

**Arab American University**

**Faculty of Engineering and Information Technology**

**E-learning course**

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**Chapter one: Overview**

**1.1 Introduction :**

This an e-learning course is a virtual reality system that educate the students of this course about Geographic informations about Jericho and surrounding areas including its archaeological sites,topography and the problem of of the Dead Sea receding .

It show the student the famous character of (Ibn battuta) to explore jericho with the student and learn about Jericho and dead sea during this virtual tour using Virtual reality .

**1.2 Advantages / Objectives :**

**`**

* The E-Learning using VR in efficient way to learn.
* The student does not need to travel.
* The student learn at home.
* The student will learn in interesting way.
* A lot of information will be add for student experiences which allow him/her to give his opinions and suggestion for Jericho geographic issues

.

# **Chapter Two: Requirement**

**2.1 Introduction :**

In this section we describe the requirements of the system .

Functional requirements that include user requirements and system requirements , from functional

requirements we define the services, features and requirements of users.

Also, we define non functional requirements , that any system without this will be useless system

,also non functional requirements affect the functional requirements, so it is important to define it.

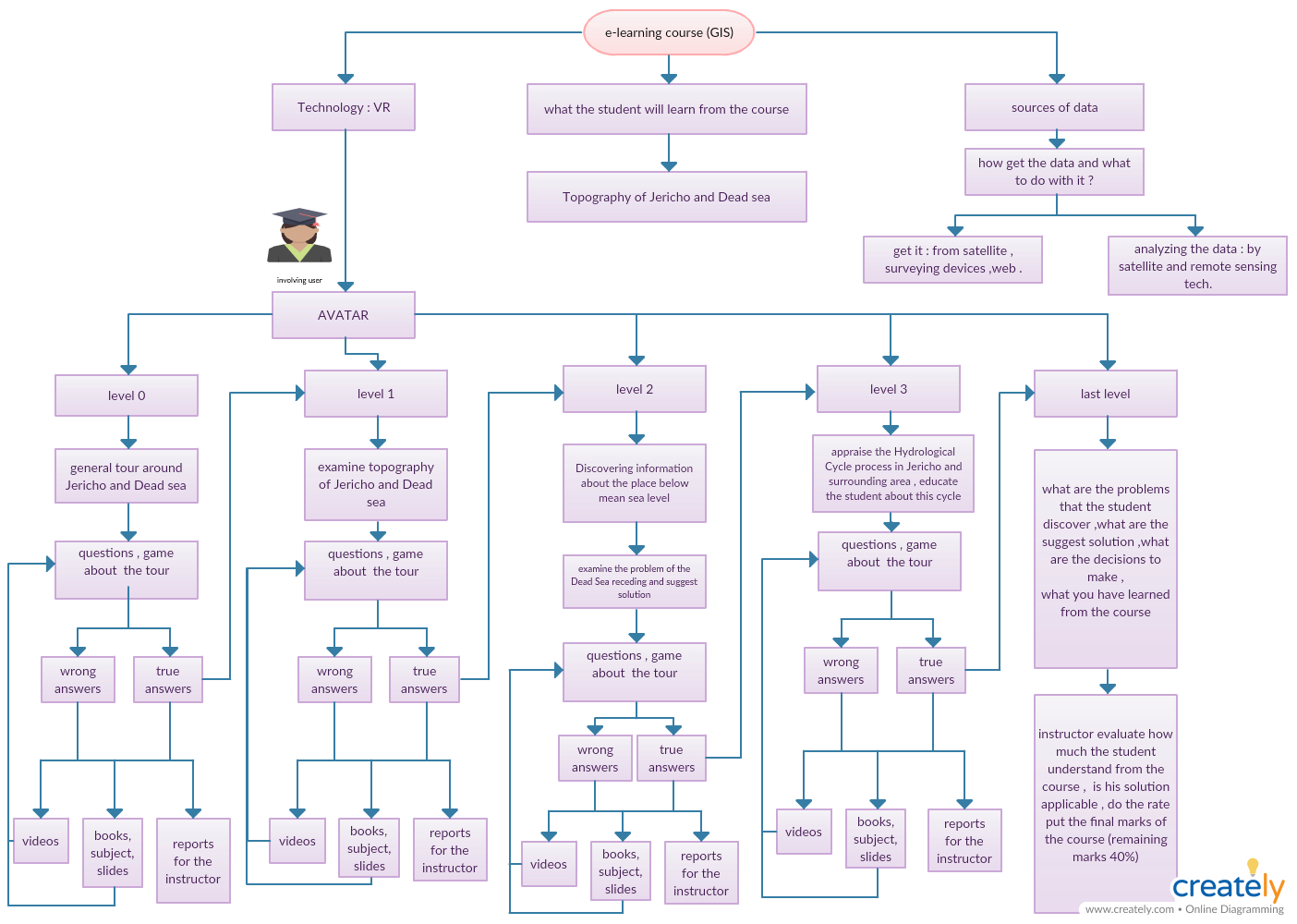
**2.2 Scenarios :**

* **Initial assumption**: the student has been already registered in the course of GIS .
* **Normal** :As a registered user in GIS course I want to log in so that i can see my main page , then log into the VR course . starting the game for the first level throw student in plane of Jericho city and then the character (**Ibn Battuta**) appear and take student with him in Jericho city in a general tour then teach student about Archaeological sites of Jericho then (**Ibn Battuta**) will ask student to find a map when he found it a quiz will flows out of the map and he/she have to catch it , it will be about what student have learned , if student have passed this exam , student will be travel to next level with (**Ibn Battuta**) , if not the game will show the student more videos or written information about Jericho Archaeological sites and then let him/her answer the question of the quiz again , the same for the general tour , if student have moved to the next level ,(Ibn battuta ) will educate him/her , about Jericho topography by take student with him in a tour around Jericho then do the same as the first level in which finding a map

but with different sites , then having a quiz questions to answer them ,then give a videos and audios for Jericho topography ,if student have reached the third level the student will be given materials concerning about the problem of the Dead Sea receding and Hydrological Cycle process then finding the map ,passing the quiz ,moving to the next level if answers were correct and showing student some materials about that problems if it were not correct .

Fourth stage will be different in which the student have to suggest solutions for problems that he found ,these solutions have to be evaluated by the instructor to decide whether the student have complete this course successfully or to ask the student to give another solutions .

* **What can go wrong:**
* The entered username or password or the generated code is wrong (this user is not exist in the portal database (the other system) ,cause he did not pay the System Subscription Fees).
* The student doesn’t do his/her tasks within duration for that tasks .The system should alarm the student that he had the given tasks to finish them within the given duration .
* Lacking of videos ,audios and the written documents that the student should be given in each level . The instructor should be alarmed if that happened .
* System down for more than 1 minute per .
* The previous progress for the student is not stored due to the student not submitting him/her progress.
* **Other activities :**The instructor can see what the student did while he/her logging in the course and he can give student instructions ,commands ...etc by sending him a message .
* **System state on completion :** the student’s activities ,answers and suggestions are stored in the DB . the record show when and how much the student worked and progress and what he have learned . generate a reports every week , then deliver it to the instructor .

Fig 1.1 :the Scenario diagram .

