

Assignment 1: Software Requirements  
Specification and Technology Neutral  
Process Design  
COS 301 Team Alpha Project  
Version 1.0

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*<https://github.com/AvinashSingh786/COS301-Alpha.git>*

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# **1 Introduction**

This document defines the Software Requirements Specification and Technology Neutral Process Design for COS 301 Team Alpha. The Computer Science Department has expressed a need for the creation of a system, which can allow researchers to keep track of publications which they are currently working on, or have already published.

The aim of this project is to follow a structured software development process in order to produce a product which provides the client with all the required functionality in an elegantly designed and built product. A collaborative and co-operative approach is required between all stakeholders who are involved in this project.

The information, specifications, and diagrams within this document are presented in order to provide testable requirements which correlate to the client's needs.

# **2 Vision**

The client for this project, Ms. Vreda Pieterse who is a member of the Department of Computer Science at the University of Pretoria, has solicited us to develop a system. The purpose of this system is to record and oversee all publications of staff members or research groups, within the Department of Computer Science. The system will assist the Head of Department to track the progress on any papers which are in the process of being written; as well as determining whether or not a staff member is under performing thus allowing the Head of Department the opportunity to provide advice to these staff members.

# **3 Background**

## **3.1 The client's problem**

The client has solicited us to develop a system that has specific usability goals, as well as certain user-experience goals. Currently, the Department of Computer Science does not have a system with which to monitor the progress of staff member's publications, nor to keep track of how many publications an author is working on. Furthermore, it is necessary to determine which publications will be presented at different conferences, as well as the reporting capabilities, and the ability to remind users of deadlines. The system should provide all these requirements in a secure, flexible and intuitive manner.

## **3.2 Future business/research opportunities**

It is desired that this system will encourage authors to collaborate with other authors on similar topics and to expand the users base knowledge of ongoing research projects.

## 4 Architecture Requirements

This section will be expanded on and developed further in the next phase of the project design and will be mentioned only briefly here.

### 4.1 Access Channel Requirements

As it is possible that the system may have concurrent users, it is favourable that there be interfaces such as a web application or website, as well as a mobile platform applications for the various different mobile devices through which the system can be accessed.

### 4.2 Quality Requirements

Specify and quantify each of the quality requirements which are relevant to the system

- Performance - How well the system can cope with extreme load.
- Security - Minimising the possibility of leaking information, maintaining data integrity, and avoiding session hijacking.
- Maintainability - Can the system be managed without downtime.
- Scalability - Can the system be used for large amount of users without it affecting performance.
- Efficiency - Can the system be optimized to produce faster and better results.
- Flexibility - Can the system be easily changed or modified.
- Reliability - Is the system able to cope with the load in order to provide constant access, ensure the system is always active and can provide all functionality.
- Integrability - Will the system be able to integrate with other technologies.
- User Friendly - Does a user easily understand how to use the system.
- Concurrency - Can multiple users perform actions at the same time.
- Low Cost, Reduced data usage - Is it suitable for users with low budget and capped Internet.
- Updatability - Can the system have version updates to introduce new features or functionality whilst maintaining old data.

### 4.3 Integration Requirements

This section specifies any integration requirements for any external systems. This may include

- The different Web protocols used.
- API - UML Interfaces.
- Google Calender and Email integration.
- Mobile Scalability and functionality Integration.
- Venue and Publication integration.

### 4.4 Architecture Constraints

This specifies any constraints, the client may require, to be placed on the system architecture. Such constraints may be:

- HTML (Hypertext Markup Language)
- AJAX (Asynchronous JavaScript and XML)
- JavaEE (Java Platform Enterprise Edition)
- JavaScript (Functionality to HTML)
- PHP (Server Side Scripting)
- MySQL (Database Manager)
- Android (Mobile Devices)
- IOS (Mobile Devices)
- Apache (Web Server)
- Linux/Windows (Operating System)

## 5 Functional Requirements and Application Design

This section discusses the application functionality required by users.

### 5.1 Use Case Prioritization

#### 5.1.1 User Login

**Description:** A user is required to log into the system before the user can make use of any functionality.

**Prioritisation:** Critical

##### Pre-conditions

- A user must have a connection to the server.
- A user must be registered as a user by a person with HOD or Admin permission.
- The user must enter the correct information in order for the authentication to be successful.

##### Post-conditions

- The user has specific access to the server on which all data is stored, i.e. add/edit authors and search for authors
- The user is able to use all the user functionality provided by the system
- The user may log out of the system when they wish to.

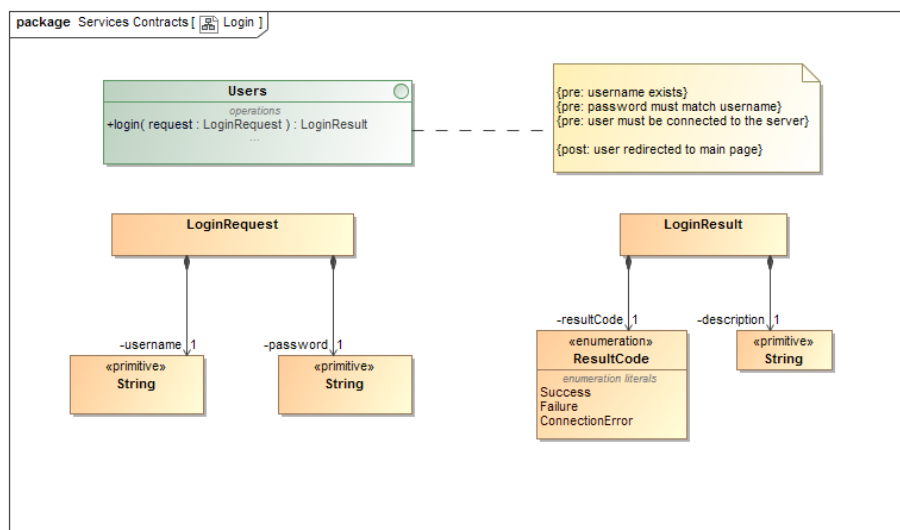


Figure 1: Service Contract: User Login

### 5.1.2 User Registration

**Description:** In order to be able to log into the system and make use of the functionality provided by the system the user must be registered on the system.

**Prioritisation:** Critical

#### Pre-conditions

- The user must be part of the staff of the Computer Science Department of the University of Pretoria.
- The administrator or HOD of the system must have registered the user on the system.
- The user must decide on their login credentials.

#### Post-conditions

- The user's login information is securely stored in the system database.
- The user can log into the system.

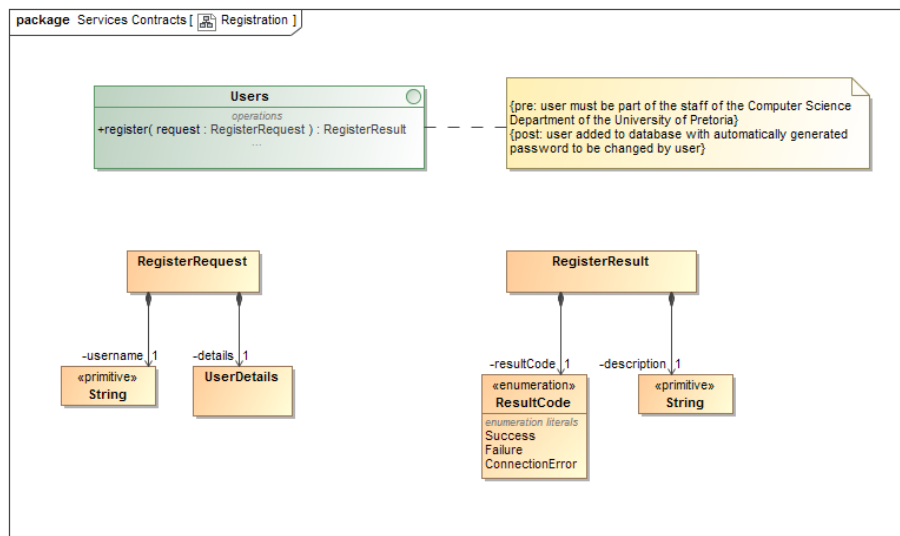


Figure 2: Service Contract: User Registration

### 5.1.3 Update User

**Description:** Personal details as well as log in credentials can be changed if and when necessary.

**Prioritisation:** Important

#### Pre-conditions

- The administrator or HOD must be logged into the system.
- The user to be updated must already exist in the system.
- The administrator or HOD must have the new information.

