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كلية علوم الحاسب والمعلومات

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Abdulrahman University
College of Computer and
Information Sciences

CS 385: Software Engineering
Term Project

Title: Online Learning Platform for Special Needs Education

Section: 53u

Group no. 7

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		Max. Mark	Mark Obtain	Notes
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Use-case Diagram (for the whole system)	Working as a team	**1.5**		
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Scenario (MSS & Extension) **Use Case 4:** Click or tap here to enter text.	Working as a team			
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Sequence Diagram **Function 3:** Click or tap here to enter text.	Working as a team			
Sequence Diagram **Function 4:** Click or tap here to enter text.	Working as a team			
Activity Diagram **Function 1:** Click or tap here to enter text.	Working as a team	**0.5**		
Activity Diagram **Function 2 :** Click or tap here to enter text.	Working as a team			
Activity Diagram **Function 3:** Click or tap here to enter text.	Working as a team			
Activity Diagram **Function 4 :**Click or tap here to enter text.	Working as a team			
State Diagram (If any)	Working as a team	**0.5**		
System Architecture	Working as a team			
TOTAL SCORE		**9**		

Contents

1. Chapter 1

System descriptions

Our online learning platform is designed specifically for students with special needs, offering tailored educational experiences that promote individual growth and learning.
Utilizing adaptive technology , we provide engaging resources that cater to diverse learning styles. Our platform fosters an inclusive environment, empowering educators, caregivers, and students to collaborate effectively. With a focus on accessibility and flexibility, we aim to enhance educational outcomes and ensure that every learner has the opportunity to thrive.

