ELEC3609 Deliverable 1
Software Requirements Specification

LECREC

Alexander Woo Hyun Jung 310250811
Khanh Cao Quoc Nguyen 311253865
Kelvin D'Amore 430515051
Martin Groen 311182291

Software Requirements Specification

Contents

1 Introduction **3**
1.1 Purpose . . . 3
1.2 Scope . . . 3
1.3 Definitions . . . 3
1.4 References . . . 3
1.5 Overview . . . 3

2 General Description **4**
2.1 Product Perspective . . . 4
2.2 Product Functions . . . 4
2.2.1 User Accounts . . . 4
2.2.2 Video Discussion Threads . . . 5
2.2.3 Upload System . . . 5
2.2.4 Notification System . . . 5
2.2.5 Discussion Rank . . . 5
2.3 User Characteristics . . . 5
2.3.1 Student . . . 5
2.3.2 Staff . . . 5
2.3.3 Administrators . . . 6
2.4 Assumptions and Dependencies . . . 6

3 Specific Requirements **6**
3.1 Functional Requirements . . . 6
3.1.1 User Interface . . . 6
3.1.2 User Account . . . 6
3.1.3 Account Editing . . . 7
3.1.4 Lecture Upload . . . 7
3.1.5 Lecture Video Player . . . 7
3.1.6 Discussion Thread . . . 8
3.1.7 Course Study System . . . 8
3.1.8 Notification System . . . 8
3.1.9 Community Thread . . . 9
3.2 Design Constraints . . . 9
3.3 Non-functional Requirements . . . 9
3.3.1 Response Time . . . 9
3.3.2 Performance . . . 9
3.3.3 Security . . . 9
3.3.4 Reliability and Availability . . . 10
3.3.5 Maintainability . . . 10

4 Team contributions **10**

5 Appendix **11**

1 Introduction

1.1 Purpose

The main focus of this Software Requirement Specification (SRS) is to outline and describe the main features, functions and requirements of the LECREC lecture recording system to ensure that the appropriate scope is adequately understood among the stakeholders of the project and can be utilised as part of the development team of the system. As such the document will also discuss the constraints, intended use, assumptions, expected definitions and dependencies involved in the design of the project to ensure that appropriate functional and non-functional requirements are understood appropriately.

1.2 Scope

This document discusses the requirements and functions of the LECREC system including details of user interface, expected design outcomes and assumptions. The specification applies to all stakeholders of the project with the main view on the development team specifically to obtain the expected internet platform outcome. The document does not discuss test cases of the system, its future implementation or how the system is expected work with mobile devices. It will cover the technical design and functions expected within the system instead.

1.3 Definitions

Term	Definition
LECREC	The main project implementation name, abbreviated from lecture recording.
Community Thread	A thread created in the community thread page discussing the lecture video on its own.
Discussion Thread	A thread defined for a timed section of a recorded lecture video.
Staff	A person who is running the subject and uploading the lectures.
Administrator	A person with full access to the LECREC system.
Student	A person who watches lectures and creates and answers discussion threads.

1.4 References

IEEE Recommended Practice for Software Requirements Specifications. New York, NY: Institute of Electrical and Electronics Engineers, 1998. Web.

1.5 Overview

The SRS will outline the main software requirements of the complete LECREC system. The first section outlines the importance of this software requirement document and its intended use for the LECREC project. Section 2 discusses the project in detail including its perspective, functions and user characteristics. Section 3 outlines the main functional and non-functional requirements of the whole system in particular on how the project should be designed with the development team in mind.

2 General Description

2.1 Product Perspective

The LECREC system is designed as a complete lecture uploading and playing platform for university students with the focus of facilitation in communication and providing a system which allows for appropriate encouragement of interaction learning but utilising a discussion thread function on a simple to use and visually appealing system.

The discussion thread function will specifically utilise a video section based specific comment feature where a student can watch the lecture recording from a particular subject and during a certain point in the recording, the student can make a discussion thread, where they can ask a question, or give comments and explanations about that part of the recording. All user accounts that have access to the video will be able to see the discussion thread and learning facilitation can be increased by the use of students being able to answer people's questions, or can learn from the comments placed by a different student. Lecturers can also view which parts of the recording went well or which parts need extra clarification by students.