#### Post-conditions

- The user's information is updated on the system's database.

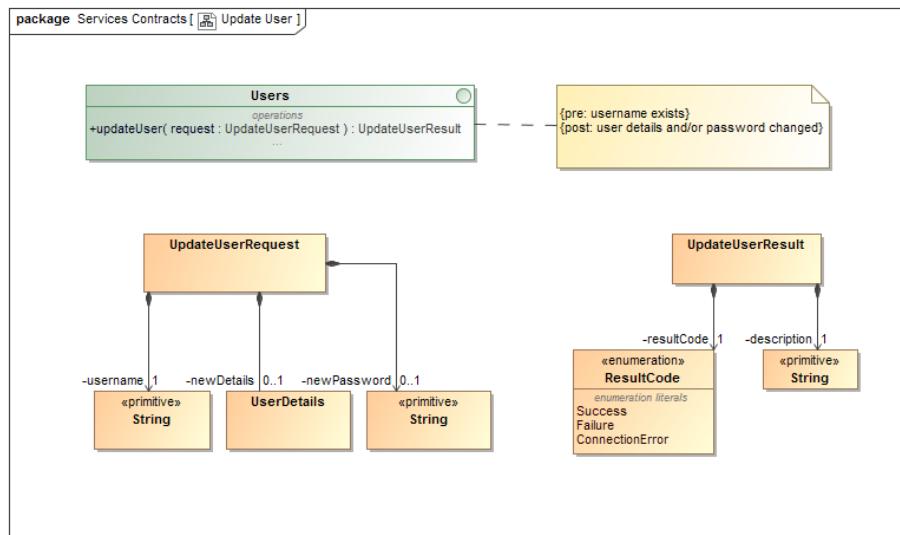


Figure 3: Service Contract: Update User



#### 5.1.4 Remove User

**Description:** Should a user no longer belong to the Department of Computer Science the person should be removed from the system.

**Prioritisation:** Important

##### Pre-conditions

- The person should be a user on the system.
- The person should no longer belong to the staff of the Department of Computer Science.
- The administrator or HOD must be the logged in.

##### Post-conditions

- The person is removed from the system's database.
- The person can no longer gain access to the system.
- The person history still remains in the log file.

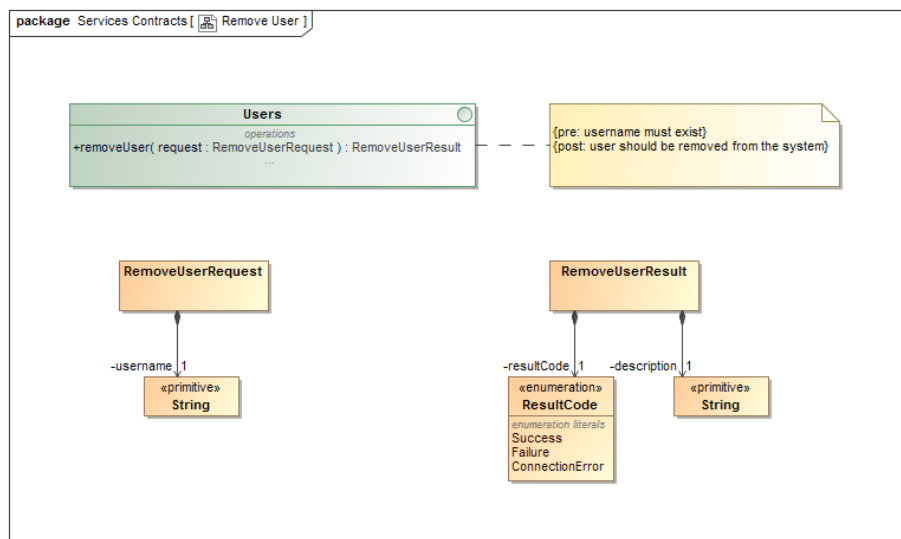


Figure 4: Service Contract: Remove User

### 5.1.5 Create Publication

**Description:** Adding a paper to the system

**Prioritisation:** Critical

#### Pre-conditions

- The user(may be the administrator or HOD) should be logged into the system.
- The user, if not the administrator or HOD, must be a contributor to the paper.
- All authors who contributed to the paper should be available on the system.

#### Post-conditions

- The paper is added to the system

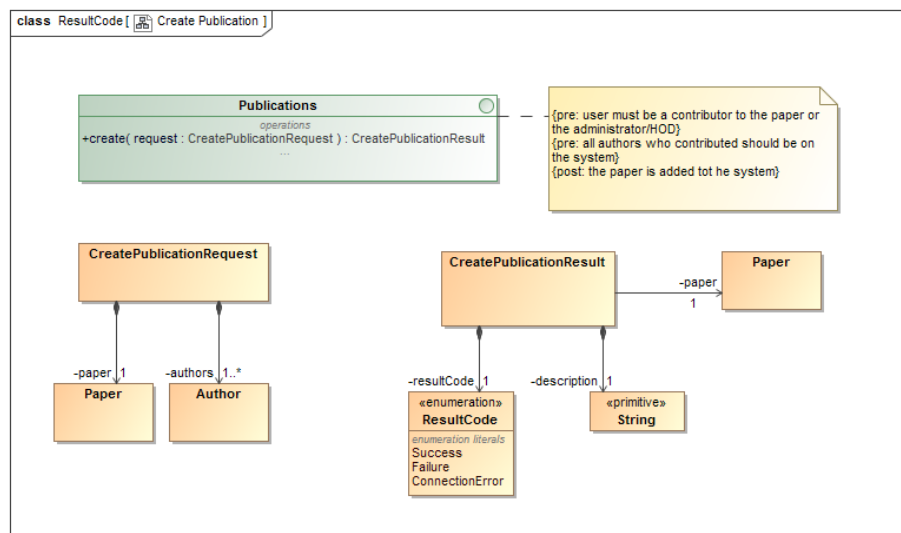


Figure 5: Service Contract: Create Publication

### 5.1.6 Update Publication

**Description:** Allows a user/administrator/HOD to change a publication's meta-data

**Prioritisation:** Critical

#### Pre-conditions

- The user(may be the administrator or HOD) should be logged into the system.
- The user, if not the administrator or HOD, must be a contributor to the paper.
- The paper must already be in the system.