The development Process model used

Incremental

System Requirements

Functional Requirements

User Requirements

1. The user shall be able to create an account.

2. The user shall be able to log into the system.

3. The user shall be able to change their password.

4. The user shall be able to view and edit information of the account.

5. The user shall be able to adjust accessibility settings.

6. The user shall be able to browse and view available courses.

7. The user shall be able to access lessons in various formats.

8. The user shall be able to track their progress.

9. The user shall be able to participate in interactive quizzes or assessments.

10. The user shall be able to communicate with the instructor.

11. The user shall be able to participate in group discussions with other students.

12. The user shall be able to report technical issues or request support.

System Requirements

1. The user shall be able to create an account.

1.1 The system shall display a registration form.

1.2 The user shall provide required information including email, username, and password.

1.3 The system must validate the email by sending a verification email.

1.4 The system shall accept the registration upon successful validation.

2. The user shall be able to log into the system.

2.1 The user shall enter their username and password.

2.2 The system shall provide a Forgot Password option.

2.3 The user shall enter their email to initiate password retrieval.

2.4 The system shall send an email with password reset instructions.

3. The user shall be able to reset their password.

3.1 The system shall display a password reset screen and prompt for the email.

3.2 The system shall send an email with a link to set a new password.

3.3 The system shall confirm to the user that the email was sent.

4. The user shall be able to manage their profile information.

4.1 The user shall be able to edit their name, email address, and profile picture.

4.2 The system shall prompt for verification via email or phone number.

4.3 The system shall send a verification email or SMS message.

4.4 The system shall confirm the new information and update the account.

5. The user shall be able to customize accessibility settings.

5.1 The system shall provide options for adjusting text size.

5.2 The system shall allow changes to color contrast settings.

5.3 The system shall ensure compatibility with screen reader technology.

6. The user shall be able to browse available courses.

6.1 The system shall display a catalog of courses categorized by topics.

6.2 The user shall be able to filter courses based on their interests.

7. The user shall be able to access course lessons.

7.1 The system shall provide lessons in various formats, including video, audio, and text.

7.2 The user shall have the option to choose their preferred lesson format.

8. The system shall track user progress in courses.

8.1 The system shall display completion percentages for each course.

8.2 The system shall highlight milestones achieved by the user.

9. The user shall be able to take interactive quizzes.

9.1 The system shall provide quizzes or assessments related to course material.

9.2 The user shall receive feedback on their quiz performance.

10. The user shall be able to communicate with instructors.

10.1 The system shall facilitate messaging or email communication with instructors.

11. The user shall be able to participate in group discussions.

11.1 The system shall provide forums or chat rooms for student interactions.

12. The user shall be able to report technical issues.

12.1 The system shall offer a dedicated support ticket system for users to request assistance.

12.2 The user shall provide details of the technical issue encountered.

Non-Functional Requirements

Nonfunctional User requirements

1.system should be accessible to the user

2.the system should be adaptable

3.the system should be easy to use

4.the system should be secure and private

5.the system should be reliable

6.system should be interoperable

7.system should have a high performance and scalability

Nonfunctional System requirements

1.system should be accessible to the user

1.1- Sign Language Support: Provide support for embedding sign language videos alongside educational content for hearing-impaired users.

1.2- Audio Descriptions and Captions: Provide captions for videos and audio content; offer transcripts for text-to-speech compatibility.

2. The system should be adaptable

2.1- Adaptive Learning Pathways: The platform should use algorithms to recommend content, lessons, or activities based on the user's progress, learning style, or performance, providing personalized learning experiences without manual intervention

3. The system should be easy to use

3.1- Intuitive User Interface (UI): The platform should offer a simple, clear, and easy-to-navigate interface for all users, especially for those with cognitive disabilities.

3.2- Multilingual Support: Provide options for multiple languages to accommodate diverse users.

4. The system should be secure and private

4.1- Data Encryption: Sensitive data, such as personal information and progress reports, must be encrypted both at rest and in transit, using protocols like SSL/TLS.

5. The system should be reliable

5.1- High Availability: The system should provide at least 99.9% uptime to minimize disruptions in learning activities.

5.2-Error Handling and Recovery: Implement clear error messages and recovery processes to prevent data loss or progress disruption during errors.

6. The system should be interoperable

6.1- API Integration: Enable seamless integration with external tools (e.g., LMS, assistive technology, and communication platforms like Zoom or Google Meet).

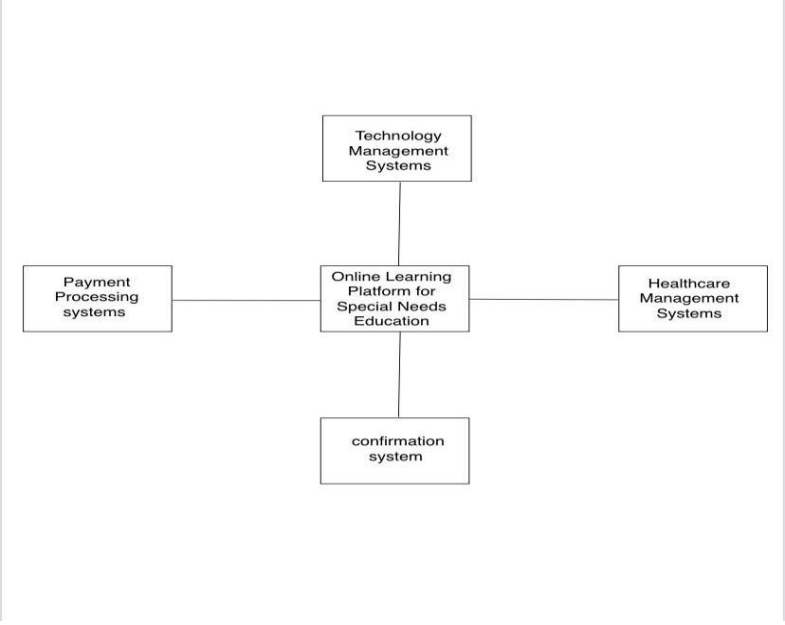
7.system should have high performance and scalability

7.1-Scalability: The system must handle increasing user loads, including traffic spikes, without performance degradation.