**2.3 Functional Requirement:**

Functional requirements describe the services that our project provide also the needs

that users want from this project.

For example , this project shall allow user to book room in hotel and to log in or

register in the website.

In addition , the system shall allow administrator to manage and control all rooms.

**2.4 Non- Functional requirements :**

Non-functional requirements define the needs in terms of performance , logical database requirements , design constraints , standards compliance , reliability , availability ,security , maintainability and portability.

* **Security Requirements:**

1. All users are authenticated and a code will be delivered for the user using his/her mobile number to authenticate him at the login time if he use this device for the first time to login .

1.1 The system shall notify the user if her account been accessed using

“New” device .

2. The system use SHA-1 algorithm to obtain the security and also have to use Salt approach so even if there a common passwords the system still Secure.

* **Reliability:**

System shall not be down more than a 1 minute per a day.cloud approach computing shall support reliability.

* **Availability:**

The system is available during 24 hours of the day 7 days a week**.**

by using redundancy networking approach.

* **Maintainability:**

1.The system shall support data recovery .

1.1 Using Cloud approach computing support data recovery.

* **Flexibility:**

System should be flexible enough to provide space to add new features and to handle them conveniently

* **Portability:**

1. User can login to the system at any time from any device have been downloaded the application .

1.1 The E-learning system shall run in any OS ,as it developed using Java Language .

**2.5 User Requirement:**

* As a non registered user in Geographic Information System (GIS) I want to open the registration page and enter the username and password and the payment confirmation code ,so that the system shall open the main page .
* As a registered student I want to open the login page and enter a username and password ,so that the system shall open the main page .
* As a registered student I must give a contact information to the system

like a phone or email to get the feedback and the new features of the system.

* As an instructor of the course , I will get my earnings after i finish my tasks ,which are adding the videos,audios and written resources for each level and weekly evaluate the work of the students.
* As an instructor ,I want to log in to the system using my username and password which were given to me by the HR after accepting me as an instructor for the GIS course .
* As an instructor of the course, I can give the students instructions, command by sending him/her massage.
* As a registered student in GIS course I want to log in so that the application shall open the main page to see my information and editing the information.
* As a registered student I want to start playing after i entered the course.

* As a registered student I want to pass the last level in the GIS course so, I suggest solutions for problems ,these solutions have to be evaluated by my instructor to decide whether the I completed this course successfully or to ask me to give another convincing solutions .
* As a registered instructor I want to add written information and videos for each level so, that the system shall let me add these materials in its order place and then save it .
* As a registered instructor I want to evaluate the students weekly so that, the system shall send me the generated reports weekly for each student to me.
* As a registered student who complete one level successfully , I want to submit the press the next button to go to the next level .
* As an instructor I want to evaluate the students solutions for the last level so that the system shall send me a report for each student provide the required solutions .
* As a registered instructor I want to submit that the student provide acceptable answers for tell his/him to provide another answers so that the system shall open a page to choose between these choices for each student.

**2.6 System Requirement:**

1. The system shall allow the registered student and instructor to login and logout from the account.

1.1 the system have to use the Id(username & password) of the student/instructor to login and logout .

1. The system shall automatically save the student’s progress when the student logout the application.

2.1 The system shall save the student current state while he/she is playing .

1. The system shall connect with VR glasses in order to be useable .
2. The system shall generate report about student’s progress and provide it for the instructor.

4.1 For each student, the system shall generate a report .

4.2 The reports shall be generated at 11:59, Friday every week.

4.3 Every report shall contains specific components .

4.3.1 For each session ,the login time ,logout time , previous level, current Level ,number of correct answers,number of incorrect answers,and the name of any document ( text,video or audio) that have been viewed during the session shall be reported.

1. The system shall treating the financial transaction .

5.1 System subscription cost shall be delivered in The Palestine Bank.

5.2 At registration time the system shall validate a bank account number given by the user.

1. The system shall use voice recognition to type the solutions in the last level .

6.1 System shall ask user to access his/her microphones by giving him inter-

active message.

6.2 User can edit the entered text using his/her keyboard.

7. The System’s Interface shall be implemented by user experience approach(UX) .

**2.7 System Requirements specifications :**

SRS/1.1

|  |  |
| --- | --- |
| Function | Login /Logout . |
| Description | The user will enter the user ID and password at the login interface. |
| source | Student . |
| Input | Student ID and password. |
| output | User main page. |
| Destination | System control unit . |
| Action | Verify Id and password of the user , if the ID and password are matching the stored content then confirm the login , else the login will not be confirmed. If the login was not confirmed three times , the student will get an unauthorized access.  P.c. (see the tabular number 1) |
| Requirement | Username and password. |
| Pre-condition | Student’s Registrations . |
| Side-effect | None. |

Tabular specification of login :

|  |  |
| --- | --- |
| Condition | Action |
| (Entered\_ID == StoredID) && (Entered\_Password ==Stored\_Password) | confirm=true |
| (Entered\_ID != StoredID) && (Entered\_Password !=Stored\_Password) | confirm=false |
| Number of attempts > 3 | Send message (alarmed) |

Tabular 1 .

SRS/2.1:

|  |  |
| --- | --- |
| Function | Save progress . |
| Description | If the student press logout button the system automatically save the progress b (Session component). |
| source | Student |
| Input | Session component |
| output | Confirmation message |
| Destination | The Cloud of data |
| Action | Saving data |
| Requirement | Press logout or save button |
| Pre-condition | The student shall be login |
| Side-effect | none |

SRS/4.3.1:

|  |  |
| --- | --- |
| Function | Report generation |
| Description | A report have to be generated each week of the semester at the 11:59 pm .  The instructor of the course will guaranteed the access for this reports .  The reports will contains , for each session: 1-the starting time :  This is the time when the student start playing the game.  2- logout time:  This is the time when the student  save/loggedout the game.  3- previous level:  The last level for the student before  This session has been started  4- current Level:  The latest level after the student  This session has been finished  5- number of correct answers during the  session  6- number of incorrect answers during the  session  7- The name of any document including text video or audio document that have been viewed during the session. |
| source | The Cloud data |
| Input | none |
| output | Generated report |
| Destination | Instructor account mailBox |
| Action | Generate report |
| Requirement | None |
| Pre-condition | “Clouding” each single session info. |
| Side-effect | None |

SRS/5.2

|  |  |
| --- | --- |
| Function | Financial transaction verification |
| Description | Palestinian bank shall generate a code for each user and simultaneously send this code for the system .  This code is one life use  At the registration time user have to enter this code in order to be authenticated user  (**authenticated user** is who pay the costs and received the authentication code),  Then user will enter the userName and new password in order to be a registered user  ( **registered user** is who have a userName and a password). |
| source | Bank |
| Input | Money in the Bank |
| output | Delever code from the Bank |
| Destination | Student , System |
| Action | Generate code |
| Requirement | Payed money |
| Pre-condition | Connection between the e\_learnig course system and bank system . |
| Side-effect | The students can’t take loan in order to join this course. |