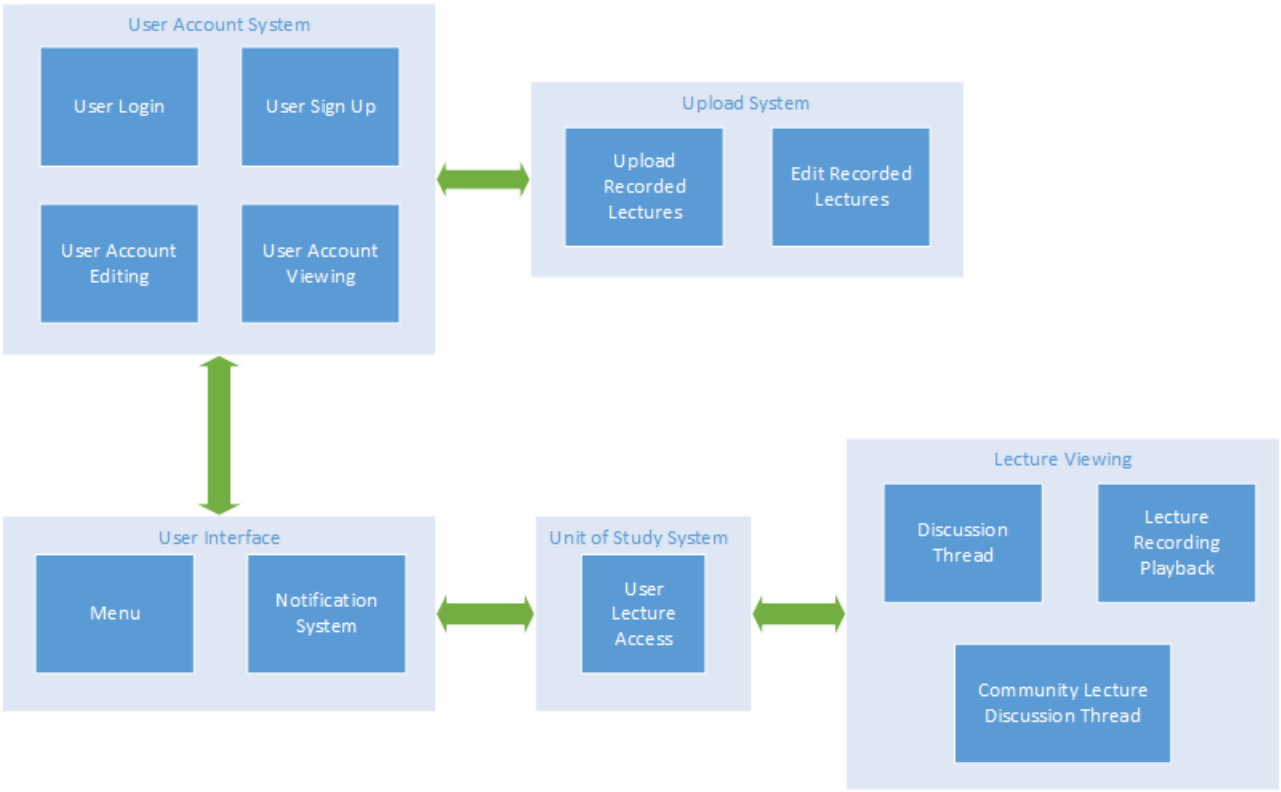

Figure 1: Block diagram

2.2 Product Functions

2.2.1 User Accounts

2.2.1.1 A user account function will be included within the LECREC system to allow for students, staff and administrators to create accounts and utilise the system. 2.2.1.2 The students will be able to use their accounts to watch video lectures, create discussion threads at certain sections on the video and reply to other

users on the system.
2.2.1.3 Staff accounts will allow for uploading of lecture recordings which is made available to the students. They can also create discussion threads and reply to students questions.
2.2.1.4 Administrator accounts will be utilised for uploading lectures, editing or deleting other user discussion threads or replies, ensuring appropriate use of the LECREC system and overall system management.

2.2.2 Video Discussion Threads

2.2.2.1 The video discussion thread outputs discussions created by users with access to the lecture recording and subject.
2.2.2.2 This thread will be seen underneath the lecture video so that users can see a comparison between the playing video and questions themselves.
2.2.2.3 These discussions allow users to ask questions, make comments or reply to other users.

2.2.3 Upload System

2.2.3.1 An upload system is designed for lecturers and moderators to place lecture recordings for a particular subject.
2.2.3.2 It allows for multiple file types and should be kept simple for users with varying computer capabilities.

2.2.4 Notification System

2.2.4.1 A notification appears next to the users name on the menu interface outputting whether someone has replied to a discussion thread you are watching.
2.2.4.2 Staff also get a notification when a new discussion thread is created so that an answer can be given quickly if a student asks a question.