#### Post-conditions

- The paper's meta-data is updated

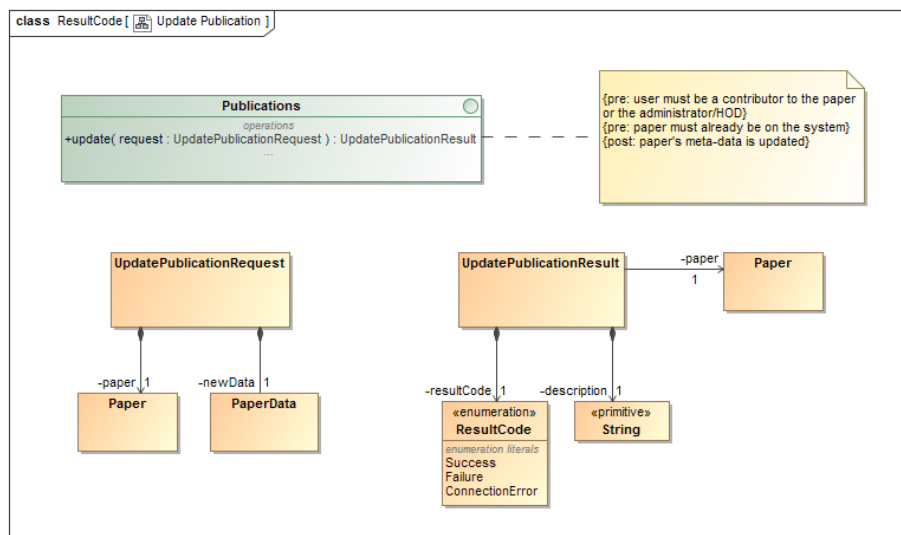


Figure 6: Service Contract: Update Publication

### 5.1.7 View Publication

**Description:** Allows a user/administrator/HOD to view the meta-data of a paper that lies within their permissions

**Prioritisation:** Important

#### Pre-conditions

- The user(may be the administrator or HOD) should be logged into the system.
- The user - if not the administrator, HOD or research leader - must be a contributor to the paper.
- The paper must already be in the system.

#### Post-conditions

- The paper's meta-data is displayed to the user

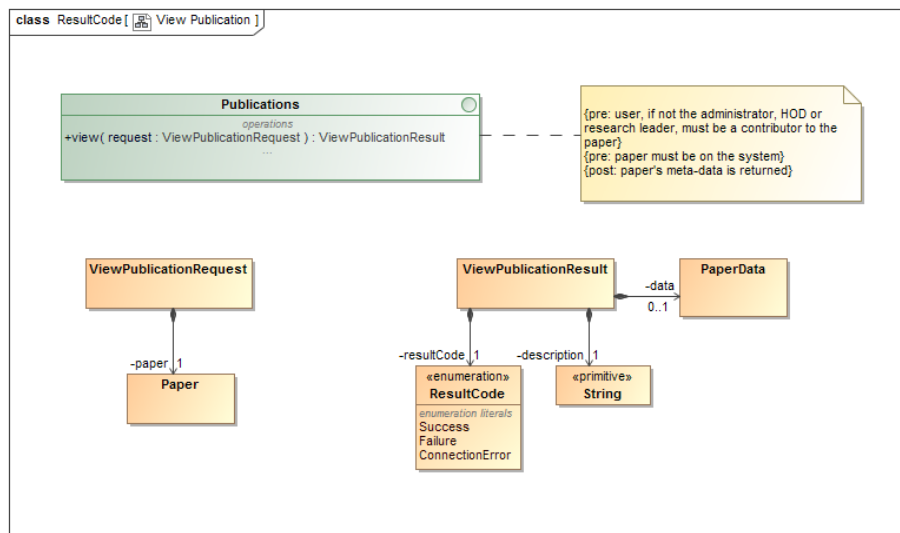


Figure 7: Service Contract: View Publication

### 5.1.8 Add Publication Type

**Description:** Allows the administrator or HOD to add a publication type

**Prioritisation:** Important

#### Pre-conditions

- The user(must be the administrator or HOD) should be logged into the system.
- The publication type to add must not already be in the system.

#### Post-conditions

- The new publication type is added to the system.

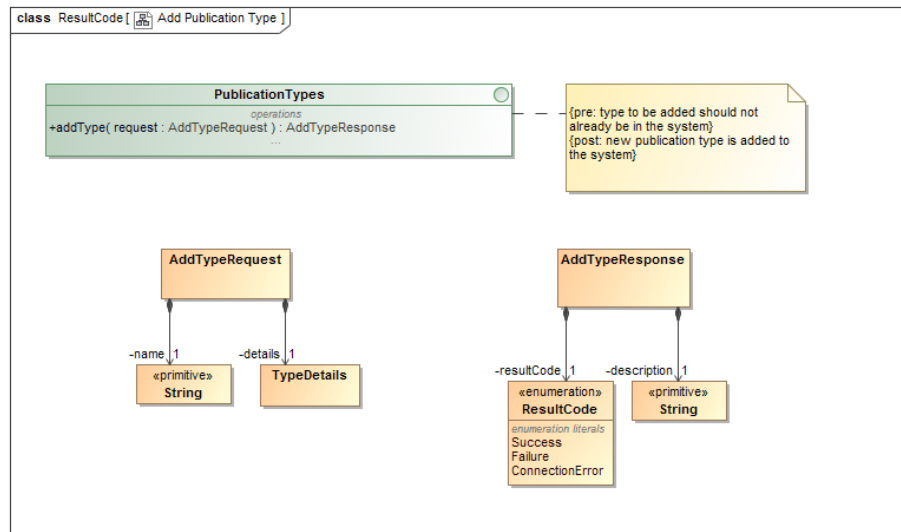


Figure 8: Service Contract: Add Publication

### 5.1.9 Update Publication Type

**Description:** Allows the administrator or HOD to update a publication type's details

**Prioritisation:** Important

#### Pre-conditions

- The user(must be the administrator or HOD) should be logged into the system.
- The user - if not the administrator, HOD or research leader - must be a contributor to the paper.
- The publication type to be updated must already be in the system.

#### Post-conditions

- The selected publication type will be updated with the new information.

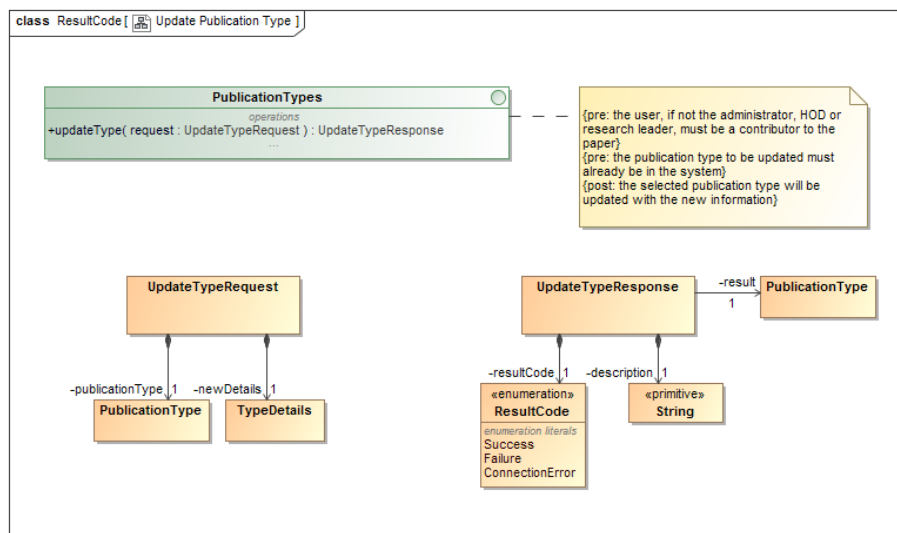


Figure 9: Service Contract: Update Publication

### 5.1.10 Add Reminder

**Description:** Allows the user to create a reminder for the deadline of the publication.

**Prioritisation:** Nice-To-Have.

#### Pre-conditions

- The user (can be the HOD) should be logged into the system.
- The user must be a contributor to the paper.
- The publication must already be in the system.