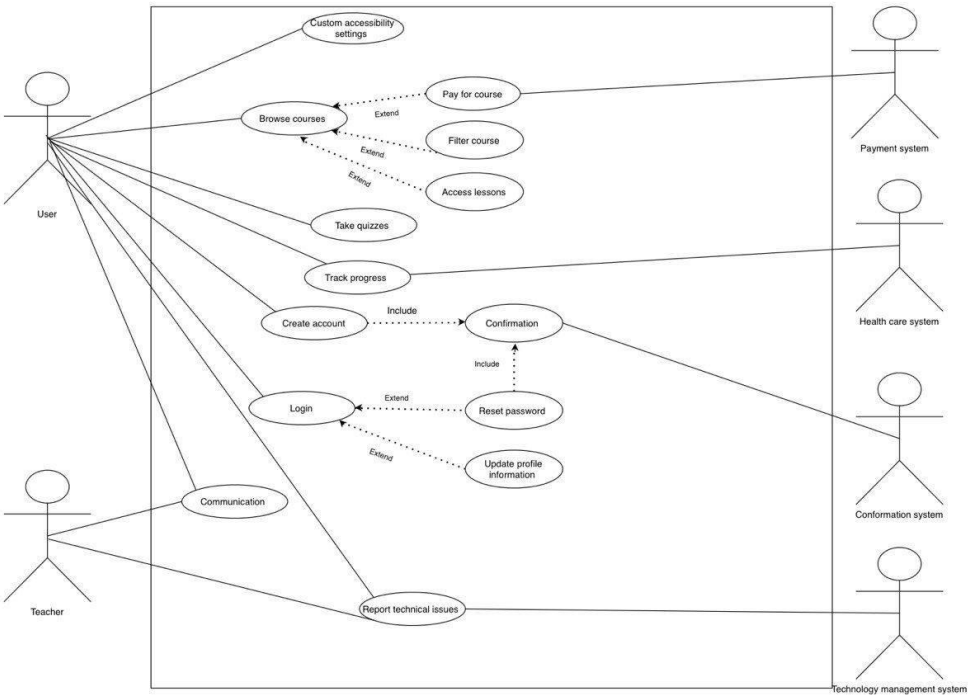
7.2-Cross-Platform Support: Ensure the platform works smoothly across different devices (desktops, mobile phones, tablets) and operating systems (Windows, macOS, iOS, Android).

2. Chapter 2

Context Diagram



System Use-case Diagram with description



Use case scenario (MSS +Extensions)

Usecase1[Create account]

Use case name	Create account
Actor	User, confirmation system
Description	The use case will allow the student to create the account
Precondition	-user should have access to the internet -open the platform
Event flow	1.the user click on the register button 2.the registration form displayed 3.enter Name, Email, phone number 4.the system confirm the email by receiving the verification email

Post condition	-System accepted the registration -user has an account saved in the database

Usecase2[login]

Use case name	login
Actor	User
Description	The use case will allow user to log in after checking the database
Precondition	-user should first have an account
Event flow	1.enter the email 2.enter password 3.check database for existing account 4.return confirmation
Post condition	-Log in accepted entered the account

Usecase3[reset password]

Use case name	Reset password, confirmation system
Actor	User
Description	The use case will allow user to reset the password
Precondition	-Have an existing account -log in -the log in failed, password not correct
Event flow	1. Click on forget my password option 2. retrieve password form displayed 3.enter the email 4.check database if the account exists 5.return confirmation 6.send link to the email 7.change password
Post condition	-Password changed -log in successful

Usecase4[update profile info]

Use case name	Update profile info
Actor	User

Description	The use case will allow the user to edit the information of an account
Precondition	-Enter the account
Event flow	1.click on edit account option 2.edit the information that user willing to change such as Name, email, and phone number
Post condition	-Account information will update - user ready use the website

Usecase5[confirmation]

Use case name	confirmation
Actor	User, confirmation system
Description	This use case ensures the validation of the student's email during account creation and verifies the identity during login or when resetting the password.
Precondition	- The student has initiated the account creation or login process. - The student has provided an email address that needs to be validated.
Event flow	1. The system sends a confirmation email to the user. 2.The user receives the confirmation email. 3. The user clicks the confirmation link. 4.The system verifies the confirmation code. 5. The system allows the user to proceed based on the success of the confirmation (account creation or login).
Post condition	-The user's email is validated, and they are granted access (for account creation) or identity is verified (for login or password reset).