2.2.5 Discussion Rank

2.2.5.1 There is a button for a users' discussion thread to add a rank to a particular comment or question.
2.2.5.2 This ranking allows for easy viewing on what students may feel are important questions or comments.

2.3 User Characteristics

2.3.1 Student

2.3.1.1 High frequency of use in watching lectures.
2.3.1.2 Wide variety in range or computer knowledge.
2.3.1.3 High frequency of use in discussion threads.
2.3.1.4 Moderate frequency of notification system.
2.3.1.5 Will utilise discussion thread for questions and read other comments.

2.3.2 Staff

2.3.2.1 Wide variety of computer knowledge.
2.3.2.2 High frequency of recording upload system.
2.3.2.3 High frequency of notification system.
2.3.2.4 Will be the main user of uploading lecture content to make available for student users.
2.3.2.5 Will check threads for comments and answer questions.

2.3.3 Administrators

2.3.3.1 Will check threads for answering questions.
2.3.3.2 High frequency of discussion thread usage.
2.3.3.3 High frequency of comment moderation including deleting or editing other comments.
2.3.3.4 High level of computer knowledge.
2.3.3.5 Able to access user discussion threads.
2.3.3.6 Can change or edit all user accounts.
2.3.3.7 High frequency of database changes.
2.3.3.8 Low frequency of lecture watching or uploading.

2.4 Assumptions and Dependencies

2.4.1.1 It is assumed that all lecture uploads are done by a user computer as opposed to a mobile or other hardware.
2.4.1.2 Adequate and stable internet is assumed by the user themselves during lecture upload.
2.4.1.3 The system assumes that the lecture recording to be of sufficient quality to be processed by the LECREC system.
2.4.1.4 It is assumed that the lecture recording is of an adequate resolution for use and processing of the LECREC system.
2.4.1.5 It is assumed that all users have a name and email address that they can utilise for sign in of the system.

3 Specific Requirements

3.1 Functional Requirements

3.1.1 User Interface

The user interface requirement involves the flow of which the LECREC platform should be made available. This includes the simplicity of the site, ease of use and colour availability.

3.1.1.1 The interface will always make available the main page through the LECREC title header.
3.1.1.2 A consistent colour display will be utilised within the interface so that the flow of the system encourages interaction.
3.1.1.3 A simple and effective interface will be strived for during development so that a large range of audience will be able to use the platform easily.
3.1.1.4 A menu strip will be used at the top of the screen which will house the main functions including user account operations, home page or the lecture recording page.
3.1.1.5 Font choice should be chosen that is clear and easy to view by the typical audience of the LECREC system and conform to typical website standards and as such a clear font should be utilised.
3.1.1.6 Black or white font colour should be utilised to make text easily viewable against a contrasting background colour.

3.1.2 User Account

The user account section involves the use of the web platform by the user including the lecturer, students, administrator and moderators. This includes account editing, password and email requirements and account type access.

3.1.2.1 The system will allow a user to sign up into the web platform.
3.1.2.2 The sign up system will require: a name, email, password and password confirmation to sign up to the LECREC platform.
3.1.2.3 Incorrect email forms (not $*@*.*$) cannot be utilised for sign up into the system.
3.1.2.4 A user cannot sign up to an account with an email already in use with the LECREC platform.
3.1.2.5 Users will be able to use ASCII based non-alphabet characters utilised by student's names of different languages.
3.1.2.6 Users can only login through one main login page.
3.1.2.7 The login page will allow only users who have created an account previously to be able to login.
3.1.2.8 A login or sign up failure will show a prompt in the reason of which the failure has occurred.
3.1.2.9 Typical sign up from 3.1.2.1 will be given an account status of a student at sign up.
3.1.2.10 Lecturer and moderator accounts are given by enabling account types set by the administrator only.
3.1.2.11 A subject can be set to a lecturer or moderator by the administrator.
3.1.2.12 The administrator has access to all accounts, subjects, and functions of the LECREC system.
3.1.2.13 An administrator account can also include a lecturer account and moderator account access.
3.1.2.14 Lecturers and moderators can invite student accounts into accessing a particular subject.
3.1.2.15 A student account accessing a particular subject also gives access to its discussion thread 3.1.6 and its community thread 3.1.9.
3.1.2.16 Only lecturers and moderators accounts have access to the upload system page of a particular subject given by 3.1.2.11.

3.1.3 Account Editing

The account editing requirement deals with changing of the account, specifically within the account editing page. This includes functions such as names, passwords and emails addresses.