#### Post-conditions

- A reminder via Mail or Calendar will be set with the selected publication and deadline.

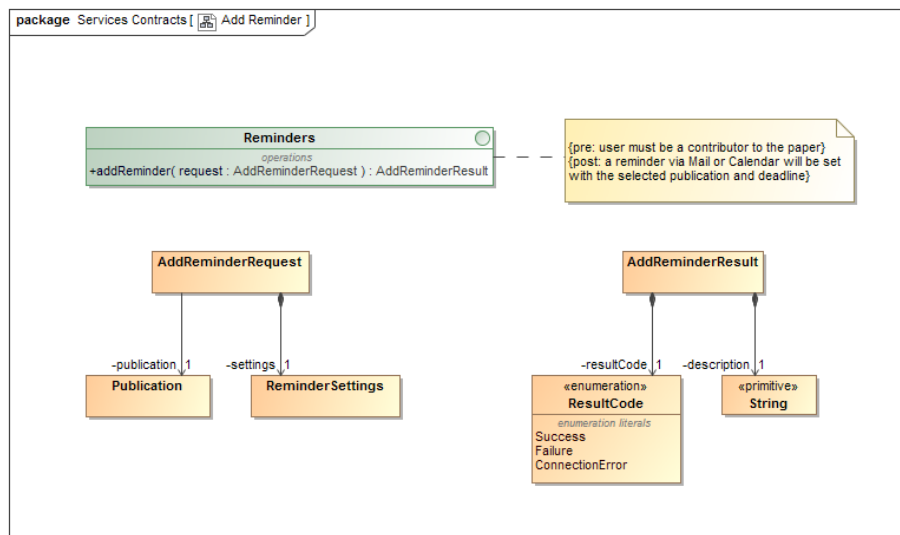


Figure 10: Service Contract: Add Reminder

### 5.1.11 Create Research Group

**Description:** Allows the administrator or HOD to create a new Research Group

**Prioritisation:** Critical

#### Pre-conditions

- The user(must be the administrator or HOD) should be logged into the system.
- The Research Group you wish to create must not already be in the system.

#### Post-conditions

- The Research Group will be created and stored in the database.
- Users will be able to join the Research Group.
- Research Leader will be able to see all Publications made by the Research Group's members.

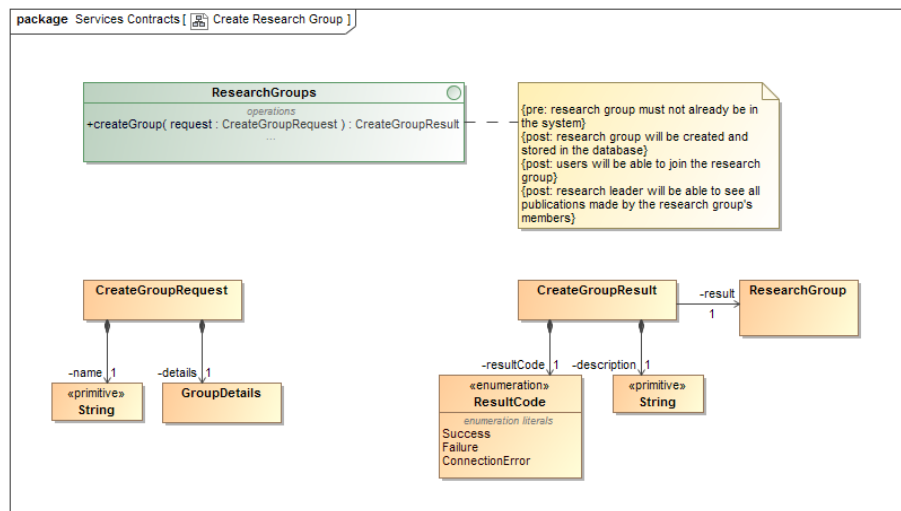


Figure 11: Service Contract: Create Research Group



### 5.1.12 View Research Group

**Description:** View the details of a Research Group

**Prioritisation:** Nice-To-Have

#### Pre-conditions

- The user(must be the administrator or HOD) should be logged into the system.
- The Research Group must already exist in the database.

#### Post-conditions

- The user will be able to view the details of the Research Group.

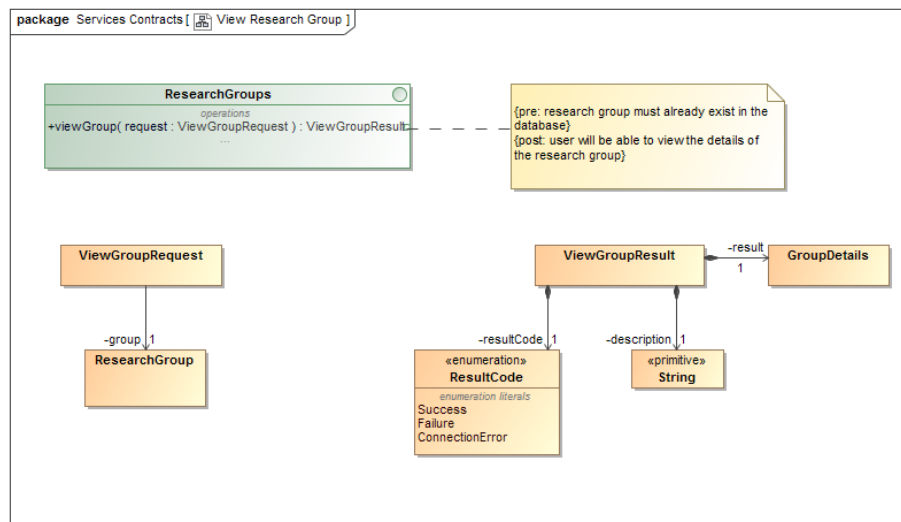


Figure 12: Service Contract: View Research Group

### 5.1.13 Update Research Group

**Description:** Allows the administrator or HOD to update an existing Research Group

**Prioritisation:** Important

#### Pre-conditions

- The user(must be the administrator or HOD) should be logged into the system.
- The Research Group must already exist in the database.

#### Post-conditions

- The user will be able to edit and save the new information entered.

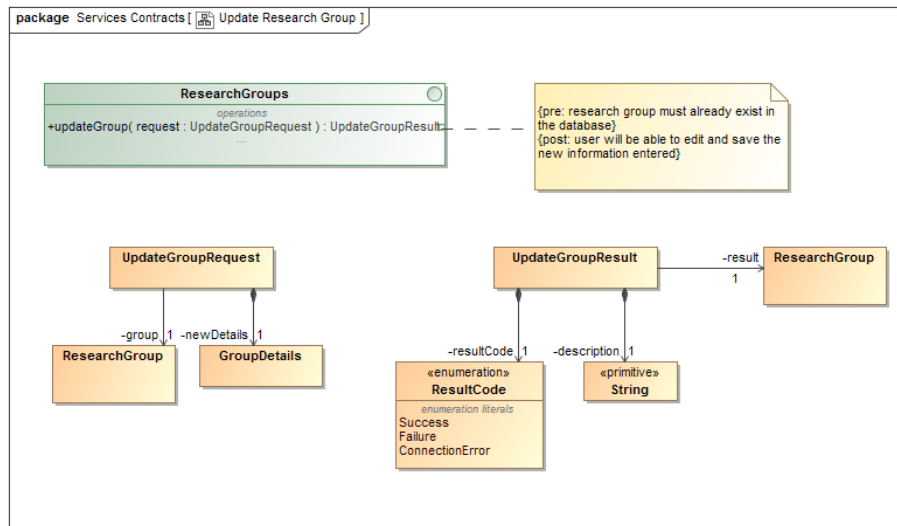


Figure 13: Service Contract: Update Research Group

#### 5.1.14 Remove Research Group

**Description:** Allows the administrator or HOD to remove an existing Research Group

**Prioritisation:** Important

##### Pre-conditions

- The user(must be the administrator or HOD) should be logged into the system.
- The Research Group must already exist in the database.
- The Research Group must have no members in it and no Research Leader.