SRS/6.1

|  |  |
| --- | --- |
| Function | Voice recognition typing |
| Description | At the last level the system allow the student to type her suggestion for the given problems by using the virtual hands or to use voice recognition to enter the answers (it will convert the student voice into written answers) . |
| source | Student device |
| Input | Typed or recorded solution |
| output | Confirmation message for the student |
| Destination | Instructor mailbox  System cloud . |
| Action | After typing or recorded the solution will reserved at the cloud and send for the instructor  The instructor will evaluate the given solution :  Case 1: the given solution is satisfactory  and acceptable then instructor will enter the grade and end the course.  Case 2: the given solution is not satisfactory and not acceptable then instructor will ask the student to suggest another solution. |
| Requirement | Voice recognition embedded system |
| Pre-condition | none |
| Side-effect | none |

**2.8 Non Functional Requirement specification:**

SRS/1.1

|  |  |
| --- | --- |
| Function | Security |
| Description | Check if the username and password are matching the stored data. If the user login from another device a message will be sent to his mobile to alarm and check if he/she is the one who login. |
| source | Student |
| Input | Username and password |
| output | Alarm message and confirm message |
| Destination | Database/Authentication system |
| Action | Generate alarm message and confirm message |
| Requirement | Username and password |
| Pre-condition | Registration |
| Side-effect | None |

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# **Chapter Tree : Modeling**

**3.1 Introduction :**

In this chapter we use modeling to describe the system and its services and features .

We define the use case to describe the requirements of the actors .

We also use activity diagram to describe the activities of actors ,we use also the sequence diagram.

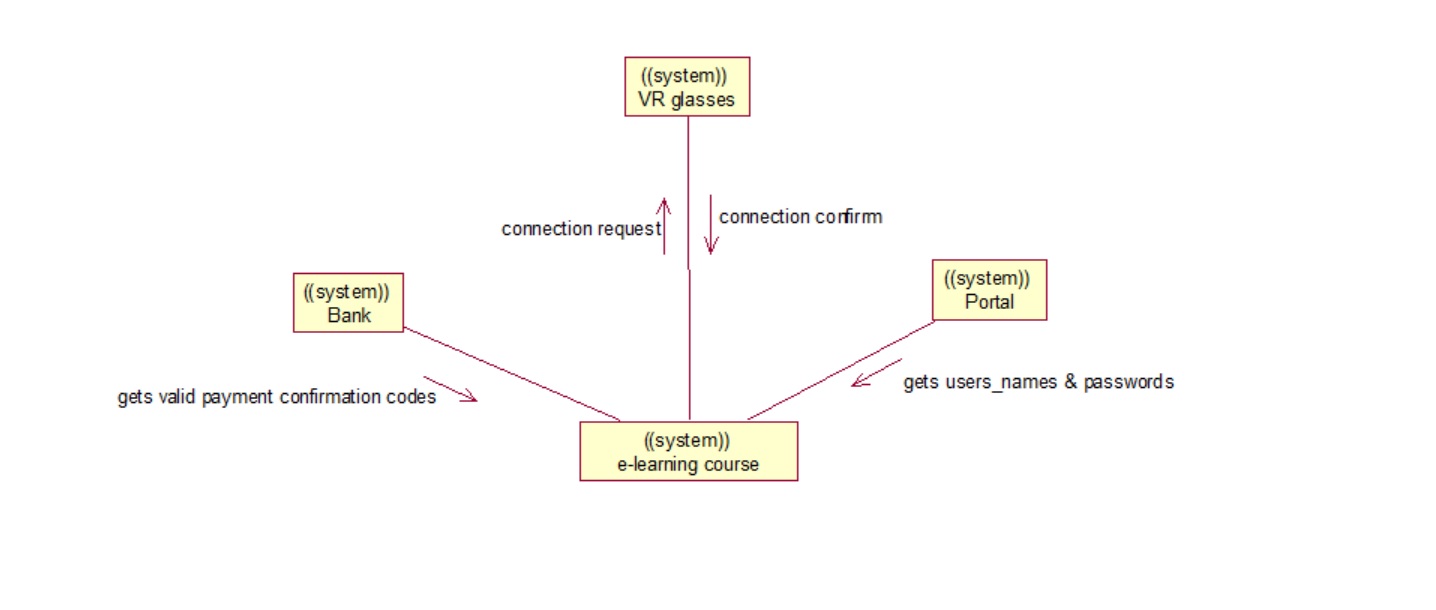
In addition we define the context diagram to define our project and its boundaries and the external

systems that our system interact with it.

Through modeling we define exactly what the system should do and the requirements of

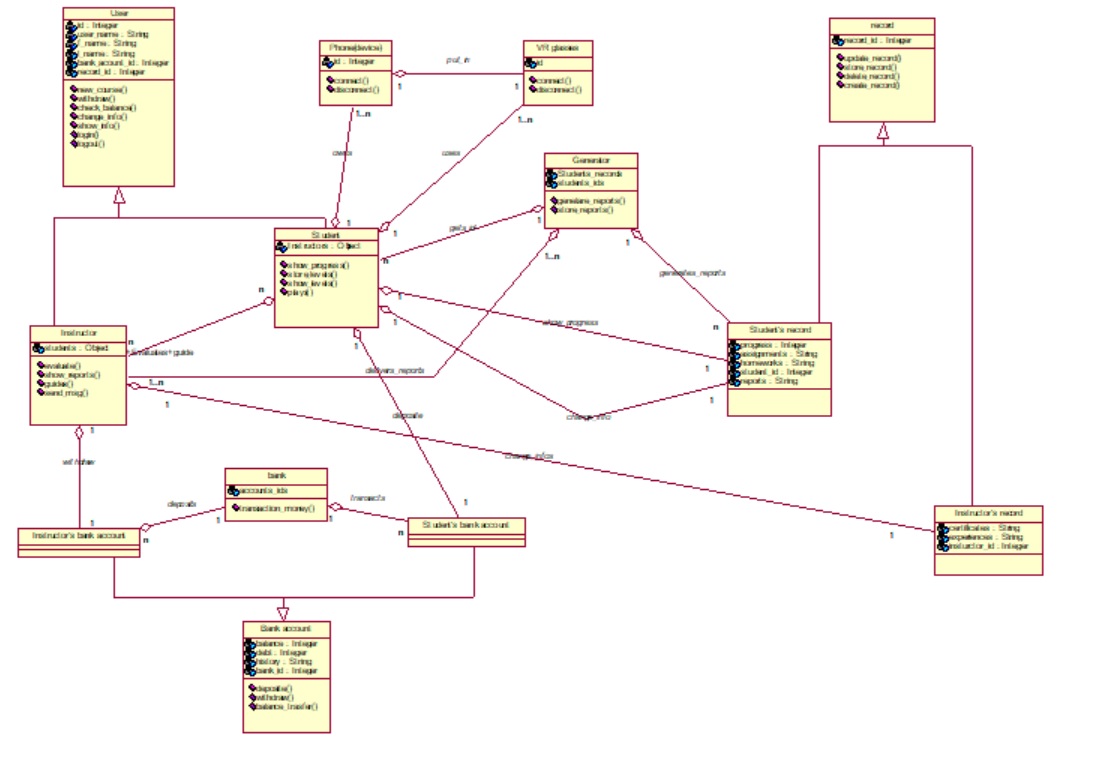
stakeholders.

