



# ELM++

Graduation Project, Part-I (SWE 496)  
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## ABSTRACT

This report describes the devolvment of our project which is an educational website aimed for those who're looking to improve their skills in a certain subject by taking courses in that specific field, And for any person that want to conduct a course for free or for a certain amount of fees.

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## 1. Introduction

Online education in the current situation has become a place of interest due to COVID 19 pandemic, The COVID-19 has resulted in schools shut across the world. Globally, over 1.2 billion people are out of the classroom.

As a result, education has changed dramatically, with the distinctive rise of e-learning, whereby teaching is undertaken remotely and on digital platforms.

In this project we will implement a platform that combine both graduate and undergraduate students mostly for people who have a full schedule, and they cannot take courses in their work time, most of the similar websites are foreign, and the local ones only focuses on students not including graduates.

In our project time is not an issue people will be able to increase their knowledge and information any time they want in any topic of their choosing such as basic math, IT & Software, Design, business, language courses etc.

Even more for teachers who wants to lecture a course online paid or free hopefully our project will help them do that also they can test their students understanding by conducting exams.

Students can look up courses easily and see the top-rated courses on the home page also rate their subscribed courses to help other people. Students can access the course content without the need of internet they can basically download the required content and start learning.



## 2. Domain Analysis

### 2.1. WEA



WEA is a charity website focuses on adult education for social purpose to increase social knowledge In the United Kingdom, the platform has online courses, and support a wide Range of Course Offerings the goal of the website is aspirations and develop educational opportunities for the most disadvantaged.[3] This includes providing basic math, English, and IT skills for employment. The disadvantage of this course that it is region locked that means it's exclusive for the people on the United Kingdom. [5]

### 2.2. Udemy

Udemy, Inc. is an American massive open online course provider aimed at professional adults and students.[2] the platform has more than 35 million students and 57,000 instructors teaching courses in over 65 languages.[5] It supports wide range of courses, and upon enrollment, students have instant access to the courses they have chosen, since all course materials, plus 30-Day Money-Back Guarantee If students determine that they do not wish to pursue a course for any reason during the first 30 days following enrollment, Udemy returns 100% of the tuition fees.[2] No Prequalification necessary to take Any course. Students can take any course that might interest them.



### 2.3. Coursera

Coursera is an American massive open online course provider, offers massive open online courses, specializations, degrees, professional and master track courses [5].

Coursera works with universities and other organizations to offer online courses, certifications, and degrees in a variety of subjects, such as engineering, data science, machine learning, mathematics, business, financing, computer science, digital marketing, humanities, medicine, biology, social sciences, 3000 plus variety of courses giving students a very broad range of information & experience in different fields. [1]



## 2.4. Shroo7

Is an educational platform that works to create an interactive learning environment by offering Special Services that help student to improving their knowledge and students who have difficulty studying with qualified and trusted teachers and provide online courses.[4]



## 2.5. Summary

Table 1 is a brief comparison of the main features of our website and the website listed above.

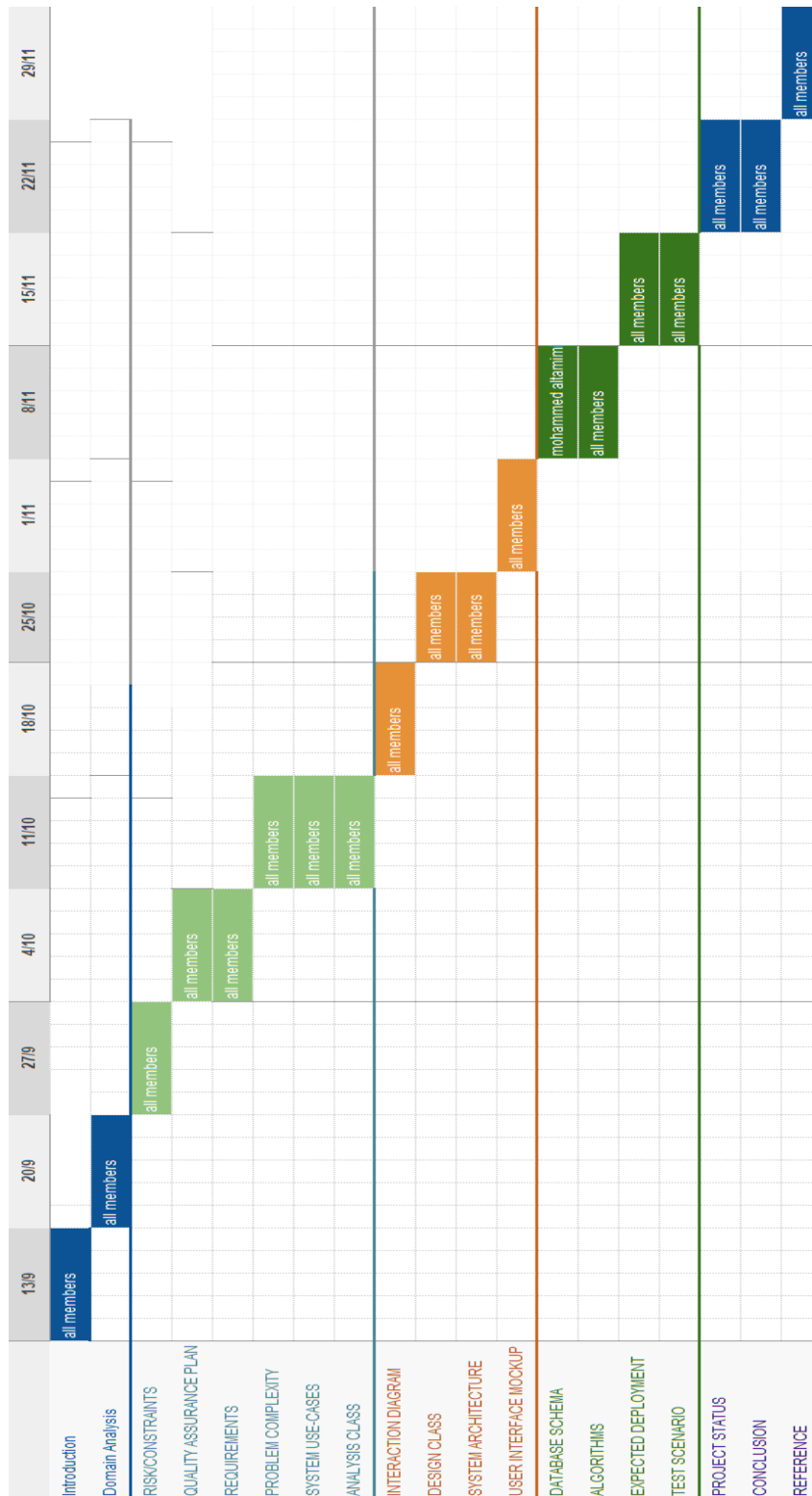
Features	EIM++	WEA	Shroo7	Coursera	Udemy
live lecturing			●		
course modification	●	●		●	●
course rating	●	●		●	●
offline mode	●				
automate exam grading	●			●	●
Provide course material.	●				
Print course certificate	●	●		●	



### 3. Risk/Constraints

No	RISK	Type	Severity	Likelihood	Risk Management Strategy
1	Limited knowledge of required technologies.	Product	Medium	Low	Take courses that teach these technologies.
2	Limited time by project deadline other courses	Project	Medium	High	Dived work between project members equally
3	Sharing video for unauthorized access.	Business	Medium	Medium	Blue mark on the video

## 4. Project Plan



## 5. Quality Assurance Plan

### - **Reviews:**

We plan to do weekly review with our advisor to make sure that we are going on the right track by taking our advisor's notes and apply changings to the project.

### - **Testing:**

The system will go through different kinds of testing such as: reliability testing, integrity testing and deployment testing.

### -**Verification:**

Can be assured the developers built the specified design when the actual design output is the same as the expected design output that meets the product specification. It can be assured if developers followed standards by creating specific guidelines, developers training, and using templates and checklists.

### - **Walkthroughs:**

Every team member will go through the artifacts of the project individually to gather enhancement point for the final system.

### - **Training Team members:**

There will be training to each of the group member to increase the overall skills in web development.