##### Post-conditions

- The user will be able to remove the Research Group from the database.

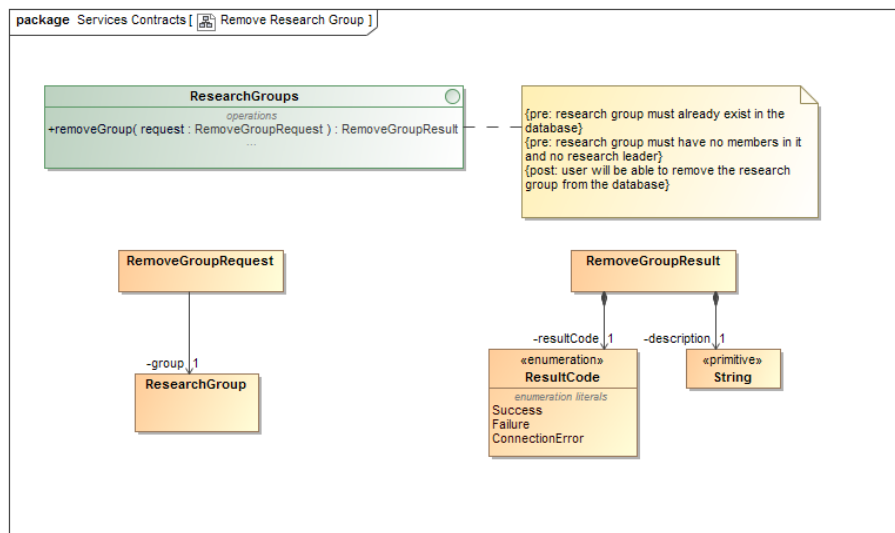


Figure 14: Service Contract: Remove Research Group

### 5.1.15 Create Author

**Description:** Allows the user to create a new Author

**Prioritisation:** Critical

#### Pre-conditions

- The user should be logged into the system.
- The Author must not already exist in the database.

#### Post-conditions

- The user will be able to create a new Author and save him/her in the database.

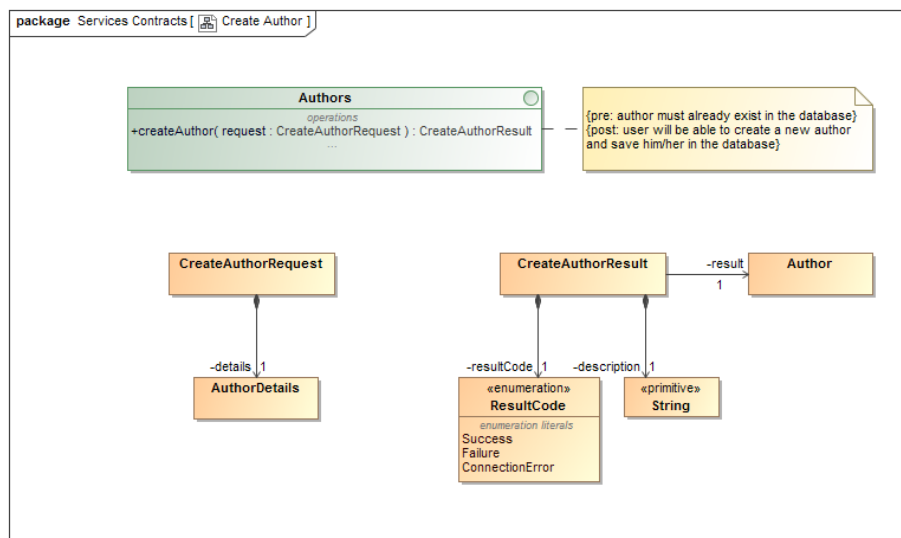


Figure 15: Service Contract: Create Author

### 5.1.16 Update Author

**Description:** Allows the user to update an existing Author

**Prioritisation:** Important

#### Pre-conditions

- The user should be logged into the system.
- The Author must already exist in the database.

#### Post-conditions

- The user will be able to edit and save the new information entered.

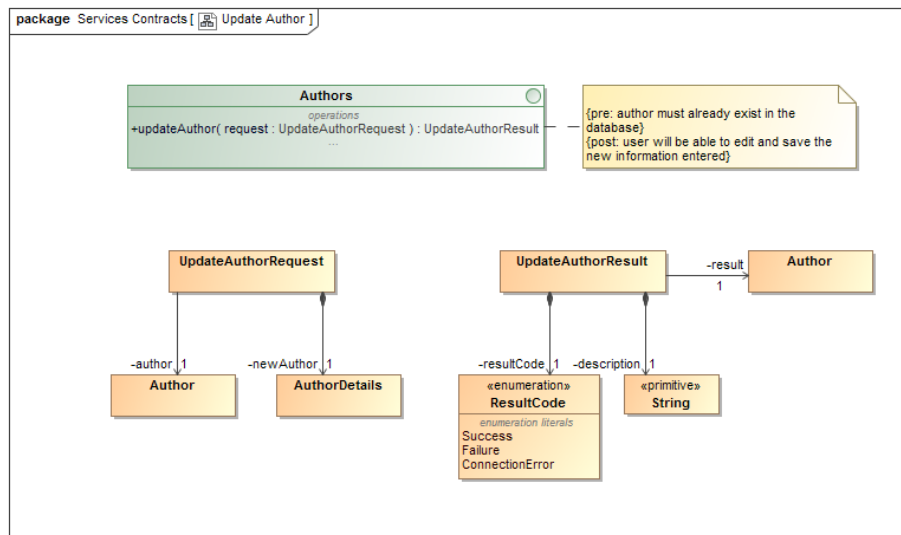


Figure 16: Service Contract: Update Author

### 5.1.17 Generate Report

**Description:** Allows the user generate a report based on certain data

**Prioritisation:** Nice to have

#### Pre-conditions

- The user should be logged into the system.
- There should be existing data in the system's database

#### Post-conditions

- The system will generate a report based on certain criteria and make it visible to the user