**3.2 Context diagram :**

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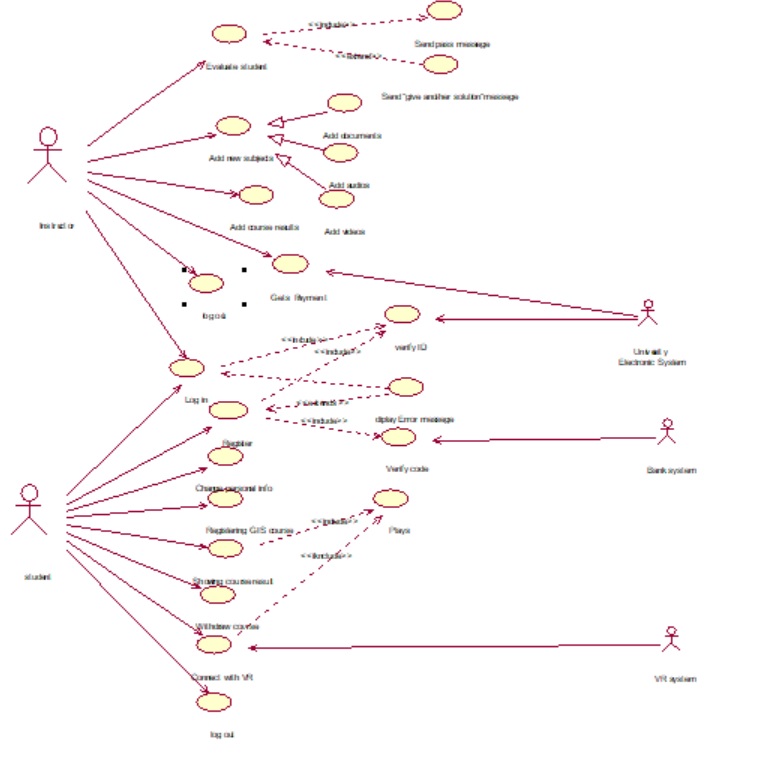
**Fig 3.1 : The Link(https://drive.google.com/file/d/1UAperTezxA0o1kgXRuT7CYeWHLiwPcjw/view?usp=sharing)**

**3.3 Class diagram :**

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**Fig 3.2 (The Link :** [**https://drive.google.com/file/d/1iZD\_g-M5Zj6MSUwh89LZN0B59i5K5zWG/view?usp=sharing**](https://drive.google.com/file/d/1iZD_g-M5Zj6MSUwh89LZN0B59i5K5zWG/view?usp=sharing)**)**

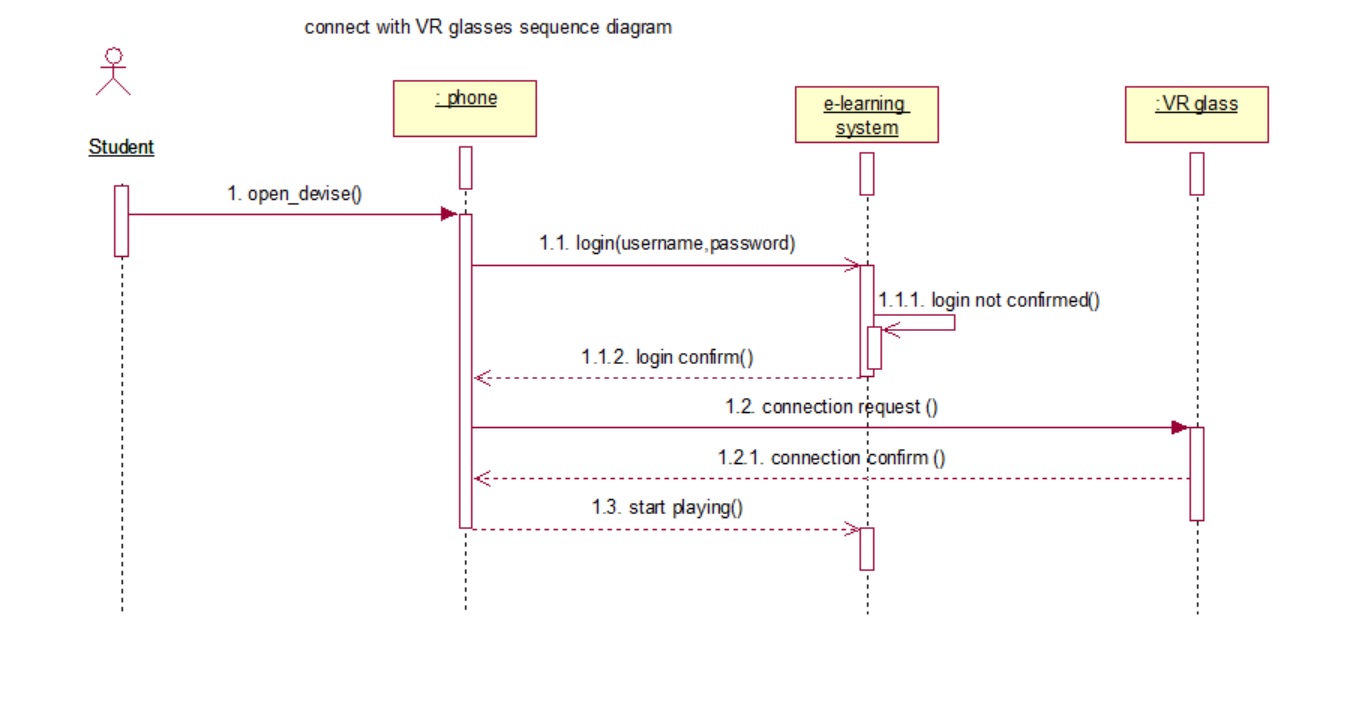
**3.4 Use\_Case diagram :**

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**Fig 3.3 (The Link : https://drive.google.com/file/d/1je3Lr7sWhF3\_hIkWhnFlNpAzqUSX-TLE/view?usp=sharing)**