3.1.3.1 A user will be able to remove themselves from the system by utilising the user account editing page.
3.1.3.2 The account editing page will allow a user to be able to change their name and email address.
3.1.3.3 A user can change their password from the user account editing page.
3.1.3.4 Any account editing requires the use of the current password to ensure security when changing.

3.1.4 Lecture Upload

The lecture upload section describes the important functional requirements that are needed to ensure that video files are uploaded in a succinct and easy to use manner and that only appropriate video file types are accepted for uploading.

3.1.4.1 Video files of lectures will be able to be uploaded by staff and adminstrators.
3.1.4.2 The video upload page will display an approximate amount of time it will take for the video to be uploaded.
3.1.4.3 Only specific video file types are applicable to be uploaded which include: avi, mp4, mkv and wmv.
3.1.4.4 Lecture video files can only be uploaded from a local video file originally hosted by the user hardware.
3.1.4.5 The lecture recording should be processed on the LECREC platform to allow for appropriate quality use in the lecture video player of 3.1.4.
3.1.4.6 A lecture video will be forced to include a name of the video when uploaded.
3.1.4.7 Lecture recordings will be able to be deleted at the uploader's discretion.

3.1.5 Lecture Video Player

The lecture video player requirement list discusses the main outputs of which the player should be to ensure that the facilitation of lecture recording education is successful. This includes the appropriate features such

as time tracking, pause and replaying, along with volume options.

3.1.5.1 The video player should allow appropriate playback of the lecture when a user starts to view the lecture page.
3.1.5.2 The player size should be at maximum the width of the full screen of the browser size and the height should fit within the full screen size of the user's monitor.
3.1.5.3 The lecture video player should display a video tracking feature outputting the time of which the video is playing at.
3.1.5.4 A play/pause feature should be added to the video player so that the lecture recording can be paused and restarted at any time.
3.1.5.5 The volume of the lecture recording should be available to be changed at the user's discretion.
3.1.5.6 A full screen feature will be utilised to allow for only viewing of the lecture recording at full screen size if needed.
3.1.5.7 If the playback is faster than the user can download, the video player should buffer for a while before playing the rest of the lecture video.

3.1.6 Discussion Thread

The discussion thread outlines the output of the thread feature including the time stamped threads pertaining to certain sections of the video and the access and functions available to the users within the thread.

3.1.6.1 All users that have access to the lecture recording can create a discussion thread on it.
3.1.6.2 During any point of the lecture video a discussion button will be available to start a discussion thread by the user.
3.1.6.3 The user will be able to time stamp the start and end time of the discussion thread so that other users can view what part of the video the discussion thread pertains to.
3.1.6.4 All users that have access to the lecture video recording will also have the access to view all discussion threads the users of that video.
3.1.6.5 All users will be able to reply to the discussion threads of any other user.
3.1.6.6 A user is able to edit a comment they have made at any time that the discussion thread is available.
3.1.6.7 A remove function will be available for users to be able to remove any comments placed on a discussion thread.
3.1.6.8 A button will be made available to up vote a discussion thread or reply so that all users can view the importance of that comment.
3.1.6.9 Administrators and staff are able to delete any discussion threads or comments made within their lecture recording.

3.1.7 Course Study System

3.1.7.1 The course study page will be available to all signed up users of the LECREC system.
3.1.7.2 The course study system will have all the courses available from Sydney University of which users can be invited to gain access into.
3.1.7.3 Only the courses that the users have been given access too will be displayed on the page.
3.1.7.4 A dynamic search feature will be implemented to quickly find specific subjects.
3.1.7.5 A link will be available on each subject for users to go from the course study system page to the lecture viewing page of that subject.

3.1.8 Notification System

3.1.8.1 A notification will appear on the menu strip seen in 3.1.1.4 if a user has received a reply to their discussion thread.

3.1.8.2 The notification will be a number value showing how many replies have been made.
3.1.8.3 A lecturer will get an additional notifications stating that a person has created a discussion thread on their lecture video.
3.1.8.4 The notification count will disappear once it has been clicked on to show that the notification has been acknowledged.

3.1.9 Community Thread

3.1.9.1 The community thread page is available to all users.
3.1.9.2 A student, staff or administrator will be able to view the community thread of any subject they have access to.
3.1.9.3 Students, staff and administrators can create community thread pages based off a specific lecture.
3.1.9.4 Community thread pages can also be destroyed, edited or changed by the user creator, staff and administrators that have access to the particular subject.
3.1.9.5 Staff, administrators and students can comment on any community thread page they have subject access too.
3.1.9.6 The community thread page will allow students to embed videos onto the community subject thread page to help engage in a higher communicative learning.