## 6. Requirements

### 6.1 Glossary

In this section we list and define the three four of users of the proposed system

- 1- **Administrator:** a user takes the control of lecturer and student accounts and approve or deny new courses.
- 2- **Student:** a user that sign up in the system as student looking for learning from our platform by subscribe to courses he wants.
- 3- **lecturer:** a user adds courses and courses materials for our platform looking to teach other students
- 4- **Visitor:** a user that did not sign up in the system

### 6.2 Functional Requirements

#### Administrator-related requirements:

1. Admin shall be able to edit his account password.
2. Admin shall be able to view his account information (Username, email).
3. Admin shall be able to delete lecturer account.
4. Admin shall be able to approve/deny lecturer account.
5. Admin shall be able view Students username and email.
6. Admin shall be able view lecturer username, email, national Id, name, phone.
7. Admin shall be able to login using his username and password.
8. Admin shall be able to view the following statistics:
  - Number of users.
  - Number of registered courses in each month.
9. Admin shall be able to view courses.
10. Admin shall be able to delete courses.
11. Admin shall be able to review course materials.

#### Student-related requirements:

1. Student shall be able to edit his account information except username.
2. Student shall be able to view his account information (Username, email).
3. Student shall be able to login using his username and password.
4. Student shall be able to Sign-up using his (Email, Username, password,).
5. Student shall be able to search for a course.
6. Student shall be able to subscribe in a course.
7. Student shall be able to unsubscribe from a course.
8. Student shall be able to report a course.
9. Student shall be able to rate a course.
10. Student shall be able to view course rating.
11. Student shall be able to download the course.
12. Student shall be able to take course exam.
13. Student shall be able to view exam results.
14. Student shall be able to print course certificate.
15. Student shall be able to choose his payment method for paid courses.

**lecturer -related requirements:**

1. lecturer shall be able to edit his account information except username.
2. lecturer shall be able to view his account information (Username, email, phone).
3. lecturer shall be able to delete his account.
4. lecturer shall be able to login using his username and password.
5. lecturer shall be able to Sign-up using his (Email, Username, password,).
6. lecturer shall be able to delete course.
7. lecturer shall be able to add course.
8. lecturer shall be able to edit the name of the course.
9. lecturer shall be able to delete course materials.
10. lecturer shall be able to add course materials
11. lecturer shall be able to edit the name of the course material.
12. lecturer shall be able to upload course materials.
13. lecturer shall be able to conduct an exam.
14. lecturer shall be able to view the following statistics:
  - Course rating
  - Number of participants per month.

**Visitor-related requirements:**

1. Visitor shall be able to Sign-up as lecturer or student.
2. Visitor shall be able to view search course.
3. Visitor shall be able to view top rated courses in given category.

**6.3 Non-Functional Requirements****Supportability:**

- The system shall support Arabic and English languages.

**Usability:**

- The user shall be able to learn the interface in no longer than 30 minutes.

**Security:**

- The system shall store user's personal and payment info in an encrypted form.

**Performance:**

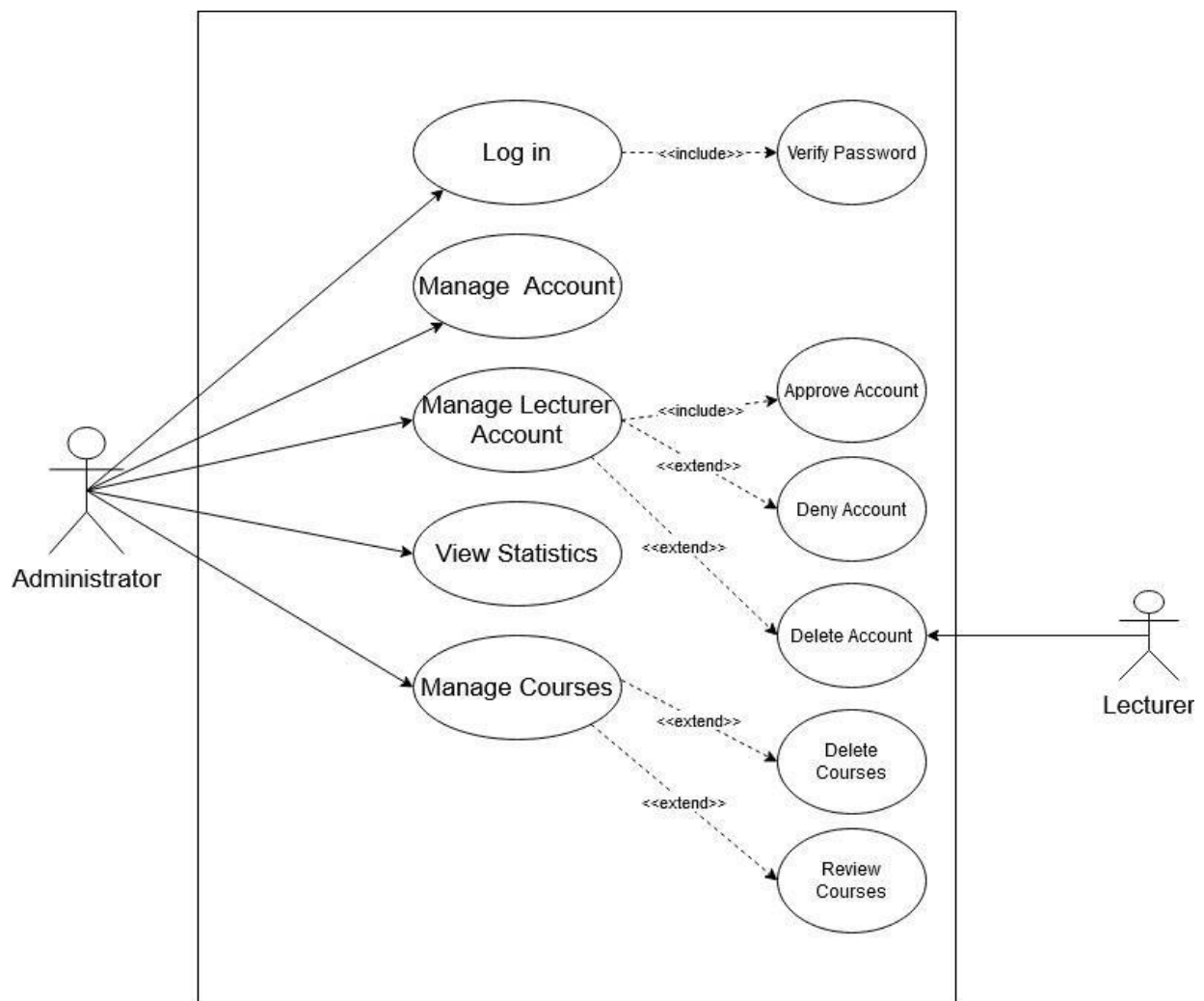
- The system shall be able to be serving 100 at same time.