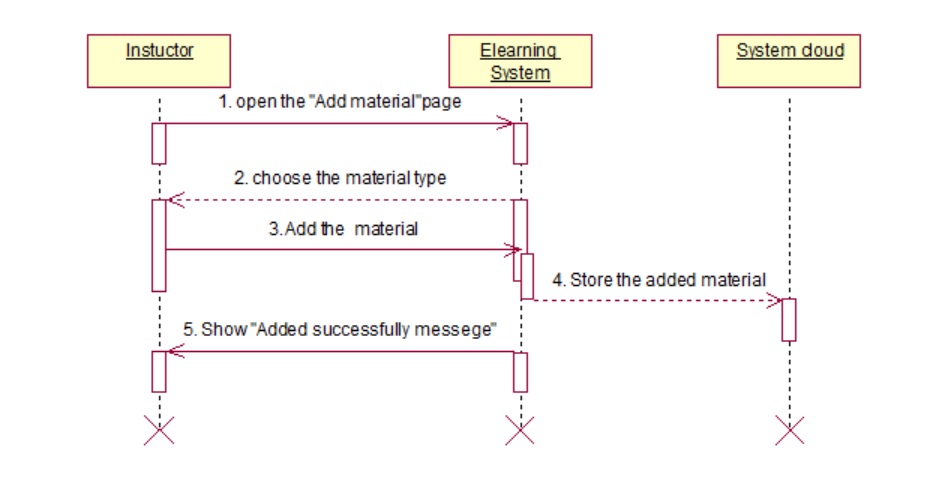
**3.5 Sequence diagrams :**

**3.5.1 Connect with VR glasses Sequence diagram:**

****

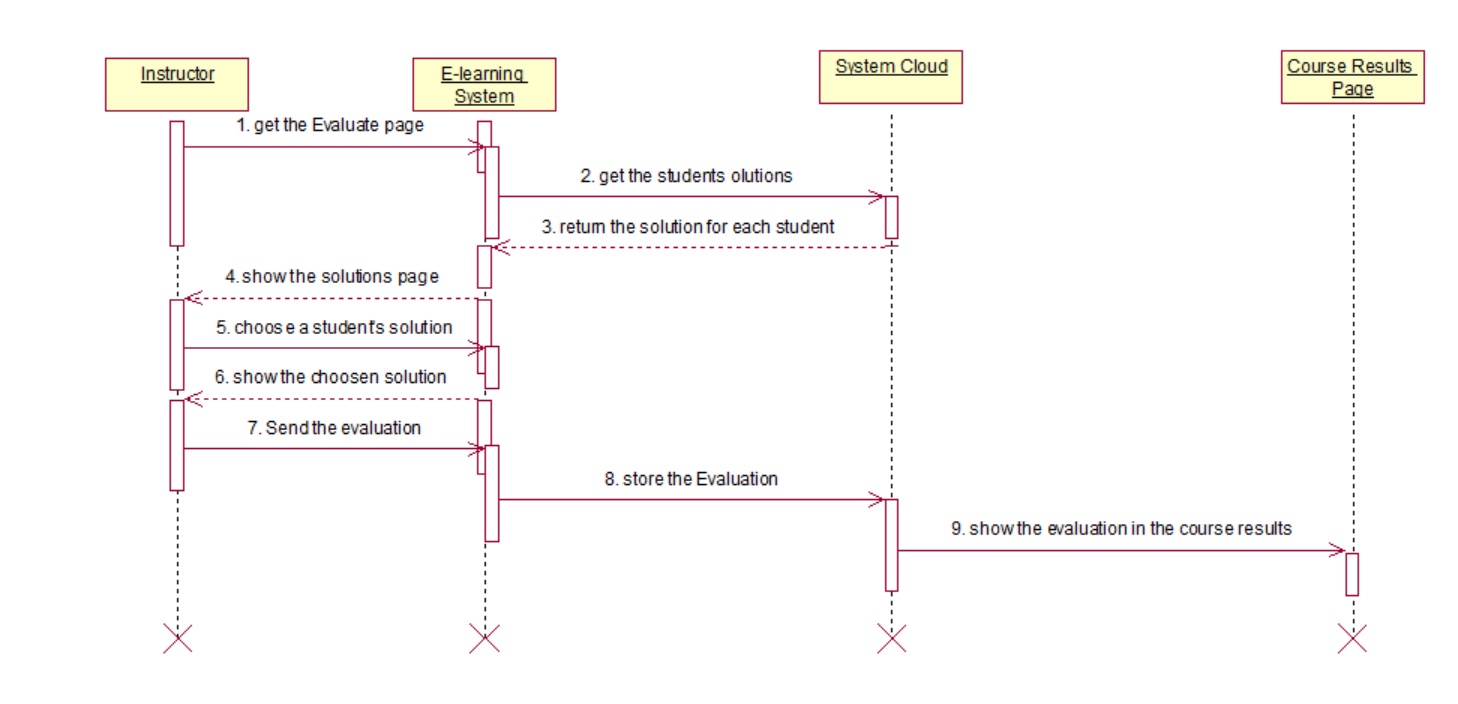
**Fig 3.4 (The Link : https://drive.google.com/file/d/1s13tbOTWgkvh90tvLLmbelHPSdyjWfq\_/view?usp=sharing)**

**3.5.2 add material Sequence diagram:**

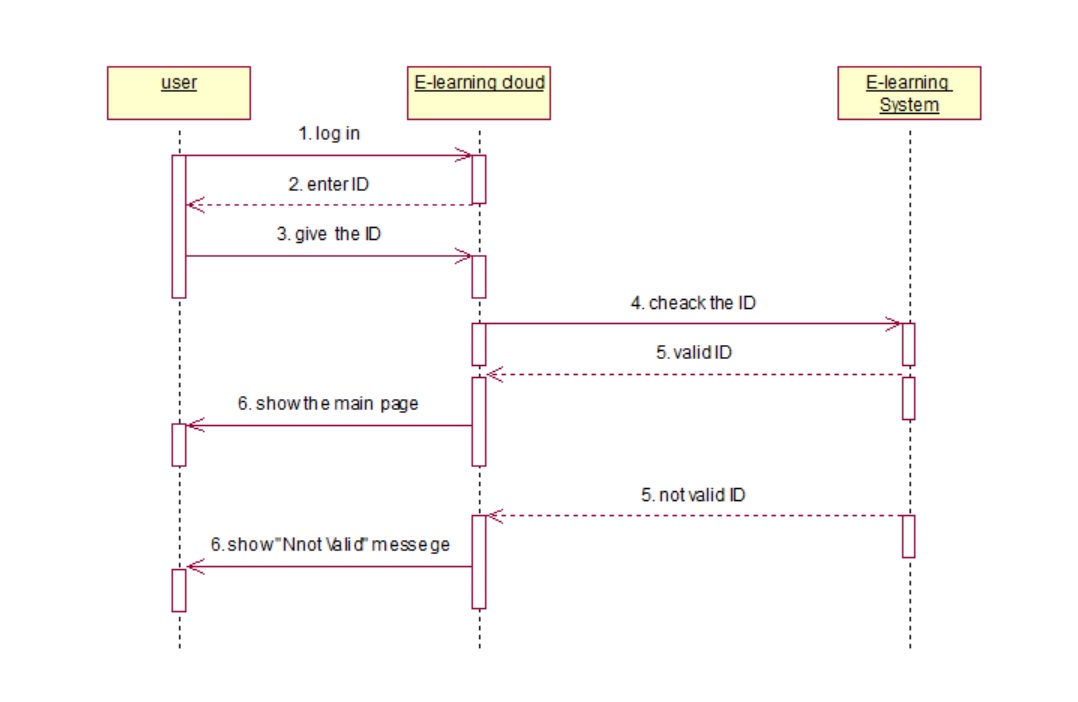
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**Fig 3.5(The Link :** [**https://drive.google.com/file/d/1CiETcoTfyA1tdzJ4LBG7xtnPMOlhp7jM/view?usp=sharing**](https://drive.google.com/file/d/1CiETcoTfyA1tdzJ4LBG7xtnPMOlhp7jM/view?usp=sharing)**)**