3.2 Design Constraints

3.2.1.1 The system is expected to be utilised on a user's computer supporting PC, UNIX and Mac platforms.
3.2.1.2 It is expected that LECREC is compatible with major browser platforms including Firefox, Safari, Internet Explorer and Google Chrome.
3.2.1.3 It is expected that mobile devices will also be supported with the LECREC system.
3.2.1.4 The development should be undertaken utilising the Ruby on Rails platform for ease in development.
3.2.1.5 The LECREC system should ensure storing and retrieving of persistent user data.
3.2.1.6 A general knowledge of computer skills is assumed by the users of the LECREC system.

3.3 Non-functional Requirements

3.3.1 Response Time

3.3.1.1 Account editing changes including email, password and name as discussed in 3.1.2.7 and 3.1.2.3 will take a maximum of 30 minutes to take into effect.
3.3.1.2 Lecture recordings should be made available to user accounts within 15 minutes after upload has finalised.
3.3.1.3 Edited comments should be updated in the LECREC system within 30 seconds.
3.3.1.4 Any page of the LECREC system should be made available within 3 seconds.

3.3.2 Performance

3.3.2.1 Video upload rate should be at least 200kb/s by the LECREC system.
3.3.2.2 The recorded videos should be made available to users at a streaming rate of 300kb/s.

3.3.3 Security

3.3.3.1 Both an email and password is needed to ensure appropriate login into the system.
3.3.3.2 Users need to re-enter their password if they wish to edit their profile.

3.3.3.3 Administrators have access to all user profiles and can make changes if necessary.
3.3.3.4 The system should utilise secure sockets when transferring confidential user login data.
3.3.3.5 LECREC should remove any cookies containing information pertaining to the user's password after client sign out.
3.3.3.6 The system will no keep any temporary files or cookies which contain confidential information of the user on the local computer when the user signs out.
3.3.3.7 The user will be signed out of their account, if it has been left inactive over a period of 8 hours.
3.3.3.8 When a user types in their password it should never show it visually but instead utilise asterisks representing each letter of the password.
3.3.3.9 The users' passwords should be encrypted or hashed on the LECREC system to ensure security.
3.3.3.10 LECREC database must be encrypted.

3.3.4 Reliability and Availability

3.3.5.1 LECREC database should be backed up once a day utilising RAID methods.
3.3.5.2 Excess data base copies should be kept on unused computer systems with automatic switch over if a system fails.
3.3.5.3 A high band internet access will need to be implemented to ensure appropriate availability to all users of the system.
3.3.5.4 The system should be able to handle 5,000 users uploading a video at the same time.
3.3.5.5 The system should be able to deal with 20,000 students utilising the main functions of the LECREC platform at once.
3.3.5.6 Storage space should be at least a quarter free of the total storage usage of the system.

3.3.5 Maintainability

3.3.4.1 The mean time between failures (MTBF) of any part of the LECREC system should be at 98 percent of a total annual cycle.
3.3.4.2 The mean time to repair a failure (MTTR) of any part of the LECREC system should be within 24 hours.

4 Team contributions

Alexander Woo Hyun Jung

Proposal and SRS discussion. Documentation planning, write up and diagram construction.
Experience in native software development (C/C++/Python/Javascript).

Kelvin D'Amore

Proposal and SRS discussion. Documentation planning, write up and diagram construction
Minor experience in web development with very basic PHP/Javascript.

Khanh Cao Quoc Nguyen

Proposal and SRS discussion. Front-end mockup, back-end implementation brainstorming
Some experience with web development with Ruby on Rails, Django, Pylons, Spring MVC.

Martin Groen

Proposal and SRS discussion. Front-end mockup, back-end implementation brainstorming
Experience in native software development (C/C++) and some knowledge in web development using CakePHP.