## 7. Problem Complexity

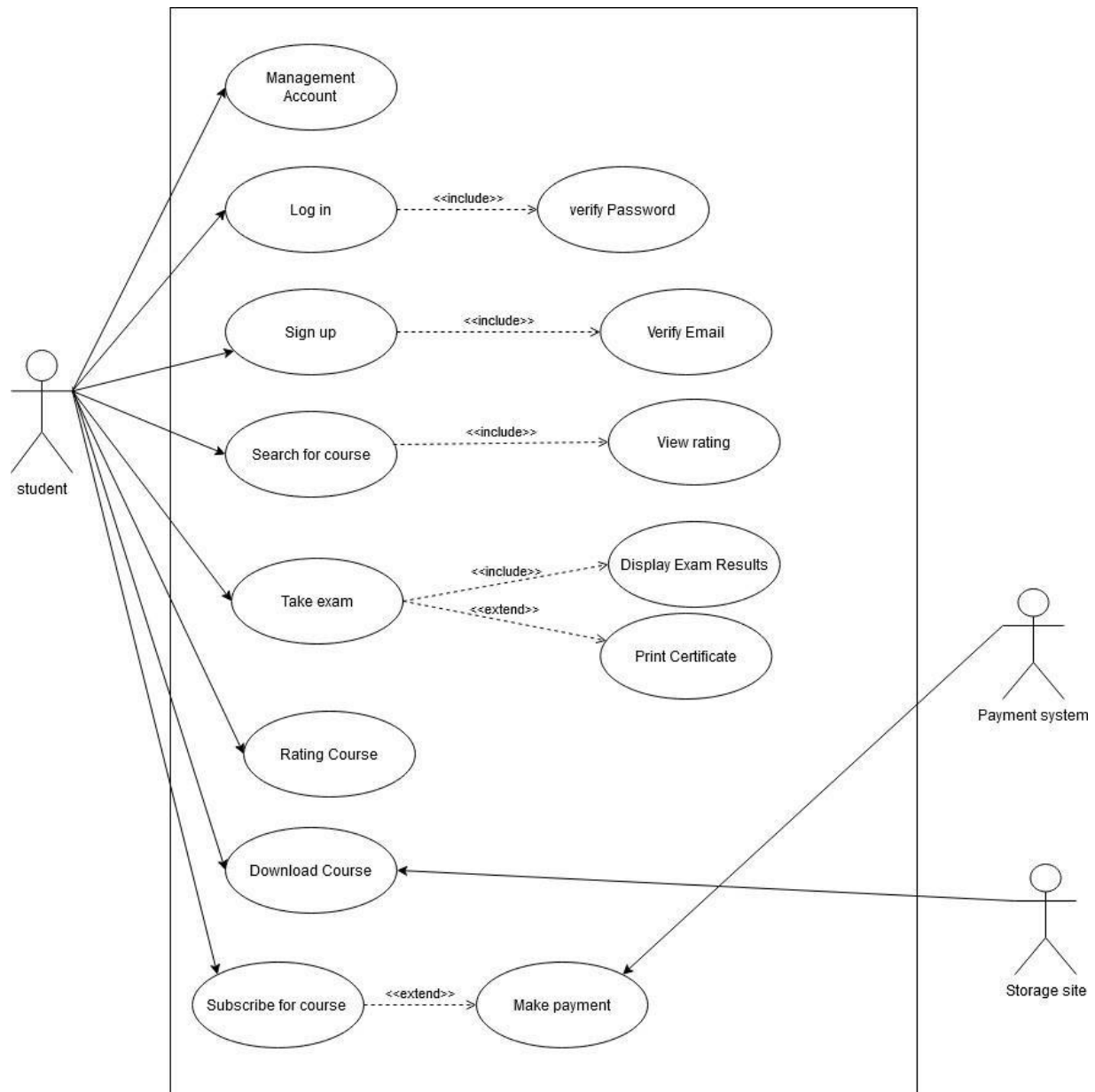
- We think that we might have to solve Algorithmic complexity related to sorting and retrieving data. There is a possibility to encounter a usability complexity due to the variety of users, which could cause an issue.

## 8. System Use-Cases

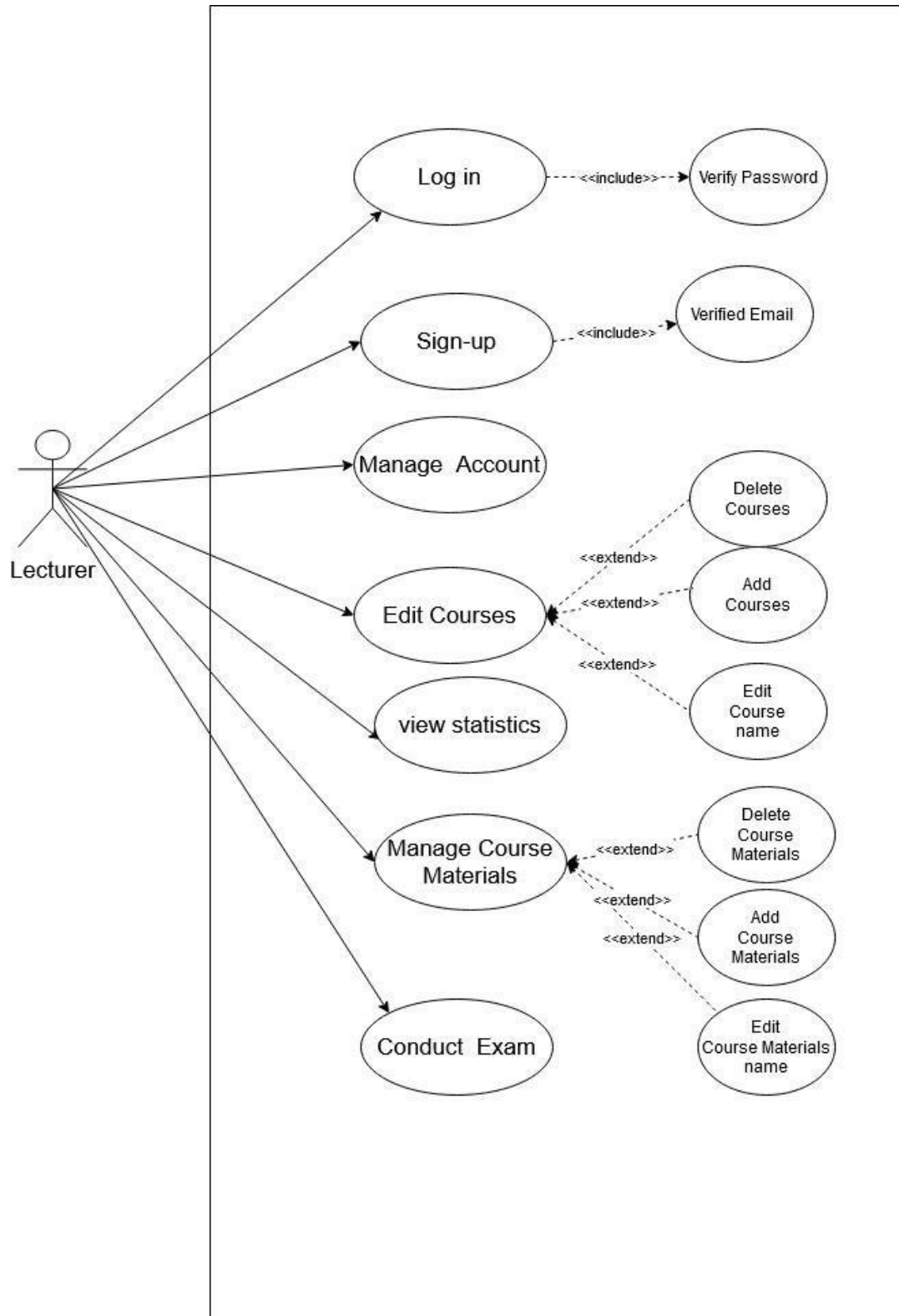
### 8.1 Administrator Use-Cases



## 8.2 Student Use-Cases



### 8.3 Lecturer Use-Cases





## 8.4 Use case description

Use Case Description	
Use Case Name: Log in	
Actor's: lecturer, student, Administrator	
Description: let the actor get access into his account	
Relationship's: Include: Verify Password properties Extends: None	Covered requirements: (R1.2), (R2.3), (R3.4)
Pre-condition: the actor is not log in	
Basic Flow	
Actor: 1. Enter his username and Password	System: 2. Validate the username and password
Alternative Flow: 4.1 the username and Password do not match the record 4.2 continue with step 1	

Use Case Description	
Use Case Name: Sign Up	
Actor's: lecturer, student	
Description: The actor creates an account in the system	
Relationship's: Include: none properties Extends: None	Covered requirements: (R2.3) , (R3.5)
Pre-condition: the actor is not log in	
Basic Flow	
Actor: 1. Enter Username, Email, Password, Re-Password.	System: 2. Check if the username available and all data correct.
Alternative Flow: 2.1. If username not available or data does not correct. 2.2. The system clears the rejected field. 2.3. The user enters the rejected field again.	