**3.5.3 evaluation Sequence diagram:**

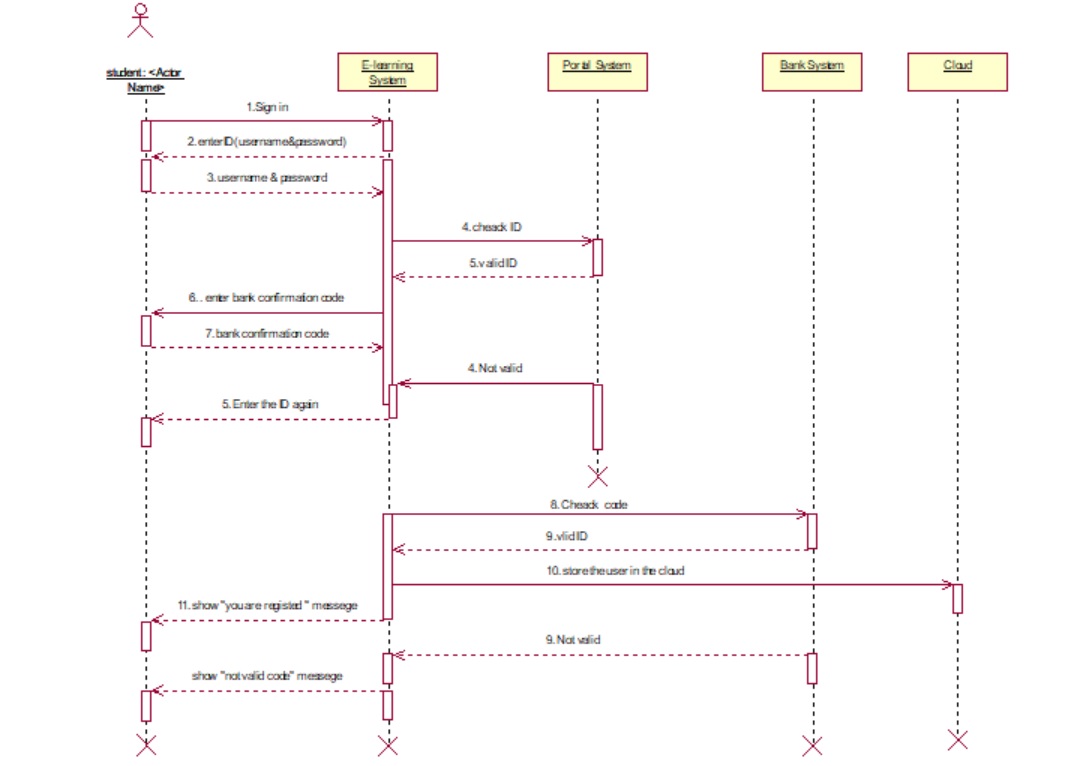
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**Fig 3.6 (The Link :** [**https://drive.google.com/file/d/1ZEjAKm8gnqwfkN0WoQbb1VaE0qIqFzvu/view?usp=sharing**](https://drive.google.com/file/d/1ZEjAKm8gnqwfkN0WoQbb1VaE0qIqFzvu/view?usp=sharing)**)**

**3.5.4 login Sequence diagram:**

**Fig 3.7 (The Link : https://drive.google.com/file/d/13DXyw1nOmPMvZyP7\_d0xcJgSaFcfodKY/view?usp=sharing )**

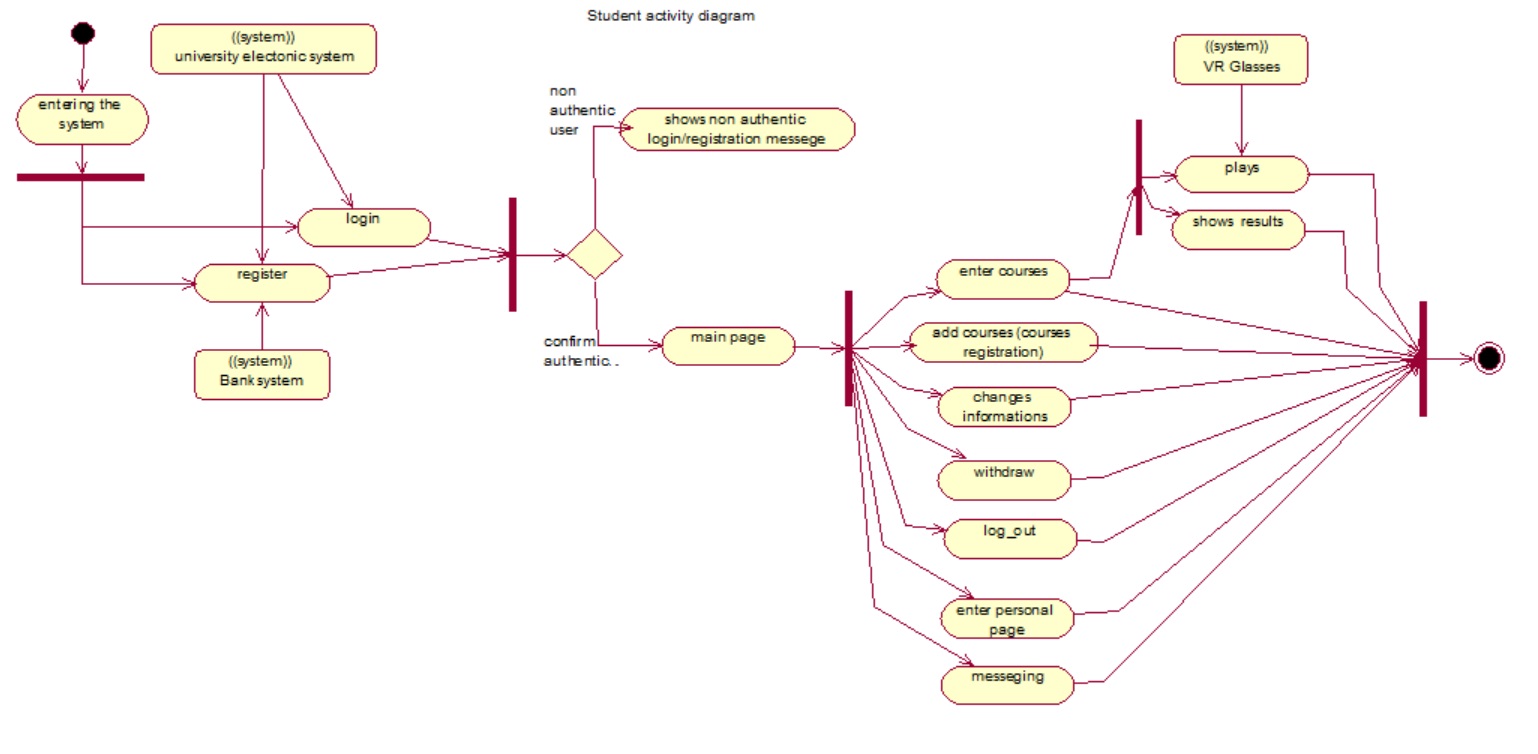
**3.5.5 Registration Sequence diagram:**

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**Fig 3.8 (The Link : https://drive.google.com/file/d/1s0QRgz6XpkFKbxS0OBOaUQsbgpmoyna2/view?usp=sharing)**