5 Appendix

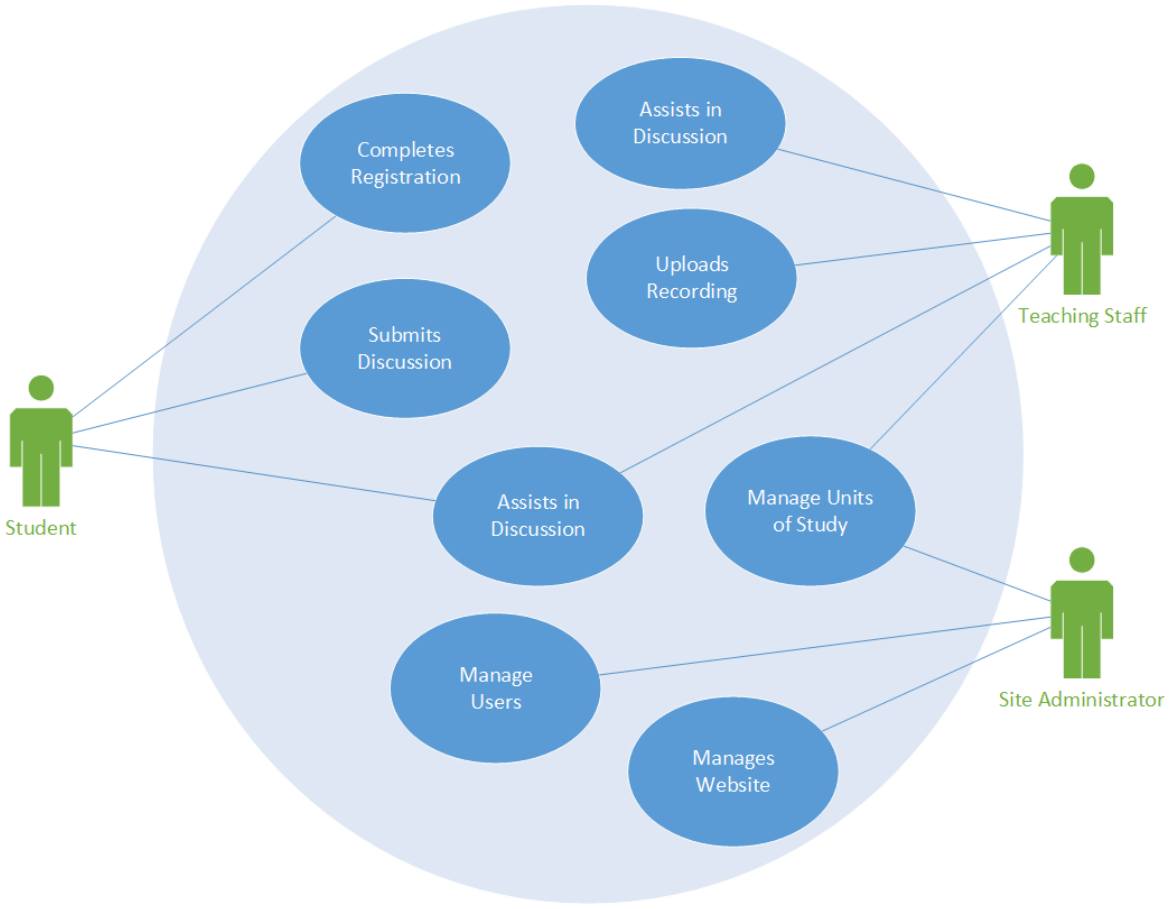

Figure 2: Use case diagram

Use case	Uploads Recording
Goal	To allow users with appropriate account privileges to make uploads of lecture recordings onto the system through the use of uploading, processing and updating of the database
Scope and Level	System Level
Pre-Condition	User already has a lecture recording saved on their local computer of the correct file type and are at the lecture upload page of the LECREC web platform
Success End Condition	The user's file has been successfully uploaded into the LECREC system with an updated database and without errors
Failed End Condition	The user's file does not successfully get uploaded into the LECREC system
Actors	Staff
Triggers	Valid user wishes to upload a video into the system
Steps	1 Initiator fills out upload form of LECREC system including the attachment of the video file 2 User submits form which is sent to uploading for which the video file gets uploaded into the system 3 The video file is processed and converted to be functional on the web platform 4 Database for the lecture recording is updated 5 Page redirects to successful upload display
Extends	2A Form incorrectly filled out 2A1 Inform user of incorrect field 2A2 Allow user to refill field 3A Video processing or conversion error occurs 3A1 Inform user of error 4A Database update error occurs 4A1 Inform user of database error
Includes	Valid video file, user, video name
Sub-variation	None
Stakeholders and Interests	Staff need to have recording available so that students can interact with it
Frequency of Use Case	Very frequent
Level of Risk	High risk - students, staff and administrators need the upload system available otherwise the platform is crippled of its core functionality
Priority	1

Figure 3: Use case description for 'Uploads Recording'