Use Case Description	
Use Case Name: Rating course	
Actor's: student	
Description: the student rate curses from 1 to 5	
Relationship's: Include: none properties Extends: None	Covered requirements: (R2.9)
Pre-condition: none	
Basic Flow	
Actor: 1. select the rate	System: 2. Save course rate.
Alternative Flow: none	

Use Case Description	
Use Case Name: Manage account	
Actor's: Administrator, Student, Lecturer	
Description: Let the actor view email, username and edit his email or password	
Relationship's: Include: none properties Extends: None	Covered requirements:  (R1.1) (R2.1) (R3.1) (R1.2) (R2.2) (R3.2)
Pre-condition: The user should be already signed in	
Basic Flow	
Actor: 1. insert new email or Password.	System: 2. save the new update
Alternative Flow: none	

Use Case Description	
Use Case Name: Manage Lecturer Account	
Actor's: Administrator Secondary actor: lecturer	
Description: Let the Administrator approve and deny and delete lecturer account and view accounts information.	
Relationship's: Include: none properties Extends: 1.Approve account 2. Deny account 3. Delete account	Covered requirements:  (R1.4) (R1.3) (R1.6)
Pre-condition: The actor should be already signed in	
Basic Flow	
Actor: 2.choose the lecturer. 4.approve, deny, delete.	System: 1. List lectures accounts. 3.Open the lecturer profile. 5.save the new update.
Alternative Flow: none	

Use Case Description	
Use Case Name: Manage courses	
Actor's: Administrator	
Description: Let the Administrator delete and review and approve courses	
Relationship's: Include: none properties Extends: 1.Delete courses 2. Review courses	Covered requirements:  (R1.9) (R1.10) (R1.11)
Pre-condition: none	
Basic Flow	
Actor: 2.open the course	System: 1. List the courses
Alternative Flow: none	

Use Case Description	
Use Case Name: Edit courses	
Actor's: Lecturer	
Description: Let the Lecturer delete and add and edit courses name	
Relationship's: Include: none properties Extends: 1.Delete courses 2. add courses 3. edit courses	Covered requirements:  (R3.6) (R3.7) (R3.8)
Pre-condition: none	
Basic Flow	
Actor: 2. choose the courses 3. edit name or delete courses	System: 1. List the courses 4.save new update
Alternative Flow: none	

Use Case Description	
Use Case Name: View statistic	
Actor's: Administrator. Lecturer	
Description: Let the actor view the statistic of number of users and Number of registered courses in each month	
Relationship's: Include: none properties Extends: none	Covered requirements: (R1.4) (R1.3) (R1.6)
Pre-condition:	
Basic Flow	
Actor: 1. open view statistic	System: 2. Display view statistic.
Alternative Flow: none	



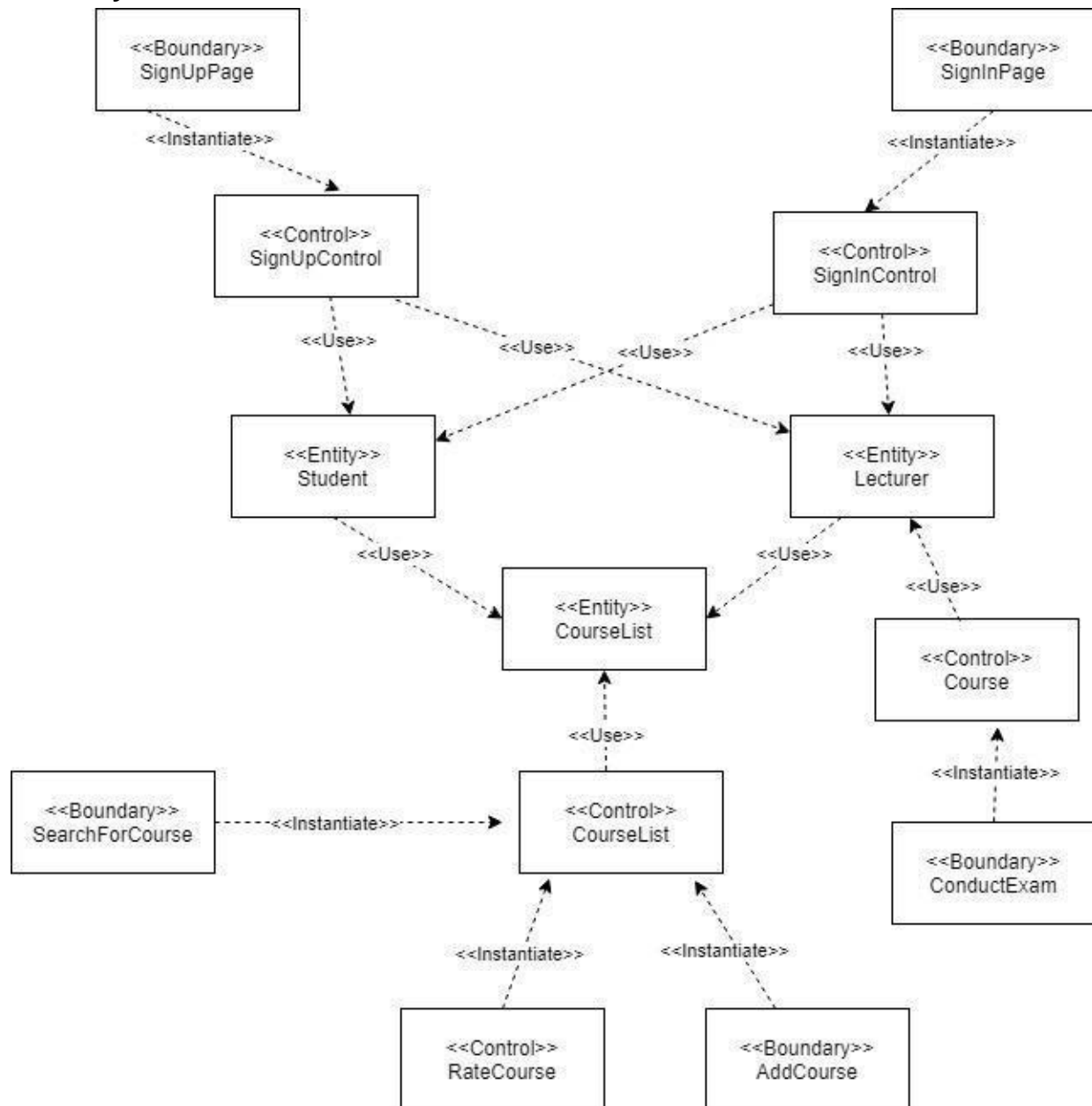
Use Case Description	
Use Case Name: Search for a course	
Actor: Student	
Description: let the student search for a course and view the course's rating.	
Relationship's: Include: non properties Extends: View rating	Covered requirements: (R2.5),(R2.10)
Pre-condition: none	
Basic Flow	
Actor: 1.enter key word	System: 2.Display search result.
Alternative Flow: 2.1. If there is no result display 'not found'.	

Use Case Description	
Use Case Name: Take exam	
Actor: Student	
Description: let the student take the exam after finishing the course the view the exam result.	
Relationship's: Include: Display Exam result. properties Extends: none.	Covered requirements: (R2.12),(R2.13)
Pre-condition: finished the course	
Basic Flow	
Actor: 1.Open exam. 3.Submit	System: 2.Display exam. 4.Display the grade
Alternative Flow: none	