Usecase6[Customize Accessibility Settings]

Use case name	Customize Accessibility Settings
Actor	User
Description	The system allows the user to customize text size and color contrast, ensuring screen reader compatibility.

Precondition	- User must be logged in. - Device compatibility with assistive technologies.
Event flow	1. User selects text size and color contrast. 2. System applies settings across the platform. 3. System ensures compatibility with screen readers.
Post condition	-The system saves the settings and reflects the changes.

Usecase7[Browse Courses]

Use case name	Browse Courses
Actor	User
Description	The system displays a list of available courses, allowing users to explore different options.
Precondition	- User must be logged in.
Event flow	1. User browses the course catalog. 2. User selects a category or uses search filters. 3. System displays relevant courses.
Post condition	-User can view course details.

Usecase8[Filter Courses]

Use case name	Filter Courses
Actor	User
Description	The system provides filters to help users narrow down the course selection.
Precondition	- User must be browsing courses.
Event flow	1. User selects filter options (e.g., difficulty, duration). 2. System refines the list based on selected filters.
Post condition	-Filtered courses are displayed.

Usecase9[Access Lessons]

Use case name	Access Lessons
Actor	User
Description	Users can access lessons from the courses they are enrolled in.
Precondition	- User must be enrolled in a course.
Event flow	1. User selects a course.

	2. System provides access to lesson materials in multiple formats.
Post condition	-User can interact with lesson materials.

Usecase10[Pay for Course]

Use case name	Pay for Course
Actor	User, payment processing system
Description	The system processes payment for courses selected by the user.
Precondition	- User has selected a course to purchase.
Event flow	1. User selects a course and proceeds to payment. 2. System connects with payment gateway. 3. System confirms payment and enrolls user.
Post condition	-User is enrolled in the course after successful payment.

Usecase11[Track Progress]

Use case name	Track Progress
Actor	User, healthcare management system
Description	The system tracks and displays the user's progress in enrolled courses.
Precondition	- User is enrolled in one or more courses.
Event flow	1. User views progress dashboard. 2. System shows percentage completion, milestones achieved. 3.the system receive the progress 4.the system provide help students with learning disorder
Post condition	-Users can see their current progress in each course. -users with learning disorders get attention.

Usecase12[Take Quizzes]

Use case name	Take Quizzes
Actor	User
Description	Users can take quizzes that are part of their course materials.
Precondition	- User must be enrolled in a course with quizzes.

Event flow	1. User selects a quiz. 2. System displays quiz questions. 3. User submits answers and receives feedback.
Post condition	-User receives quiz results.

Usecase13[Communicate with Instructors]

Use case name	Communicate with Instructors
Actor	User, Instructor
Description	The system facilitates communication between students and instructors.
Precondition	- User must be enrolled in a course.
Event flow	1. User sends a message or request to instructor. 2. System forwards the message to the instructor. 3. Instructor replies to the message.
Post condition	-User receives a response from the instructor.

Usecase14[Report Technical Issues]

Use case name	Report Technical Issues
Actor	User, Teacher, Technical Support
Description	The system allows users to report technical issues they encounter.
Precondition	- User is logged into the system.
Event flow	1. User reports a technical issue. 2. System assigns the issue to technical support. 3. Support team resolves the issue and updates the user.
Post condition	-Issue is resolved and user receives a notification.