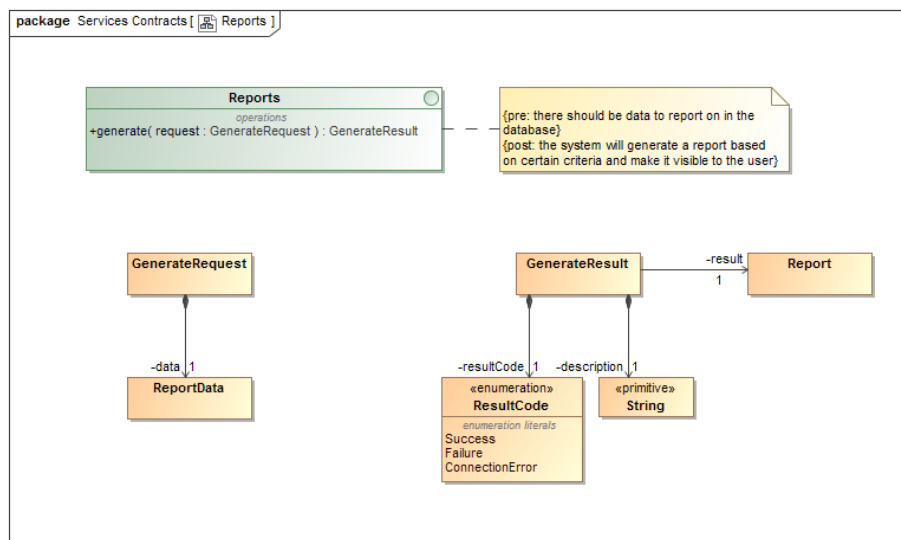


Figure 17: Service Contract: Generate Report

## **5.2 Use Case/Services Contracts**

### **5.3 Required Functionality**

#### **5.3.1 User-Research System interaction**

**Description:** The type of user indicates what privileges that user has in the Research system

##### **Normal-user**

- A normal user may log in to the system if registered on the system.
- A normal user may add publications to the system.
- A normal user must be an author of a publication should they want to add it to the system.
- A normal user may add authors to a publication.
- A normal user may change authors in a publication.
- A normal user may add a publication to a conference.
- A normal user may only view their own publications.

##### **Head of Department**

- The head of department may log in to the system.
- The head of department may add/edit/remove a user.
- The head of department may add/edit/remove an author.
- The head of department may add publication/edit a publication.
- The head of department may be an author on a publication.
- The head of department may add authors to a publication.
- The head of department may add/remove publications for conferences.
- The head of department may view all publications on the system.

##### **Admin**

- Admin users may log in to the system.
- Admin users may add/remove/edit users.
- Admin users may add/edit publications.
- Admin users may not be an author to any publication on the system.
- Admin users may add authors to a publication.
- Admin users may change authors to a publication.

- Admin users may add/remove publications to conferences.
- Admin users may view all publications on the system.

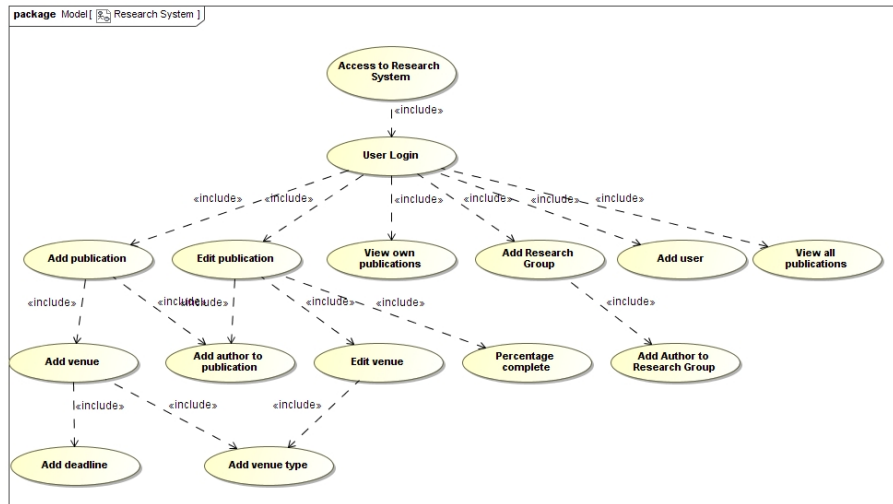


Figure 18: Functional Requirements: Overview of Research System

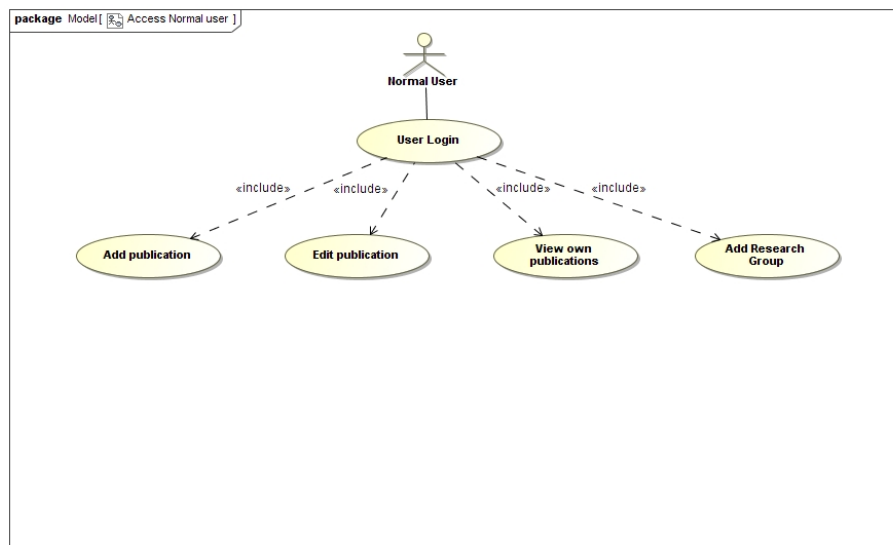


Figure 19: Functional Requirements: Normal user access privileges



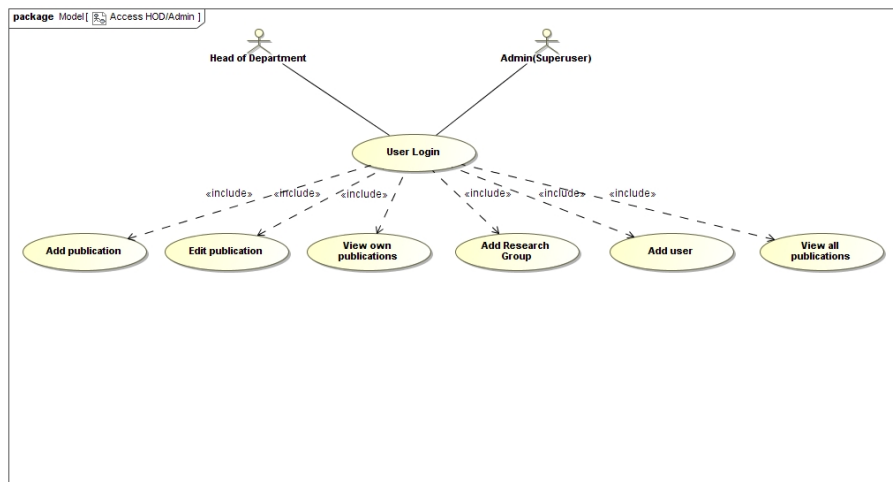


Figure 20: Functional Requirements: Superuser(HOD and admin) access privileges

## 5.4 Process Specification

This section contains UML activity diagrams that illustrate the sequences that will be followed for various use case scenarios.