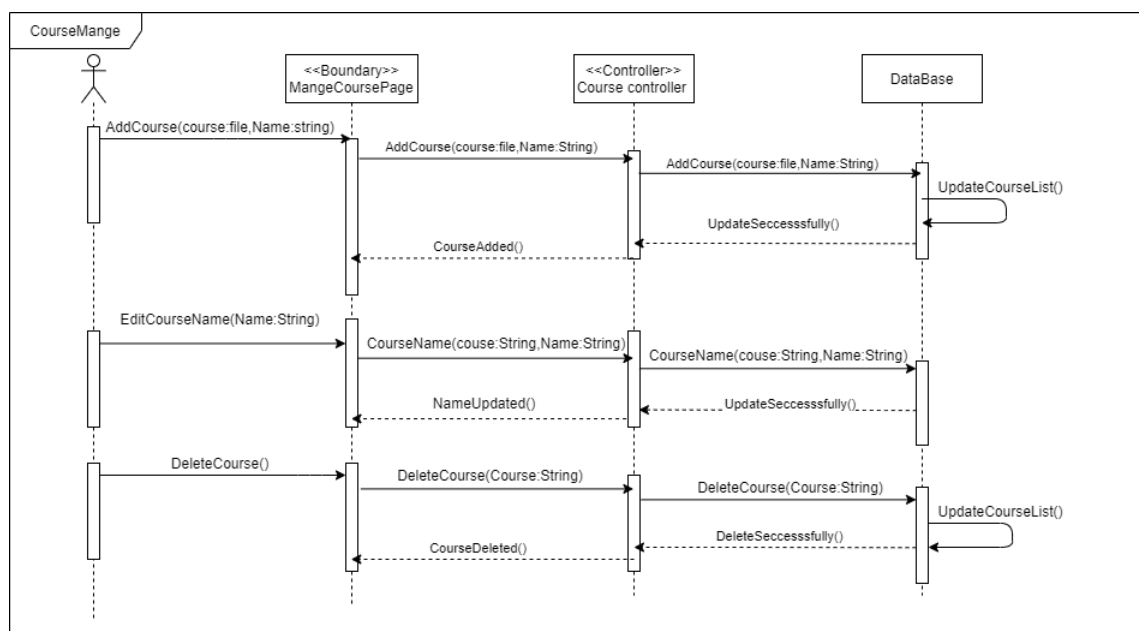
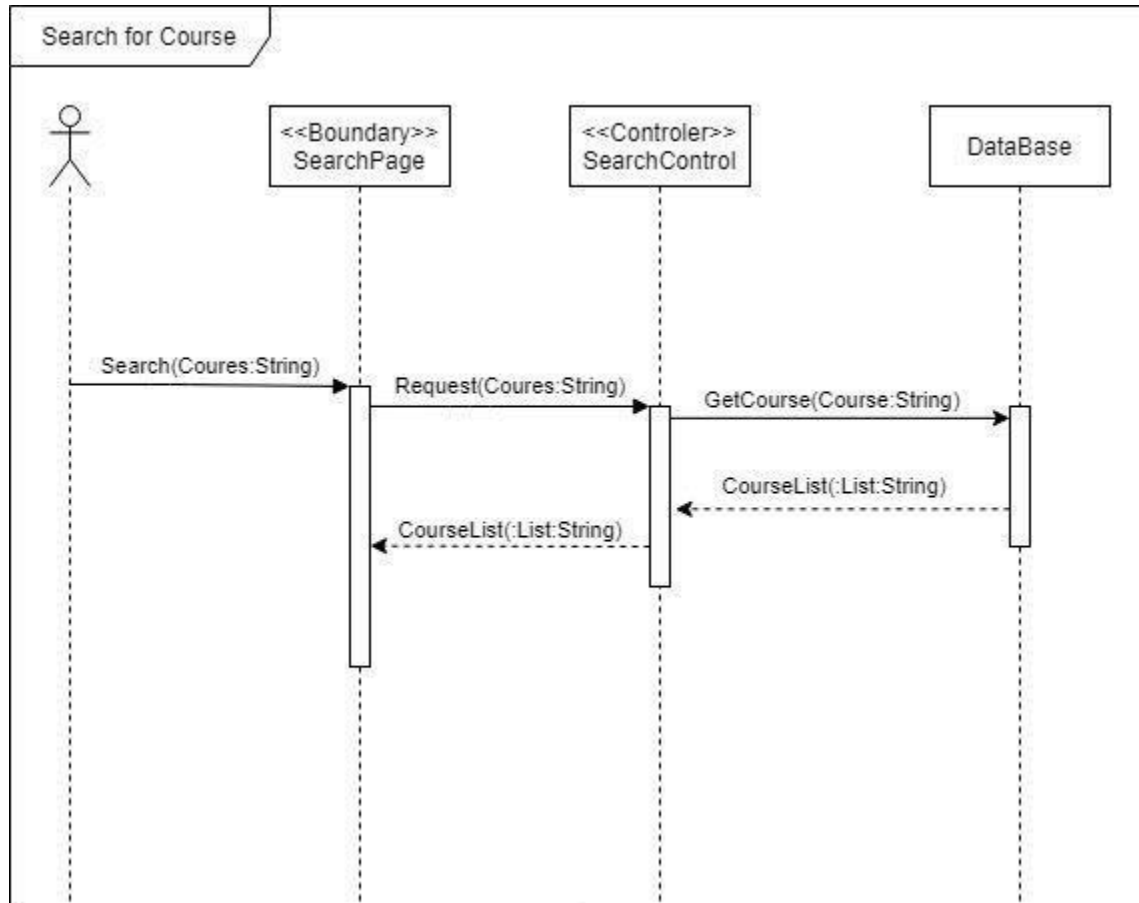
Use Case Description	
Use Case Name: Manage Course Material	
Actor: Lecturer	
Description: Let the lecturer add and edit and delete the course material	
Relationship's: Include: none. properties Extends: 1.Delete Course Material. 2.Add Course Material. 3.Edit Course Material.	Covered requirements:  (R2.12), (R2.13)
Pre-condition: The lecturer already in the course page	
Basic Flow	
Actor: 1.Edit, add, delete course material	System: 2.save new update
Alternative Flow: none	

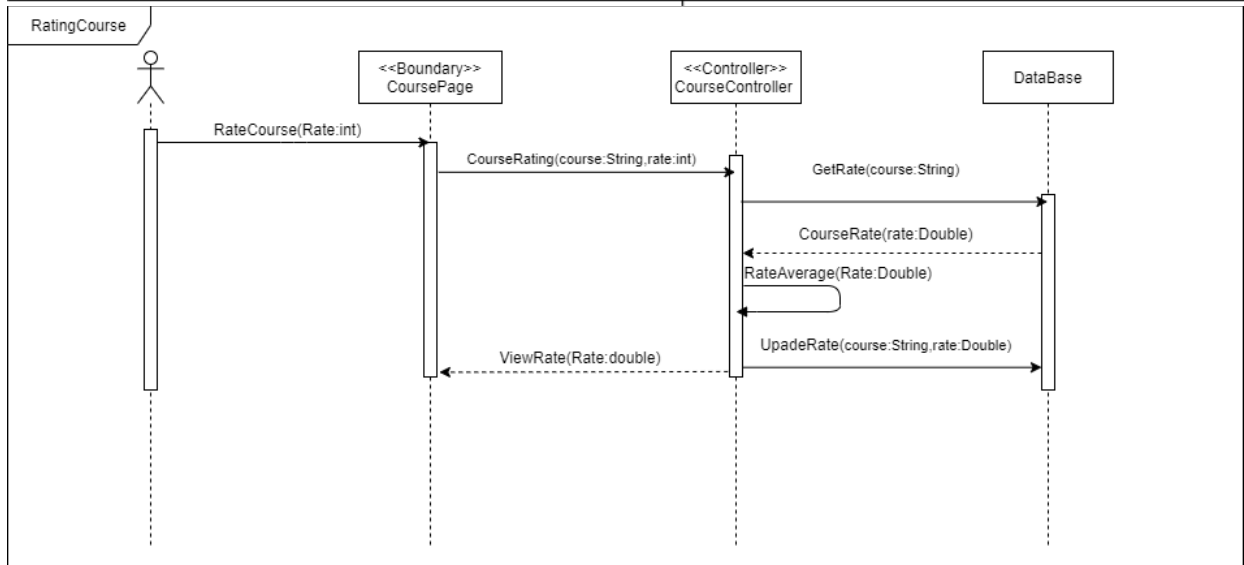
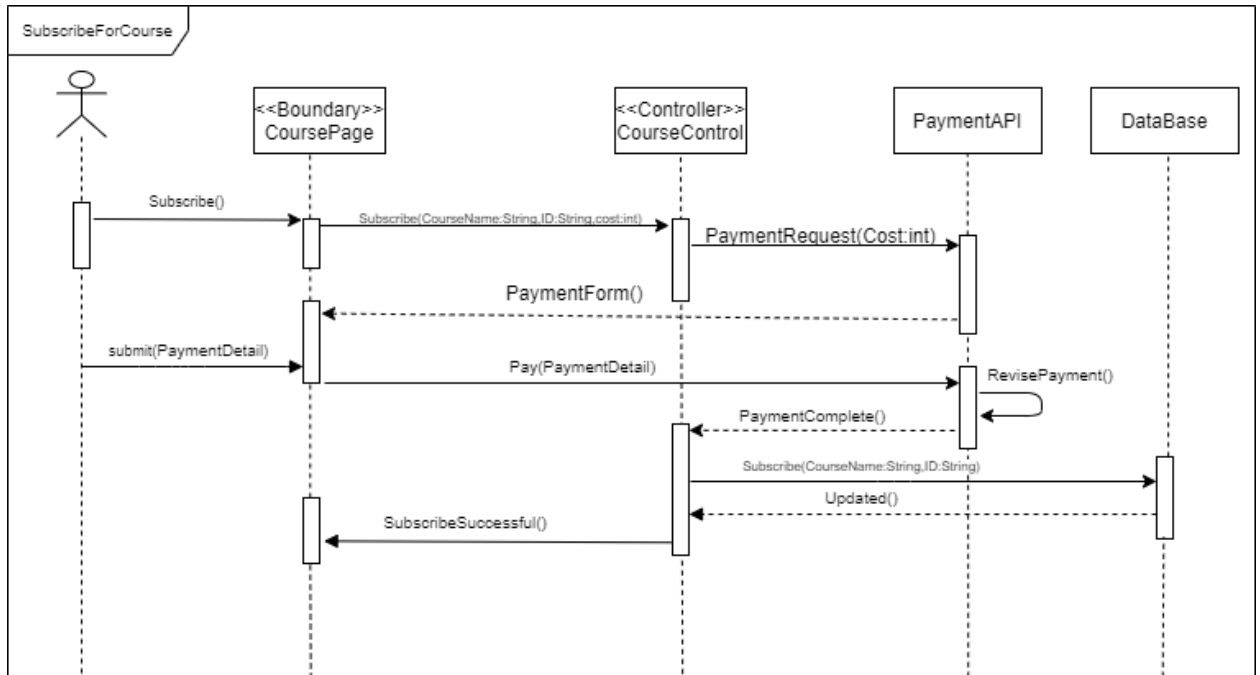
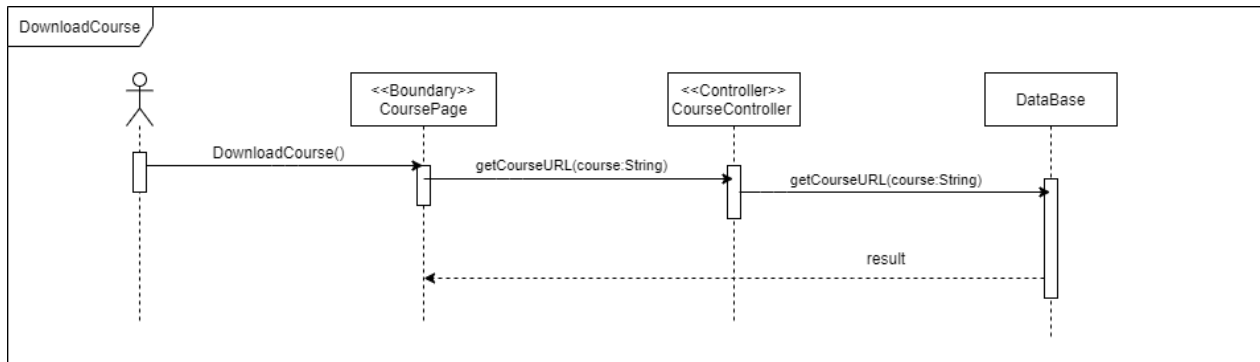
Use Case Description	
Use Case Name: Download Course	
Actor: Student	
Description: let the student to download the subscribed courses.	
Relationship's: Include: none. properties Extends: none.	Covered requirements: (R2.11)
Pre-condition: the actor is should be subscribed in the course	
Basic Flow	
Actor: 1.Download course.	System: 2.Open download page
Alternative Flow: none	

