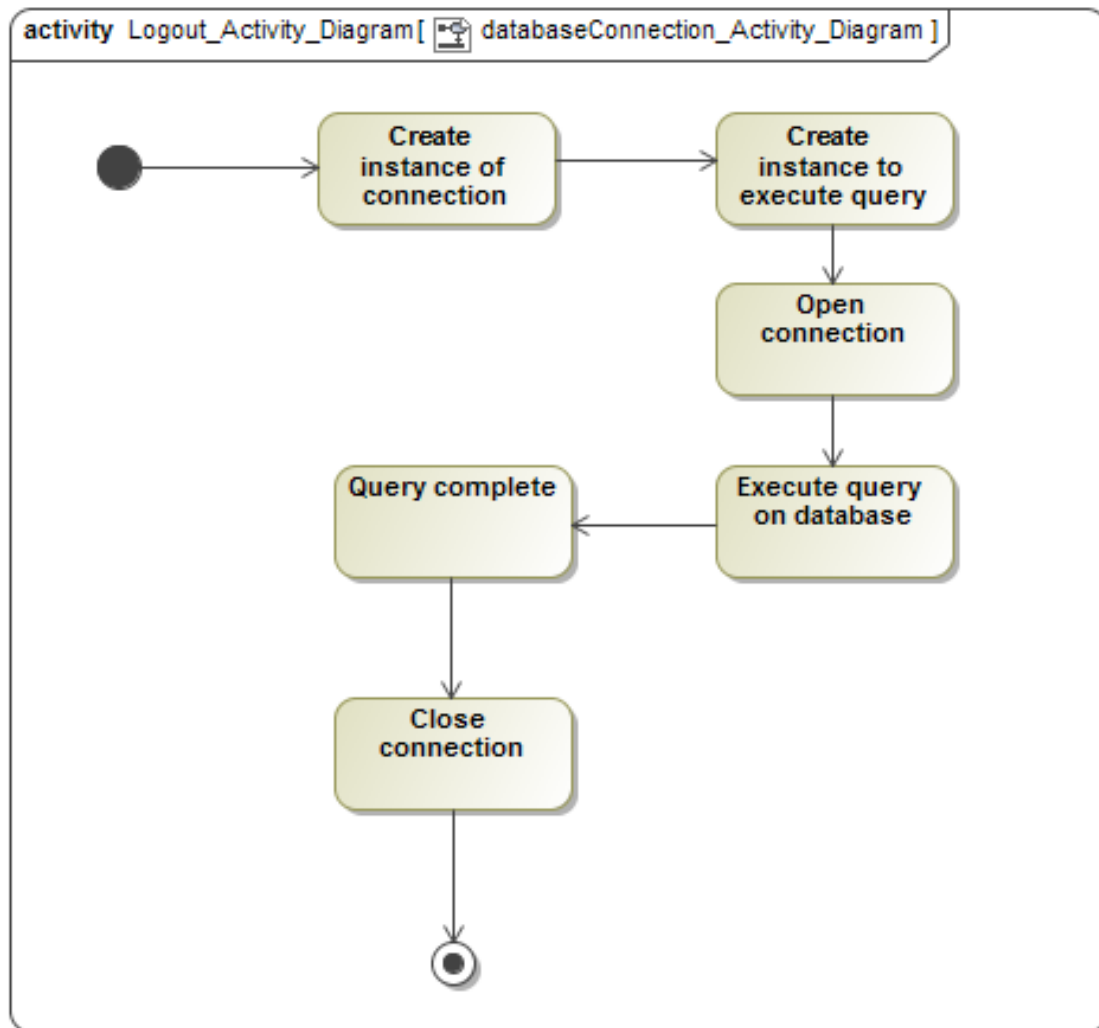
send user
notification

system

Authorised user

### 5.3.8    Archival Services

## 5.4 Process specifications

### 5.4.1 Server Connection

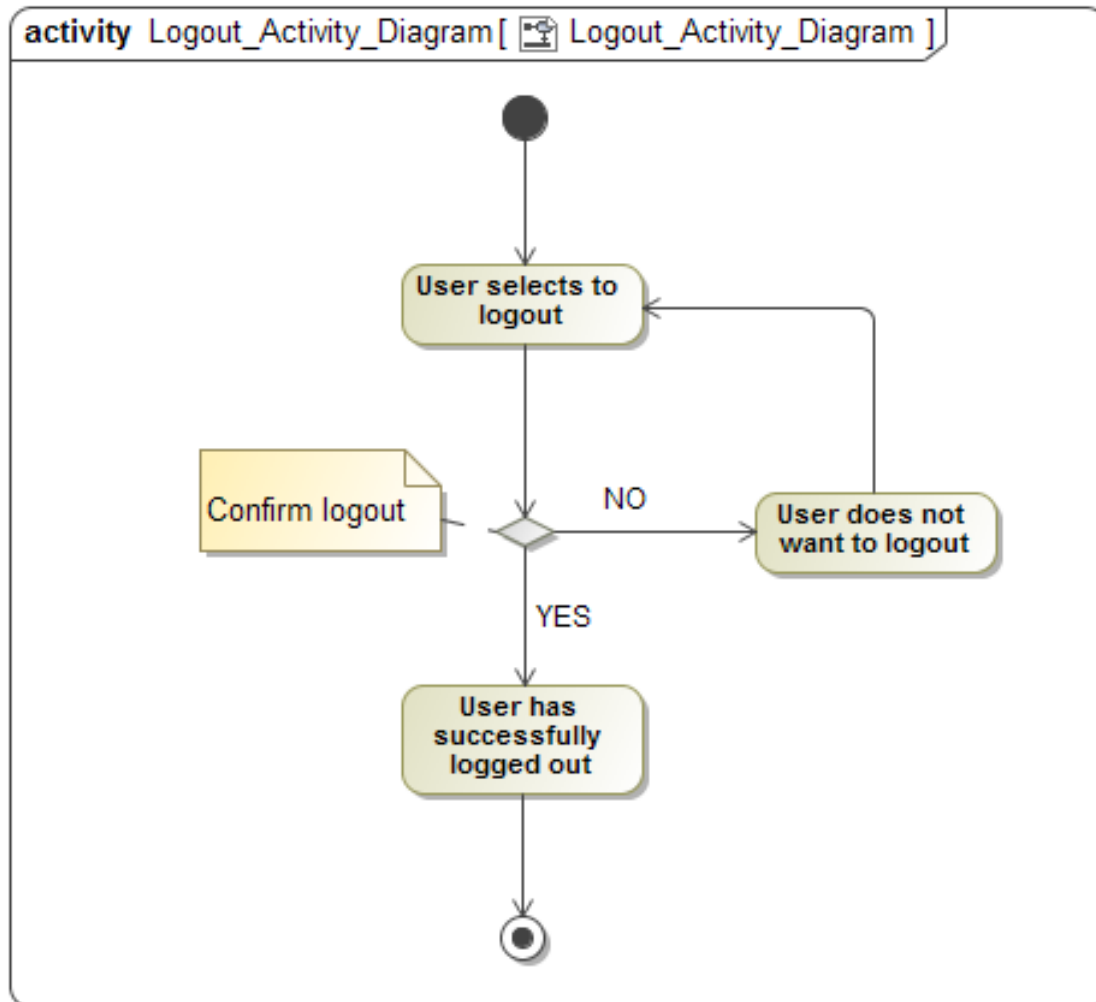### 5.4.2 Database Connection

activity Logout_Activity_Diagram[ databaseConnection_Activity_Diagram ]

- Create instance of connection → Create instance to execute query → Open connection → Execute query on database → Query complete → Close connection → (end)

### 5.4.3   Login



activity Login_Activity_Diagram [ Login_Activity_Diagram ]