Use case	Submits Discussion
Goal	To allow students to begin discussion threads on topics
Scope and Level	User level
Pre-Condition	Student is enrolled and invited into their units of study
Success End Condition	A new discussion thread is created under a unit of study
Failed End Condition	No new discussion thread is created under a unit of study
Actors	Student
Triggers	Student wishes to begin a new discussion thread
Steps	1 Student opens unit of study page 2 Student selects a lecture recording to watch 3 Student tags a part of the video to post a discussion thread 4 Page is updated with new discussion thread
Extends	4A Page update error occurs 4A1 Inform user of page update error
Includes	User, video file, discussion thread
Sub-variation	None
Stakeholders and Interests	Students need discussion threads to be actively updated so they may interact with the video and other students to learn
Frequency of Use Case	Very frequent
Level of Risk	High risk - students may feel discouraged if their discussion threads are not actively updated or received by other students or staff
Priority	1

Figure 4: Use case description for 'Submits Discussion'

Use case	Manages Unit of Study
Goal	To allow the functional management of the unit of study database, including enrolment of students and uploading of lecture recordings
Scope and Level	System Level
Pre-Condition	Units of study have been entered into the system
Success End Condition	Students will be enrolled into a unit of study
Failed End Condition	Students will not be enrolled into a unit of study
Actors	Students, staff, administrators
Triggers	Unit of study needs to be correctly registered for students to be added
Steps	1 Staff navigates to unit of study page 2 Staff selects the semester and year of unit of study 3 Staff invites/enrols students into unit of study, either individual or bulk 4 Database for the unit of study is updated 5 Unit of study page is updated
Extends	3A Student enrolment error occurs 3A1 Inform user of error 4A Database update error occurs 4A1 Inform user of database error 5A Page update error occurs 5A1 Inform user of page update error
Includes	Unit of study, users
Sub-variation	None
Stakeholders and Interests	Students need to be correctly enrolled into their units of study for use of the system. Staff and administrators will facilitate in the successful enrolment of students and management of the unit of study page
Frequency of Use Case	Very frequent
Level of Risk	High risk - if the units of study are not correctly managed then the students will not be able to access the lecture recording system
Priority	1

Figure 5: Use case description for 'Manages Unit of Study'