Use Case 1: Create Account

GOAL: Create a new account on the platform

ACTORS: User, Confirmation system

Precondition: User has internet access and has opened the platform

Main Success Scenario:

1. User clicks on the register button.

2. Registration form is displayed.

3. User enters name, email.

4. System sends a confirmation email to the user.

5. User clicks the confirmation link in the email.

6. System verifies the email and creates the account.

Post condition: User's account is created and saved in the database.

Extensions:

a. User enters invalid email.
   1. System prompts user to enter a valid email address.
b. User submits incomplete information.
   1. System prompts user to fill in all required fields.
c. User's email is already registered.
   1. System notifies the user that the email is already in use.

Use Case 2: log in

GOAL: Login to the application

ACTORS: User

Precondition: User has an existing account

Main Success Scenario:

1. User enters email and password.

2. System verifies if the account exists in the database.

3. System validates the email and password.

4. System authorizes the user to access their account.

Post condition: User is logged in and enters their account.

Extensions:

a. User enters wrong password.
   1. System fails validation and prompts the user to retry.
b. User enters an unregistered email.
   1. System informs the user that the email is not registered.
c. Account is locked due to multiple failed attempts.
   1. System prompts the user to reset the password or contact support.

Use Case 3: Reset Password

GOAL: Reset the user's password

ACTORS: User, Confirmation system

Precondition: User has an existing account, but login failed due to incorrect password

Main Success Scenario:

1. User clicks on the "Forgot password" option.

2. Password reset form is displayed.

3. User enters email.

4. System checks the database for the email.

5. System sends a password reset link to the user's email.

6. User clicks the link and sets a new password.

Post condition: User's password is successfully changed, and they can log in.

Extensions:

a. User enters non-existent email.
   1. System notifies the user that the account doesn't exist.
b. User doesn't receive the reset link.
   1. System provides an option to resend the reset email.
c. Reset link expires before user changes the password.
   1. System informs the user that the link has expired and prompts for another reset request.

Use Case 4: Update Profile Info

GOAL: Update the user's profile information

ACTORS: User

Precondition: User is logged into their account

Main Success Scenario:

1. User clicks on the "Edit profile" option.

2. User edits the desired information (name, email, phone number).

3. System updates the information in the database.

Post condition: User's profile information is updated.

Extensions:

a. User enters invalid phone number.
   1. System prompts user to enter a valid phone number.
b. User tries to update an email that already exists in the system.
   1. System notifies the user that the email is already registered.
c. User submits incomplete updates.
   1. System prompts the user to fill in all required fields.

Use Case 5: Confirmation

GOAL: Confirm the user's email for account creation and password reset

ACTORS: User, Confirmation system

Precondition: User has initiated account creation or password reset and provided an email

Main Success Scenario:

1. System sends a confirmation email to the user.

2. User receives the email and clicks the confirmation link.

3. System verifies the confirmation code.

Post condition: Email is validated, and the user can proceed.

Extensions:

a. User doesn't receive confirmation email.
   1. System allows the user to resend the confirmation email.
b. User fails to click the confirmation link within the required time.
   1. System invalidates the account creation or login attempt until confirmation is complete.

Use Case 6: Customize Accessibility Settings

GOAL: Customize text size and color contrast for better accessibility

ACTORS: User

Precondition: User is logged into the system and device is compatible with assistive technologies

Main Success Scenario:

1. User selects text size and color contrast options.

2. System applies these settings across the platform.

3. System ensures compatibility with screen readers.

Post condition: System saves the settings and reflects changes across the platform.

Extensions:

a. Settings don't apply correctly.
  1. System displays an error message and prompts the user to try again.
b. User selects unsupported settings for the device.
  1. System notifies the user that certain settings are incompatible with the device.
c. User tries to revert changes but change their mind.
  1. System allows the user to reset settings to default.