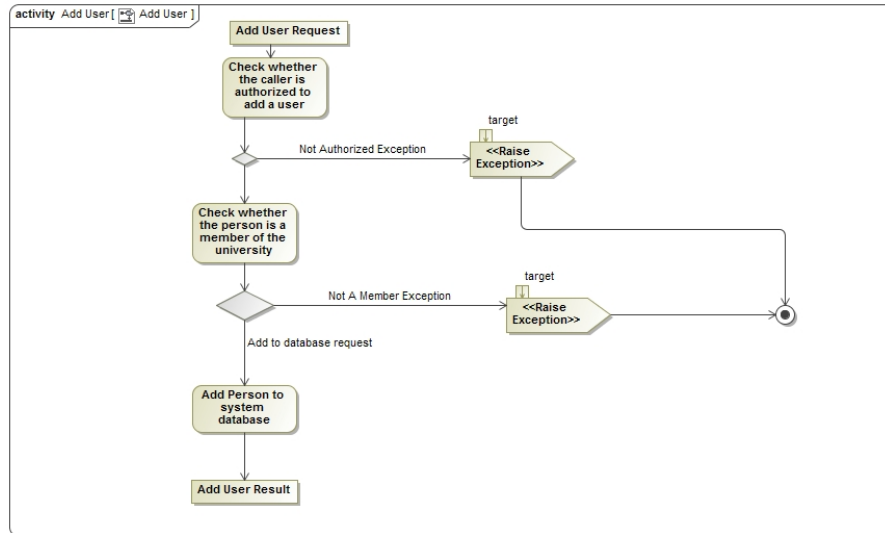


Figure 21: Process Specification: Adding A User

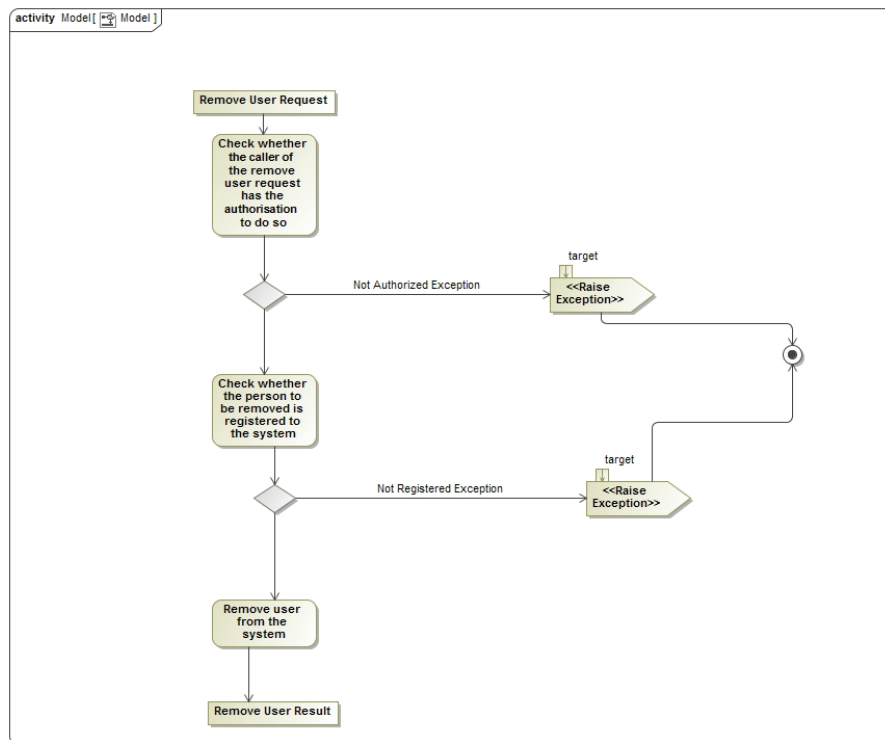


Figure 22: Process Specification: Removing A User

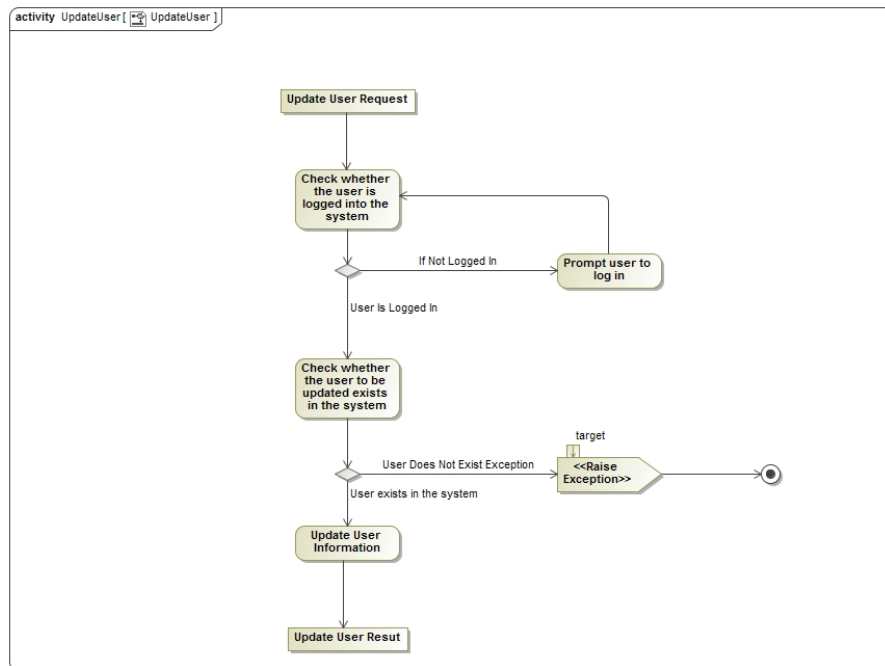


Figure 23: Process Specification: Update A User

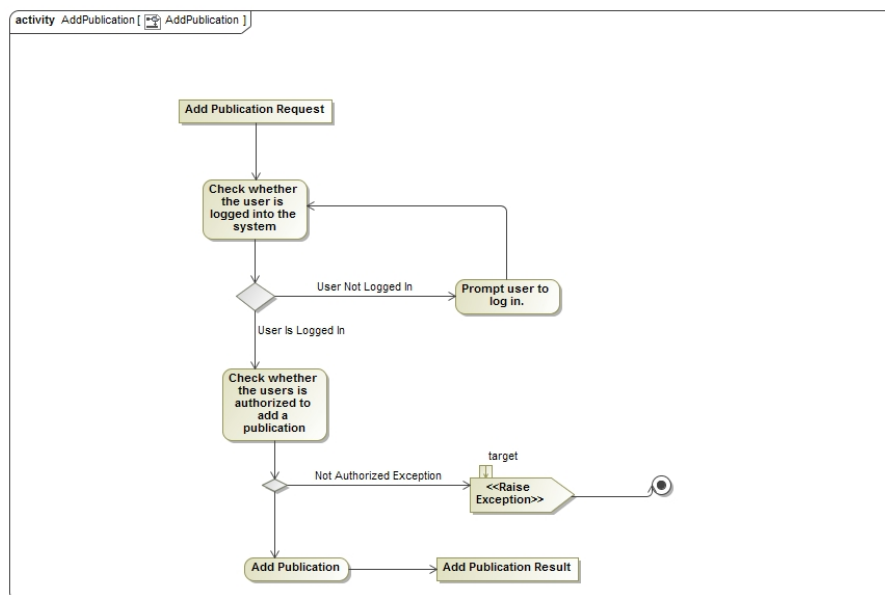


Figure 24: Process Specification: Adding A Publication

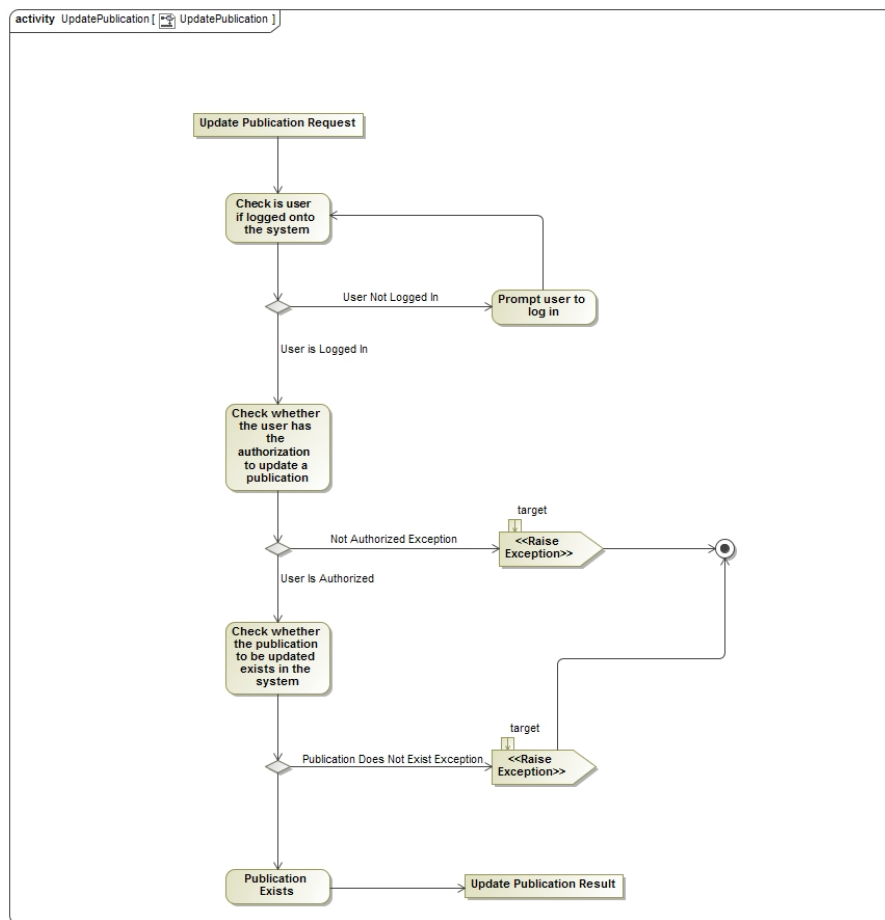


Figure 25: Process Specification: Update A Publication

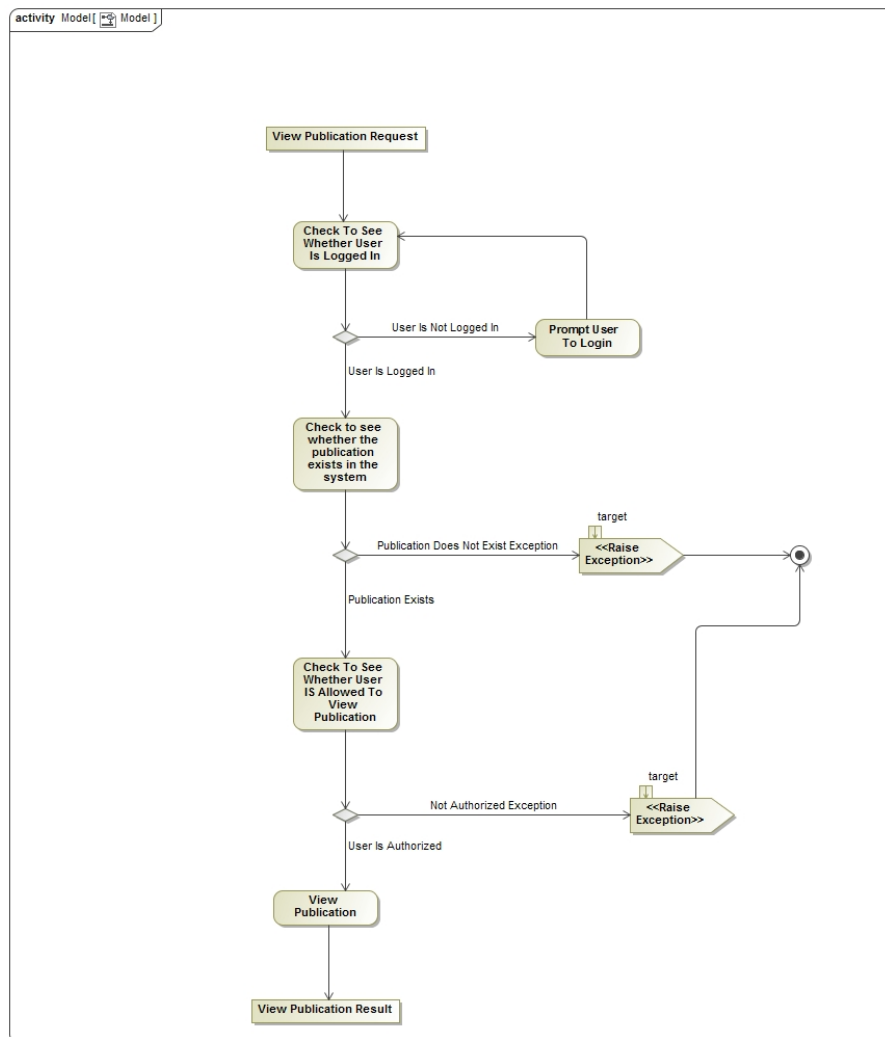


Figure 26: Process Specification: View A Publication