## 9. Analysis Class

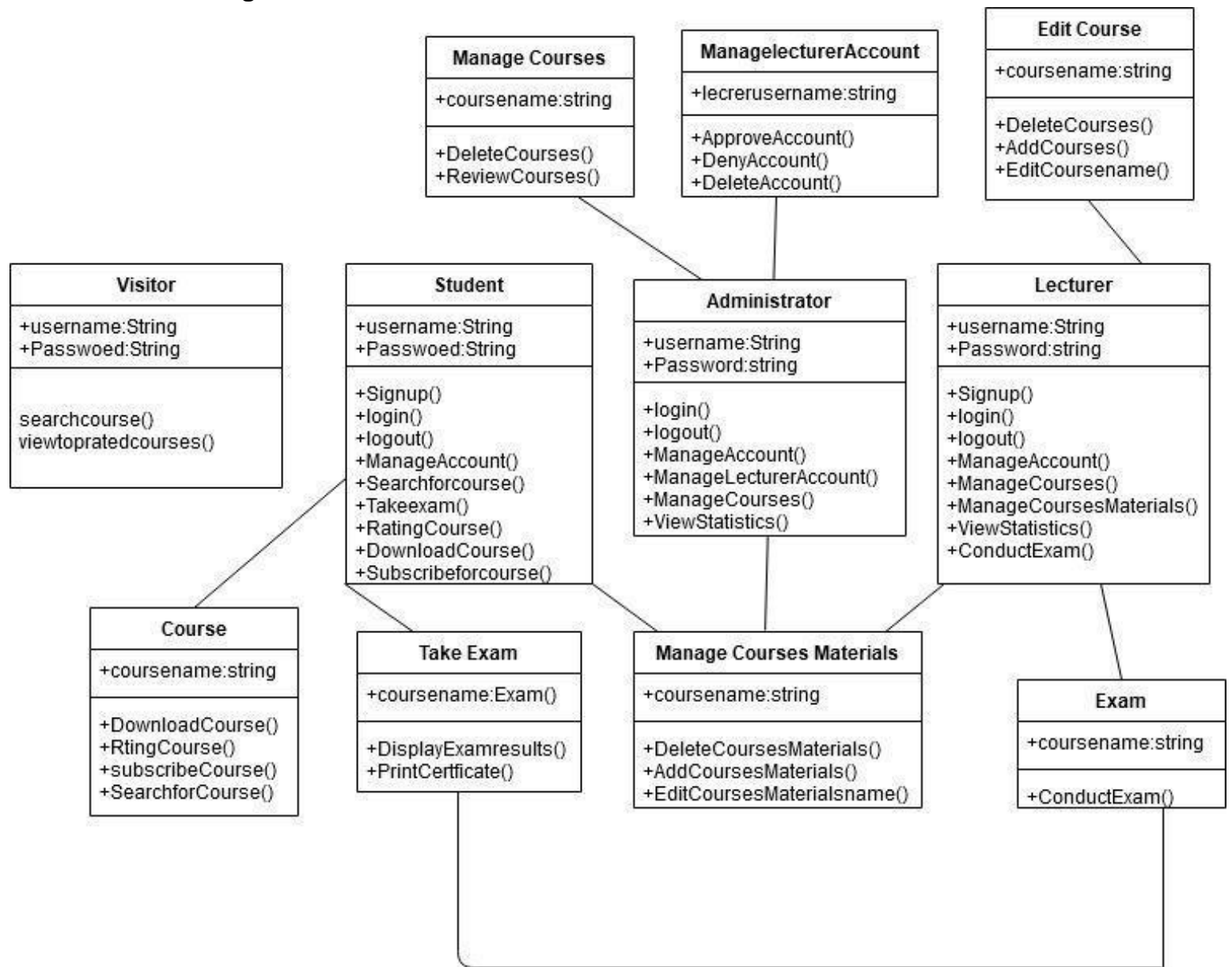


## 10. Interaction Diagram





## 11. Design Class





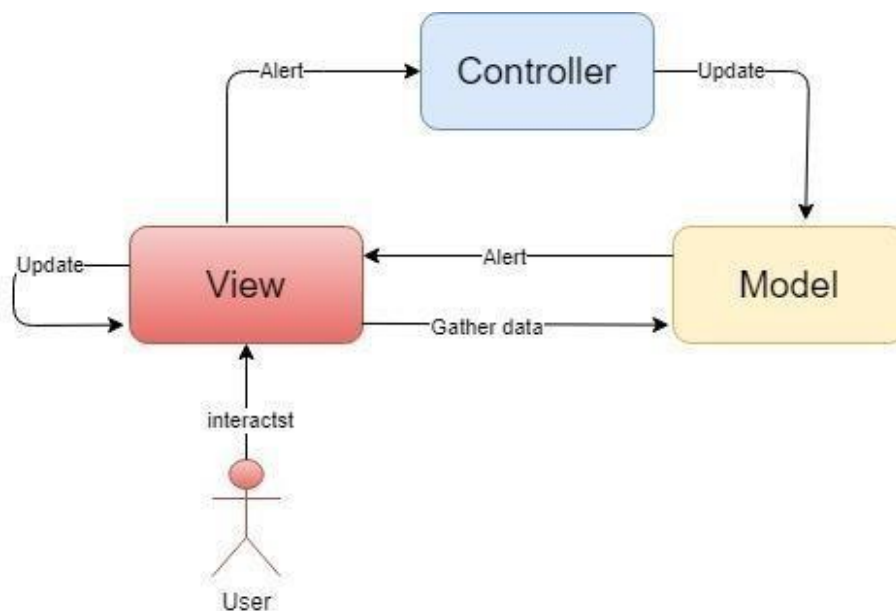
## 12. System Architecture

We went for the MVC architecture, MVC patterns separate the input, processing, and output of an application. This model divided into three interconnected parts called the model, the view, and the controller.