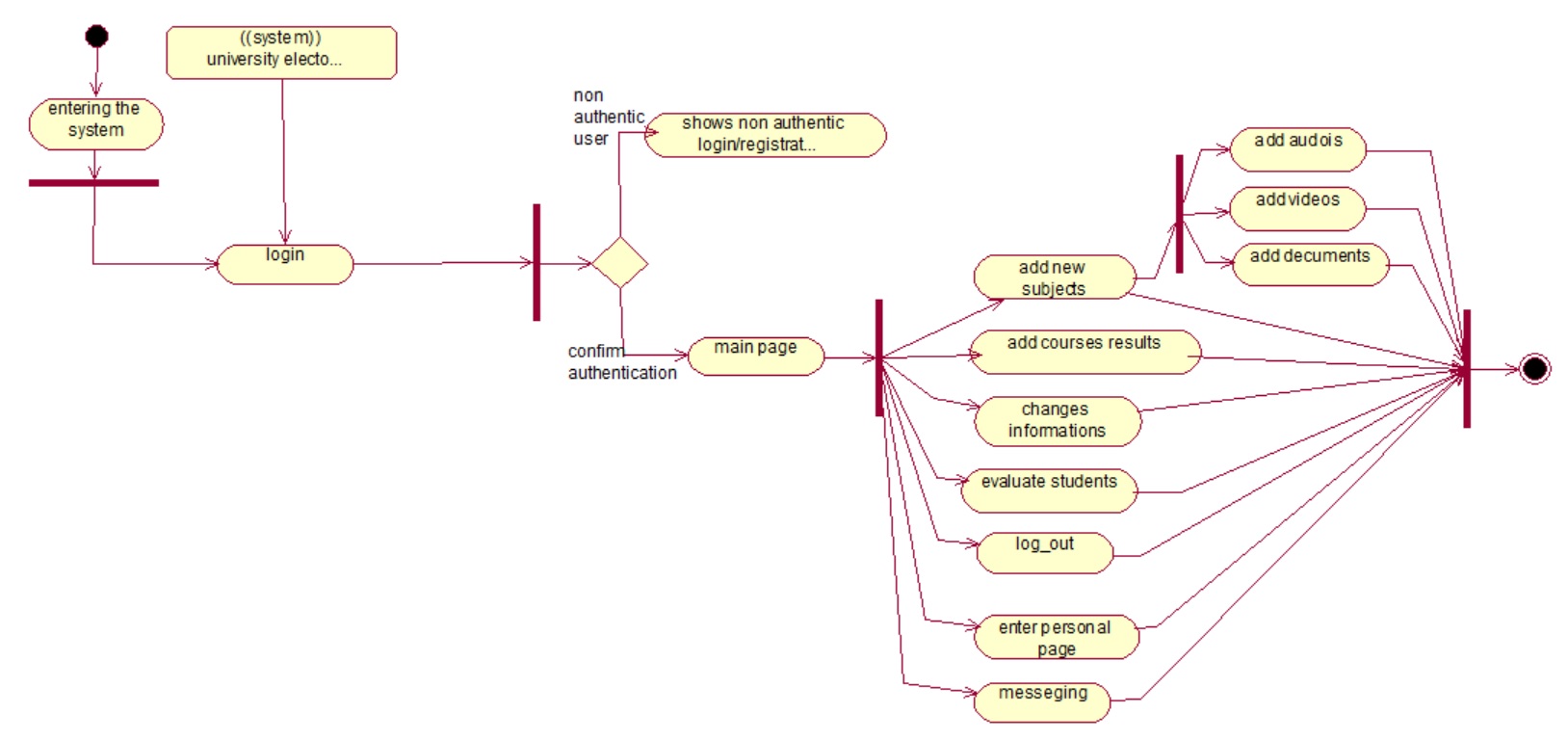
**3.6 Activity diagram :**

**3.6.1 Student Activity diagram:**

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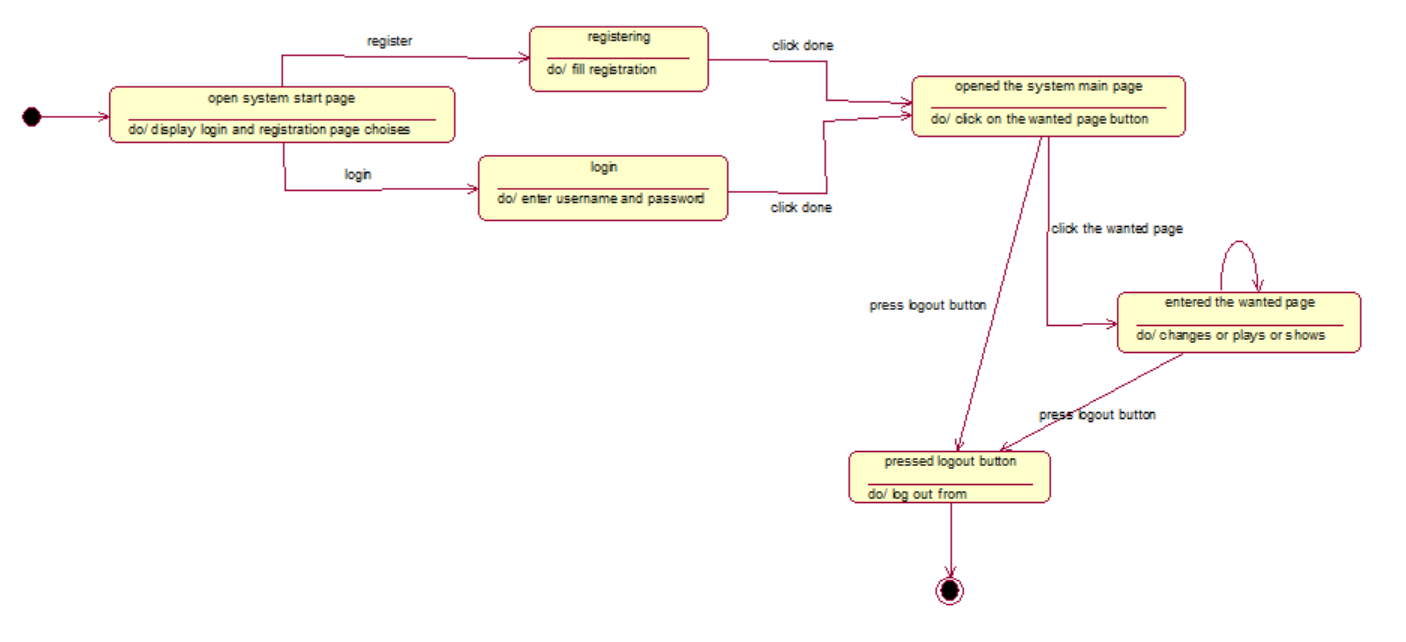
**Fig 3.9 (The Link : https://drive.google.com/file/d/1KZl7tozyKamiV9wnNgOP0a6pTvN5rctc/view?usp=sharing)**