Login

Login using existing details          YES          NO          Register

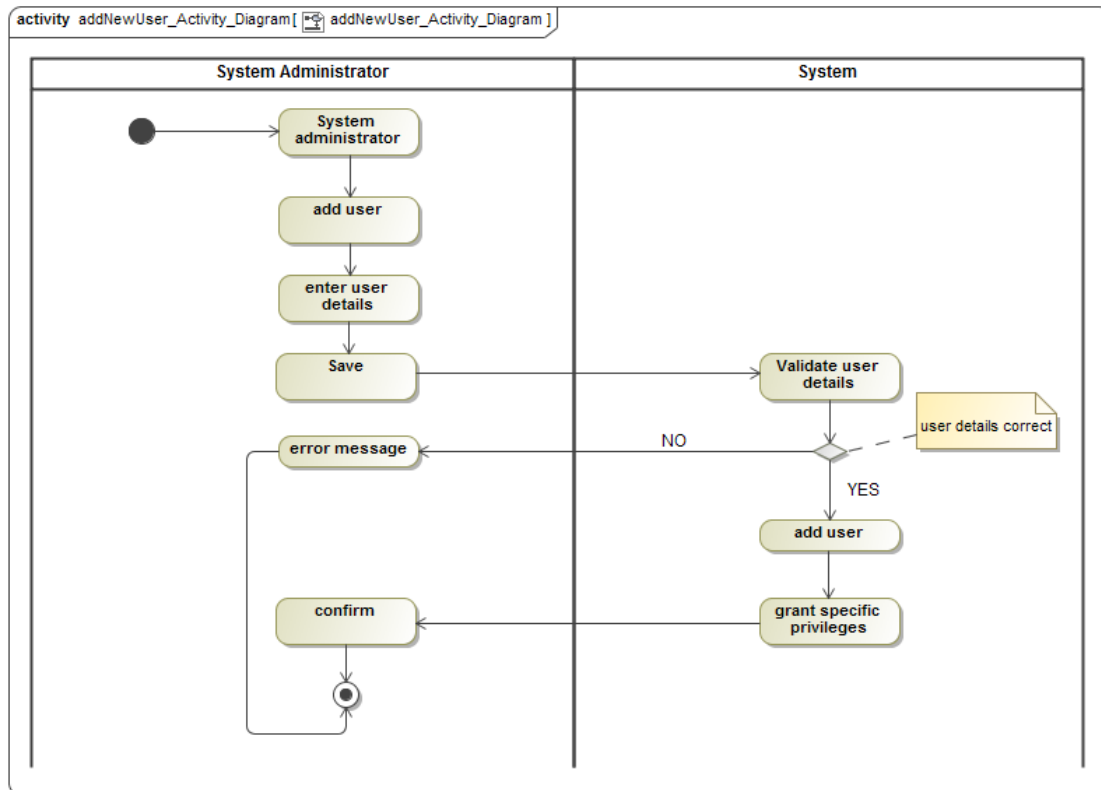Existing User

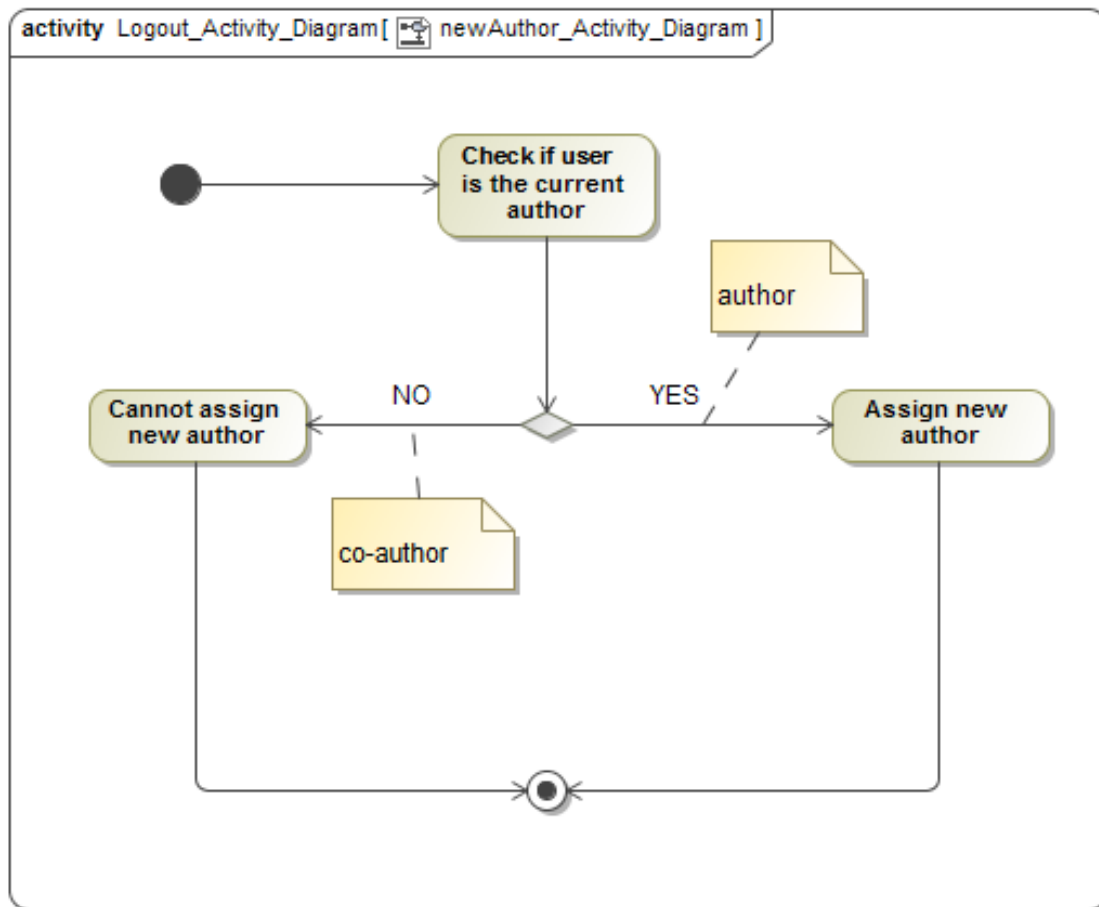User in system          NO

YES

logged into system
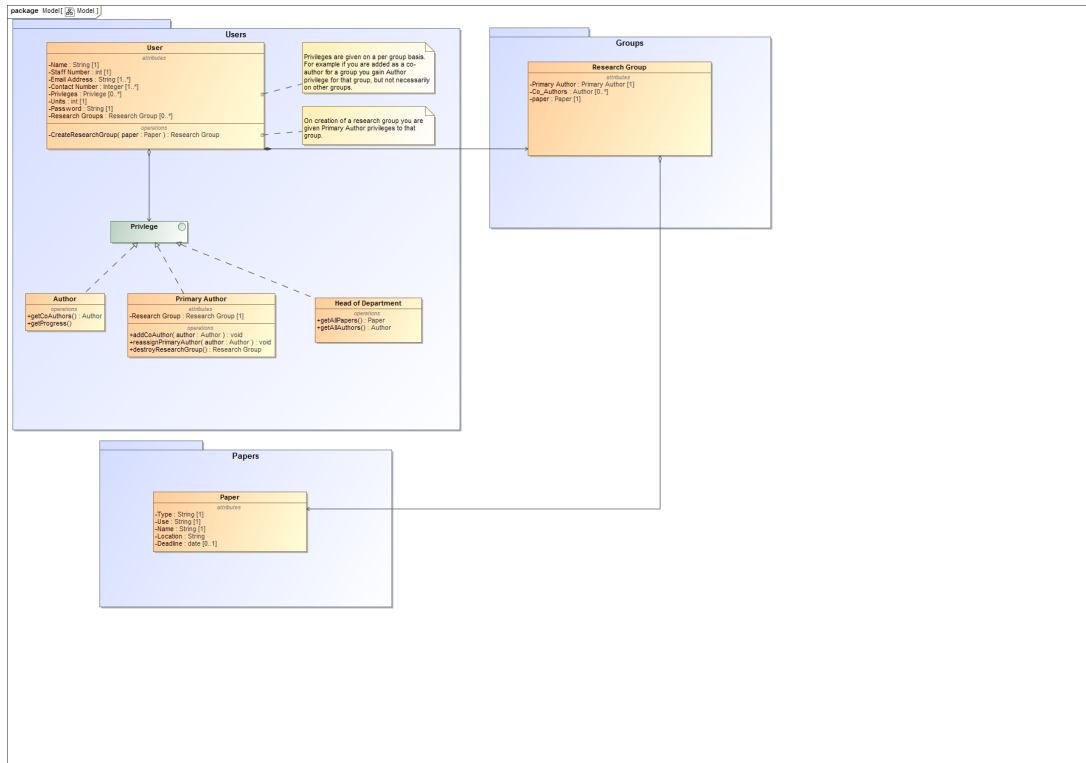
### 5.4.4 Logout

### 5.4.5   add new User

### 5.4.6 New Author

### 5.5   Domain Model



## 6   Open Issues

- Implement a GUI that will make the navigation of the system easier

- Have a chat service that exists within the scope of each research document

- Colour code the status of each document for easier viewing

- Closer to the deadline a pop up should display a message informing the user time is running out

- Give the user the option to display whether they're online or not

# References

[1] Mrs Vreda Pieterse. Cos 301 mini project: Client specification. COS 301 lecture notes and template documents via the Computer Science website, February 2016. Specifications also provided during COS 301 lectures at the University Of Pretoria.