As of why we choose it, simply because it is popular and well-suited architecture for web application, also it supports rapid and parallel development. Therefore one team member can work on the frontend while the other can work on the backend or the controller to create the business logic of the web application.

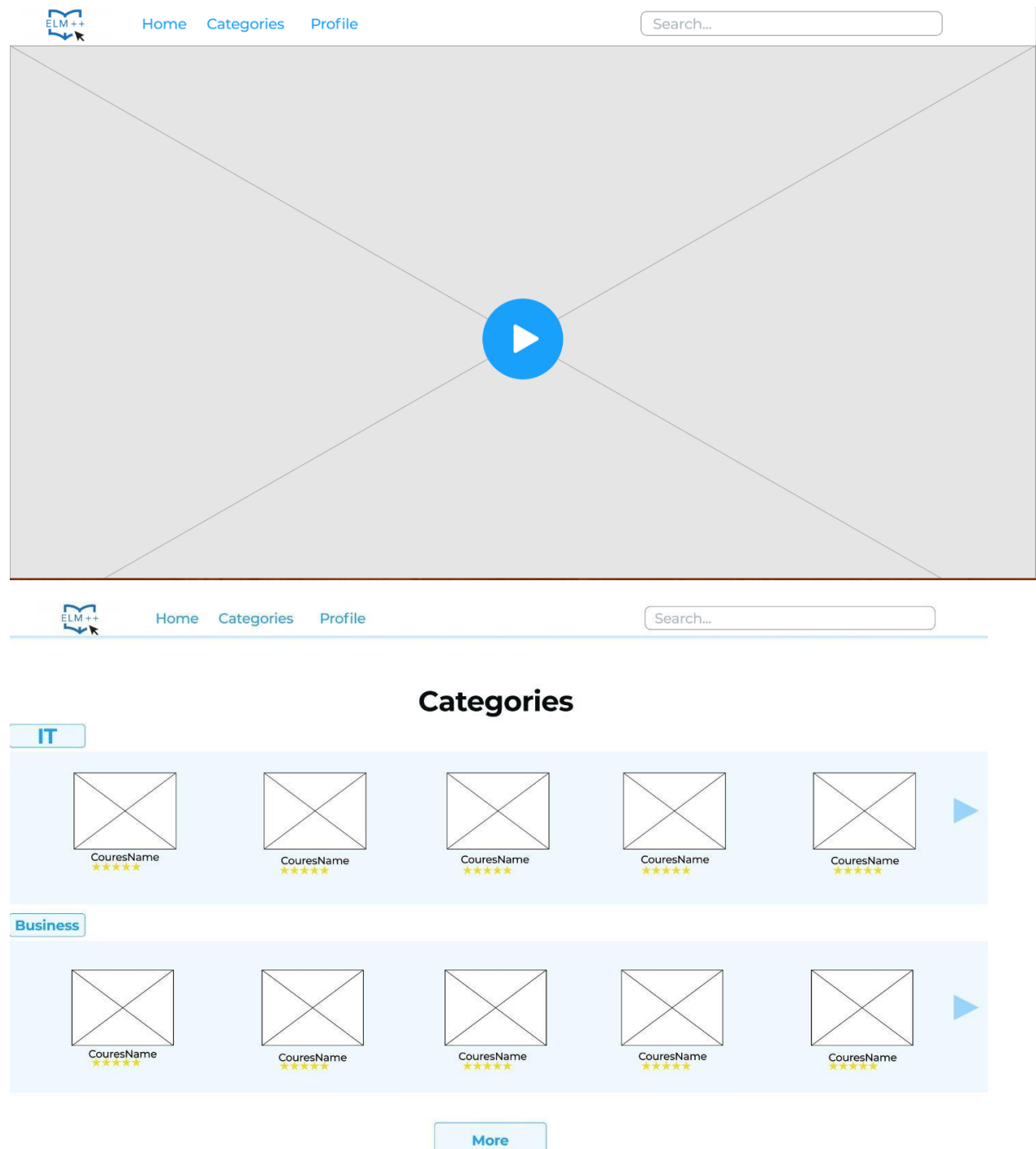
Another important features that the MVC architecture can also integrate with the JavaScript Framework. This means that MVC applications can be made to work even with PDF files, site-specific browsers, also with desktop widgets. And MVC support of Asynchronous Technique which helps for faster load time.

The most important feature is separation of concerns, it is obvious that you make frequent changes in your web application like changing colors, fonts, screen layouts, and adding new device support for mobile phones or tablets. Moreover, adding a new type of view are very easy in the MVC pattern because the Model part does not depend on the views part. Therefore, any changes in the Model will not affect the entire architecture.