## 5.5 Domain Model

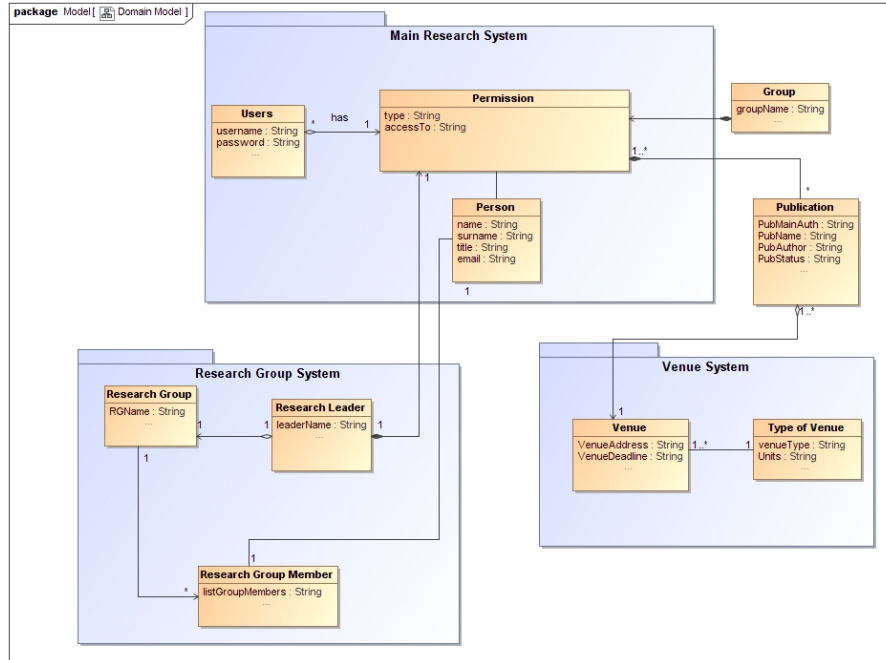


Figure 27: Domain Model of Research System

## 6 Open Issues

This section deals with issues that still need to be clarified, specified, assumed or have been discovered to include inconsistencies in the requirements, comprising of the following issues:

- Will a server be provided?
- Should the HOD be a separate entity or fall within the Admin entity?
- To where does the publication go to be reviewed?
- Should the reminder system be via Mail or Calendar notification?
- It is assumed that the Venue will have a deadline attached.