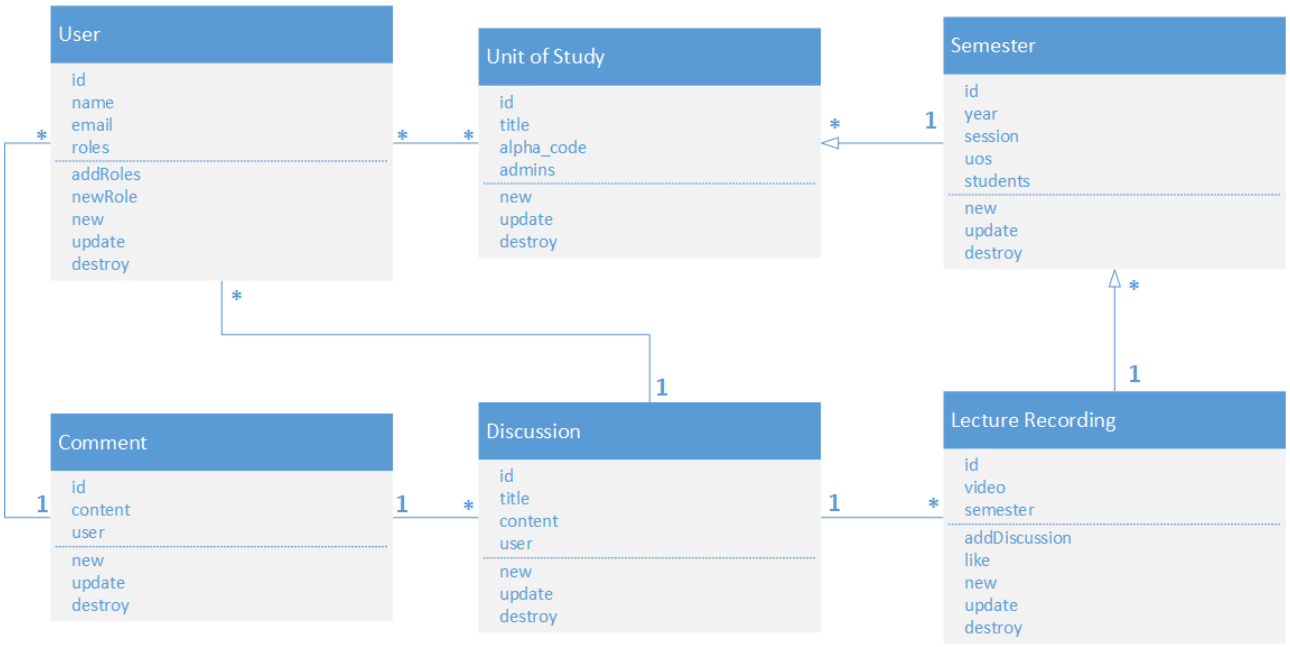

Figure 6: Analysis class diagram

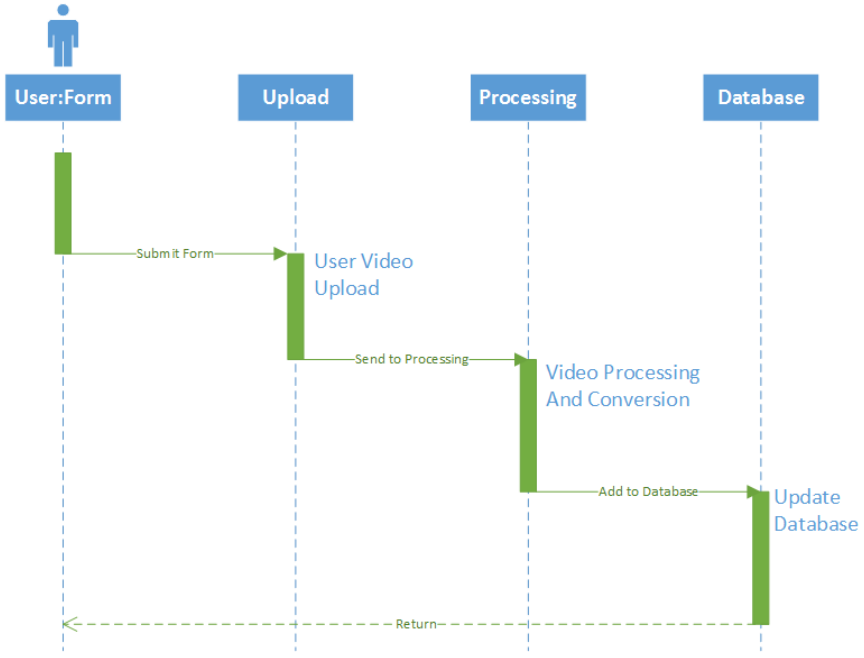

Figure 7: Sequence diagram

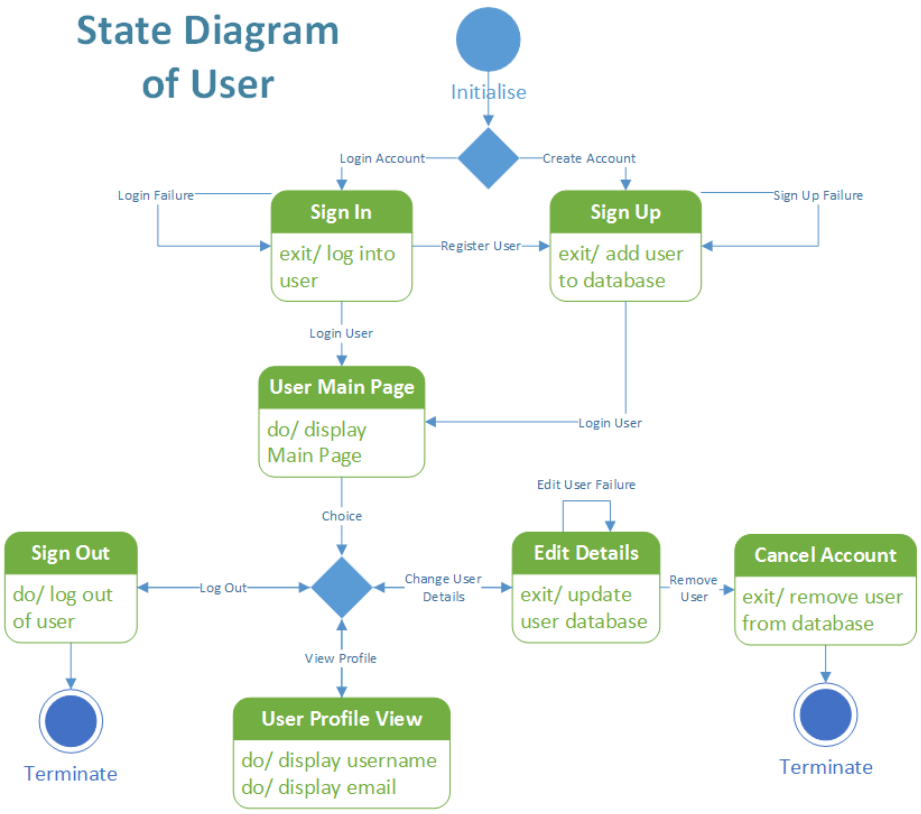

Figure 8: State diagram