**3.6.2 Instructor Activity diagram:**

****

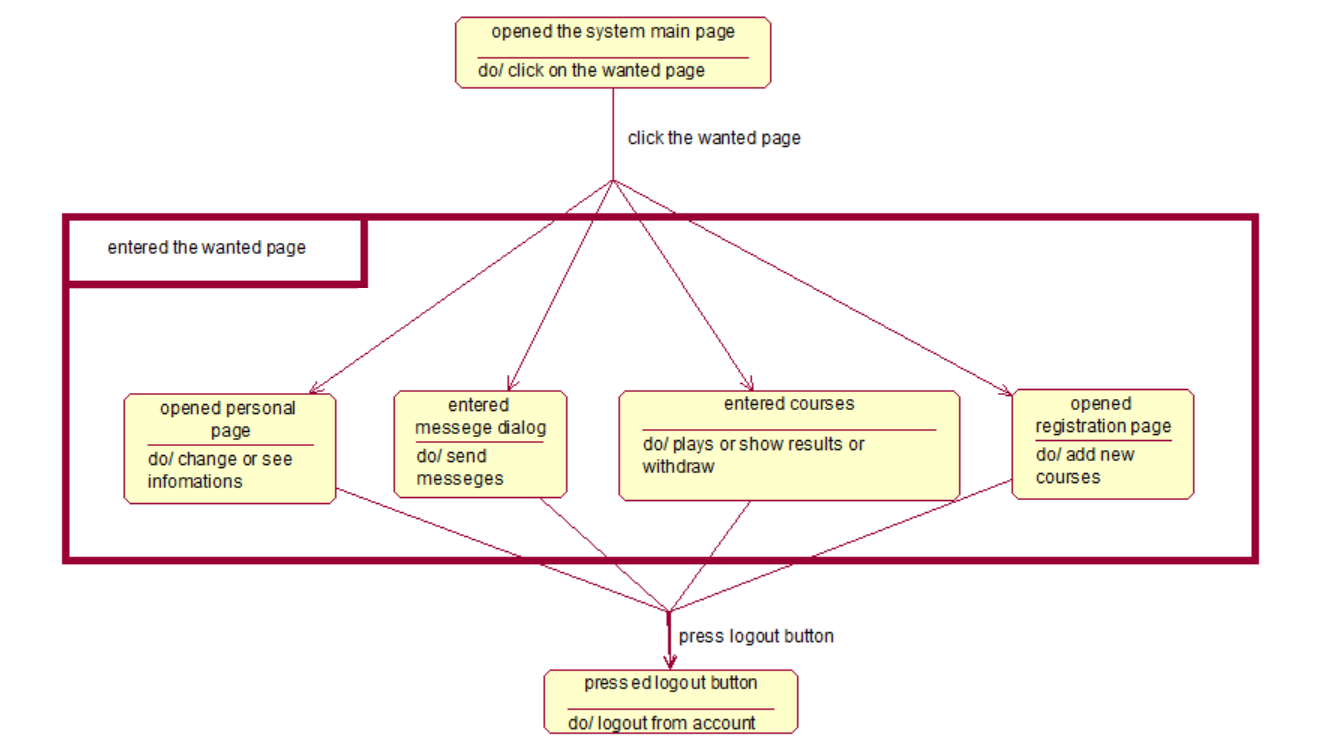
**Fig 3.10 (The Link : https://drive.google.com/file/d/1mD6KUNRv\_QoPdoOhQ-cpoSfIfgf1GmB6/view?usp=sharing)**

**3.7 State diagram:**

****

**Fig 3.11 (The Link : https://drive.google.com/file/d/19DZB4eJPNE8XhY8VX7GiqSSMVc2XcNSo/view?usp=sharing)**

**3.7.1 entered the wanted page State diagram:**

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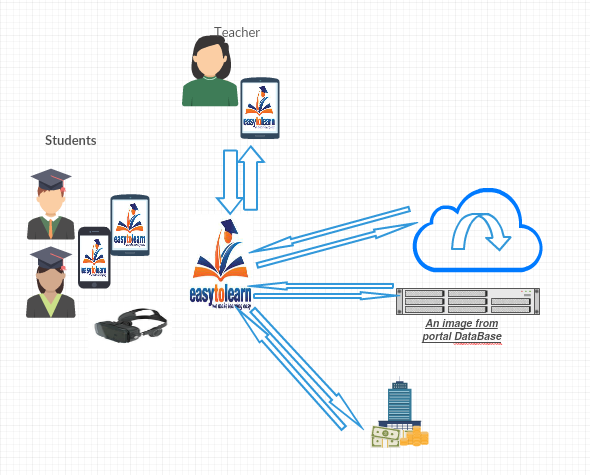
**Fig 3.12 (The Link : https://drive.google.com/file/d/1JvCSwdj-fbAirOTDvndX3X\_zKp8Ktozz/view?usp=sharing)**

**3.8 Architectural Design :**

**The reason why we use the MVC architecture because we have logical that represented in physical components that interacts with each other , also these components manages the data of the system that are stored in the cloud , and the operations on these data .**

**The view component here is the user interface in the application which present the data to the user .**

**The Controller component is the application which manages the user interaction using VR glasses and VR playhand ,and the VR keyboard and passes these interactions to the cloud and the user interface and the bank for the money transactions , vice versa .**

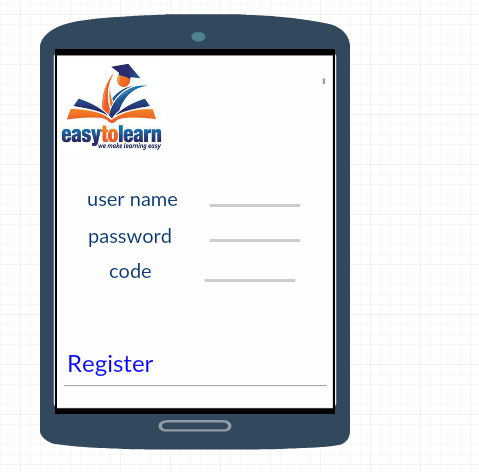
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**Fig 3.13 Architectural design.**

**3.9 Interface Design :**

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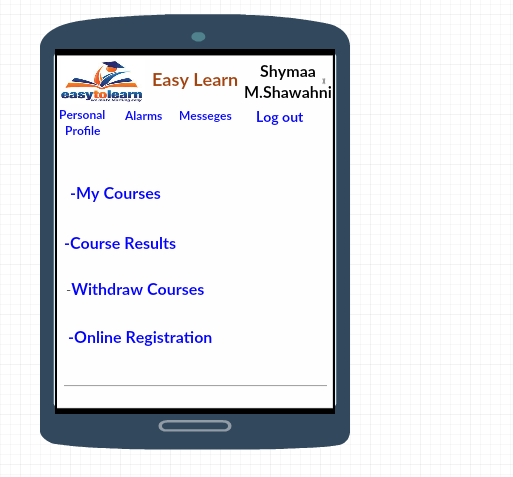
**Fig 3.14 system interface design.**

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**Fig 3.15 register page design.**

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**Fig 3.16 login page design.**

****

**Fig 3.17 main page design .**

# **Chapter Four :Conclusion and Recommendations**

**4.1 Conclusion :**

The e-learning system is a solution to many of the problems , so we make it easy on students who need to know about Jericho city and Dead see , saves time and effort of getting the use full information to students in easy and fun way.

The absence of VR glasse well make the system useless and not fun at all, and nothing will be done through the system.

**4.2 Recommendations for Future works :**

We will keep trying to develop the system and add new features and services based on user requests.

In addition to working on trying to expand the scope of his work to all universities and to reduce the possible errors in the system.