**Figure 3. System Architecture**

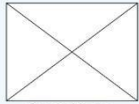
## 13. User Interface Mockup





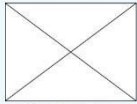
## Categories

### Business



CouresName  
★★★★★ Free

Subscribe



CouresName  
★★★★★ 40 SR

Subscribe



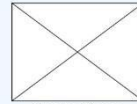
CouresName  
★★★★★ 50 SR

Subscribe



CouresName  
★★★★★ Free

Subscribe



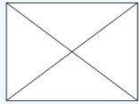
CouresName  
★★★★★ Free

Subscribe



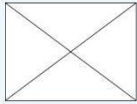
CouresName  
★★★★★ 20 SR

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CouresName  
★★★★★ 30 SR

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CouresName  
★★★★★ Free

Subscribe



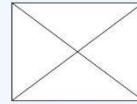
CouresName  
★★★★★ 70 SR

Subscribe



CouresName  
★★★★★ Free

Subscribe



CouresName  
★★★★★ 50 SR

Subscribe



CouresName  
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Subscribe



## Payment

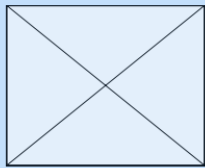
Pay Now



Edit

Edit

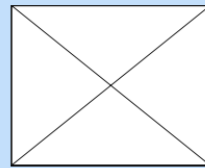
My Courses



CouresName

Delete

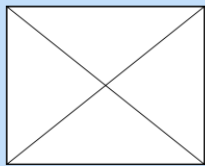
EditName



CouresName

Delete

EditName



CouresName

Delete

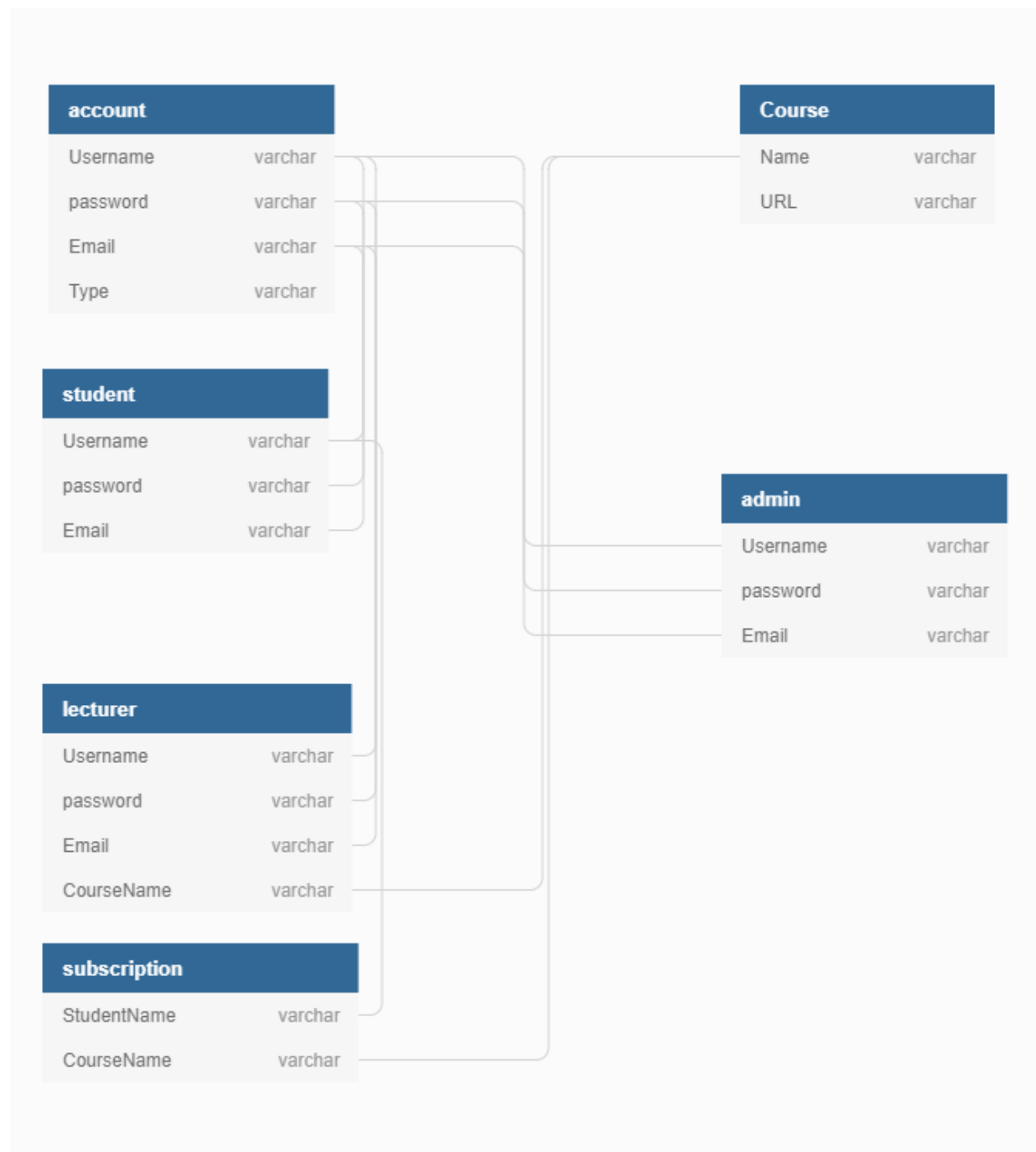
EditName



## Log in

## Sign up

## 14. Database Schema



## 15. Expected Deployment

### Global Overview

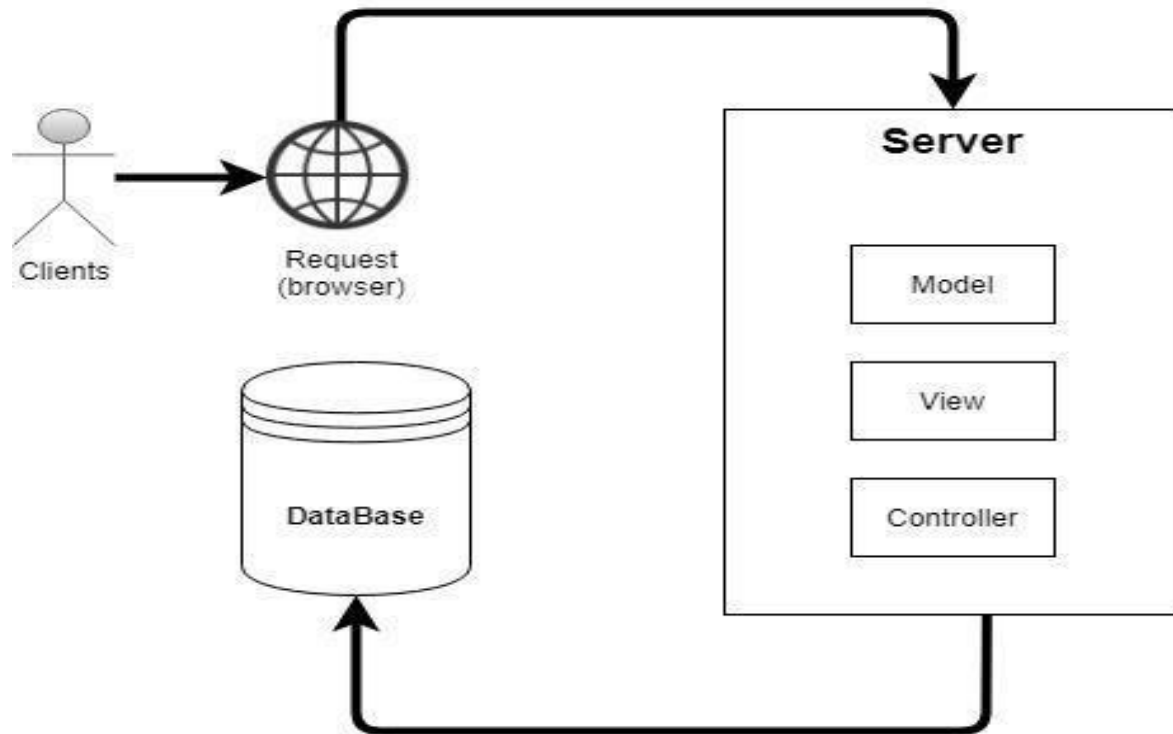


Figure 4. System deployment diagram

## 16. Test Scenario

### 16.1 Sign up

Test case number	input	output
<b>1.1</b>	email = "mohammed@gmail.com " username = "Mohammed" Password = "MoHaMmed12" Re password = " MoHaMmed12" Account type = "Student"	Account created successfully.
<b>1.2</b>	email= "mohammed@gmail.com " username = " Mohammed" Password = " MoHaMmed" Re password = " MoHaMmed" Account type = "Lecturer"	error message.  Password did not have numbers.
<b>1.3</b>	email = "nasser@gmail.com " username = "Mohammed" Password = " MoHaMmed12" Re password = " " Account type = "Student"	error message.  All fields should be filled.



## 16.2 Sign in

Test case number	input	output
<b>1.1</b>	email="mohammed@gmail.com" Password =" MoHaMmed12"	signed in Successfully
<b>1.2</b>	email = "Mohammed" Password =" MoHaMmed12"	Error message Wrong Email or password
<b>1.3</b>	email="mohammed@gmail.com" Password = ""	Error message All fields should be filled
<b>1.4</b>	email="Mohammed@gmail.com" Password ="@ (892#010"	Error message Wrong Email or password

## 16.3 Search course

Testcase number	input	output
<b>1.1</b>	Search keyword = "math "	The result should appears successfully.

<b>1.2</b>	Search keyword = ""	Error message. Please enter a key word to search.
------------	---------------------	--

#### 16.4 Create a Course

Test case number	input	output
<b>1.1</b>	Title = "Math 106" Description = "any text " Video = "Video 1"	Course created successfully.
<b>1.2</b>	Title = "Math 106" Description = "" Video = "Video 1"	Error message.  All fields should be filled

## 17. Project Status

We expect to finalize the following items next semester:

- Review all the report based on the examiners' comments.
- Revise requirements and design as we go further in programming.
- Conduct and report on a detailed quality plan.
- Elaborate and execute a test plan.
- Conduct a usability survey.

## 18. Conclusion

In this document we compared our project to several other systems, we also described our quality assurance plan and use cases with description to the main ones, we also talked about what system architecture we're going to use and why we choose it, moreover we've list some mockups to show the overview of our user interface.

## 19. Reference

1. Coursera, <https://www.coursera.org/>, Accessed: September 2020.
2. Udemy, <https://www.udemy.com/>, Accessed: September 2020.
3. Wea, <https://www.wea.org.uk/>, Accessed: September 2020.
4. Shroo7, <https://www.shroo7.com/>, Accessed: September 2020.
5. Wikipedia, <https://www.wikipedia.org/>, Accessed: September 2020.