Use Case 7: Browse Courses

GOAL: Browse the available courses on the platform

ACTORS: User

Precondition: User is logged in

Main Success Scenario:

1. User browses the course catalog.
2. System displays courses.

Post condition: User can view course details.

Extensions:

a. System fails to load course catalog.
  1. System displays an error message and provides the option to retry loading.

Use case 8: Filter Courses

Goal: Allow users to filter courses based on specific criteria

Actors: User

Precondition: user is browsing available courses

Main Success Scenario:

1.user selects filter option

2.system refine the courses list based on the selected filters

3.filtered courses are displayed

Post condition: filtered courses are displayed based on user preferences

Extensions:

a. User selects incompatible filters

1.System displays a message “no courses found matching selected filters”

Use case 9: Access lessons

Goal: Allow users to access lessons from the courses they enrolled in

Actors: User

Precondition: user must be enrolled in a course

Main Success Scenario:

1.user selects a course they are enrolled in

2.system provides access to lesson materials in multiple formats

3.user interact with the lesson materials

Post condition: user can access and interact with the lesson materials

Extensions:

a. Lesson materials fail to load

1.System displays a message “unable to load lesson materials. Please try again later”

Use case 10: pay for course

Goal: Allow users to make payments for selected courses

Actors: User, payment system

Precondition: user has selected a course to purchase

Main Success Scenario:

1.user selects a course and proceeds to payment

2.system connect to the payment gateway

3.system confirms the payment and enrolls the user in the course

Post condition: user is enrolled in the course after successful payment

Extensions:

a. Payment fails

1.System displays a message “payment unsuccessful. Please try again”

Use case 11: Track progress

Goal: Allow users to track their progress in the courses they are enrolled in

Actors: User, health care system

Precondition: user is enrolled in one or more courses

Main Success Scenario:

1.user views the progress dashboard

2.system display percentage completion and milestones achieved

3.system track the user progress and update dashboard

Post condition: user can see their progress in each course and support is provided for students with learning disorders

Extensions:

a. Progress tracking system fails to update

1.System displays a message “unable to update progress at this time. Please check again”

Use case 12: Take Quizzes

Goal: Allow users to quizzes as a part of their course materials

Actors: User

Precondition: user is enrolled in a course with quizzes available

Main Success Scenario:

1.user selects a quiz from the course

2.system display the quiz question

3.user submit answers and receives feedback

Post condition: user receives quiz results

Extensions:

a. Quiz submission fails

1.System displays a message “failed to submit quiz. Please try again”

Use case 13: Communication with instructor

Goal: facilitate communication between users and instructor

Actors: User, instructor

Precondition: user is enrolled in a course

Main Success Scenario:

1.user sends a message to the instructor

2.system forwards the message to the instructor

3.instructor replies to the message

Post condition: user successfully communicates with instructor

Extensions:

a. Message sending fails

1.System displays a message “failed to send the message. Please try again”

Use case 14: Report Technical Issues

Goal: Allow users to report technical issues they encounter

Actors: User, Technology management system

Precondition: user is logged into the system

Main Success Scenario:

1.user navigates to the technical support section

2.user describe the issue and submits the support ticket

3.system logs the issue and assigns it to the support team

Post condition: user successfully reports the technical issue

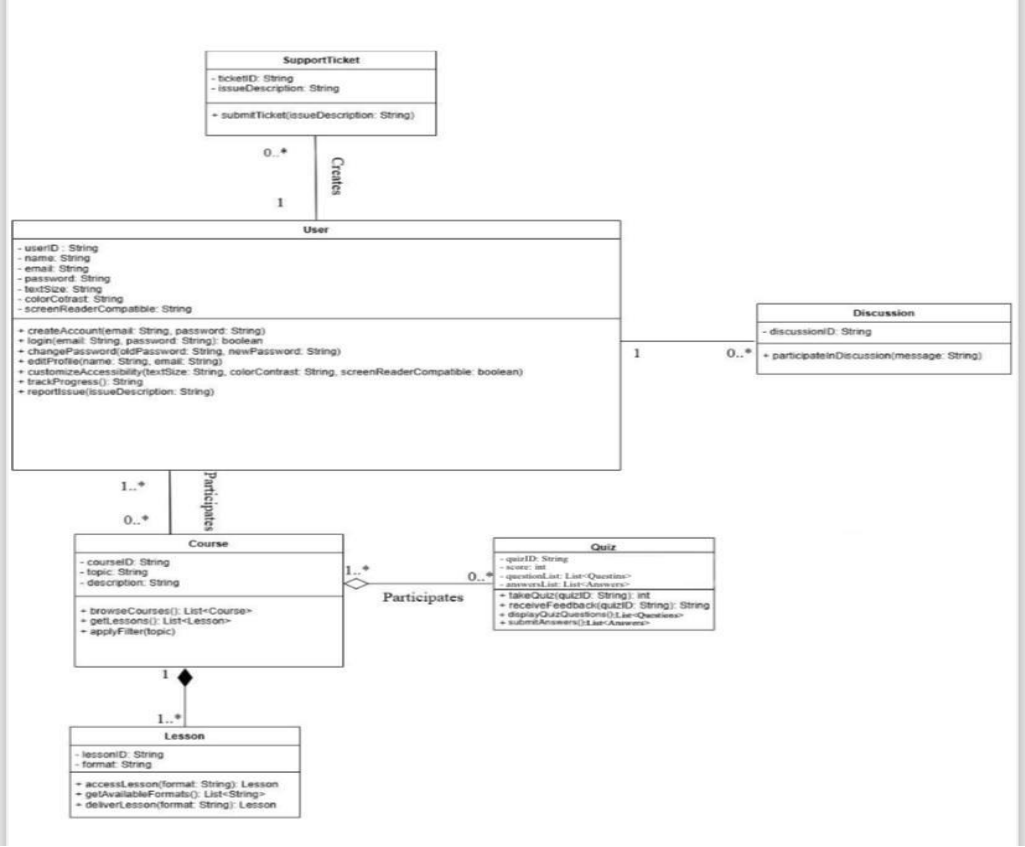
Extensions:

a. User provides incomplete issue details

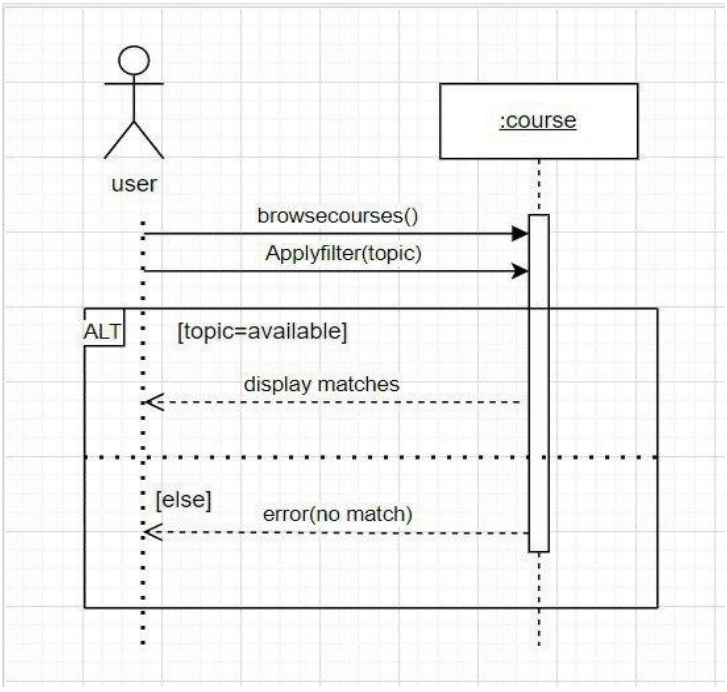
1.System prompts the user to provide more details before submitting

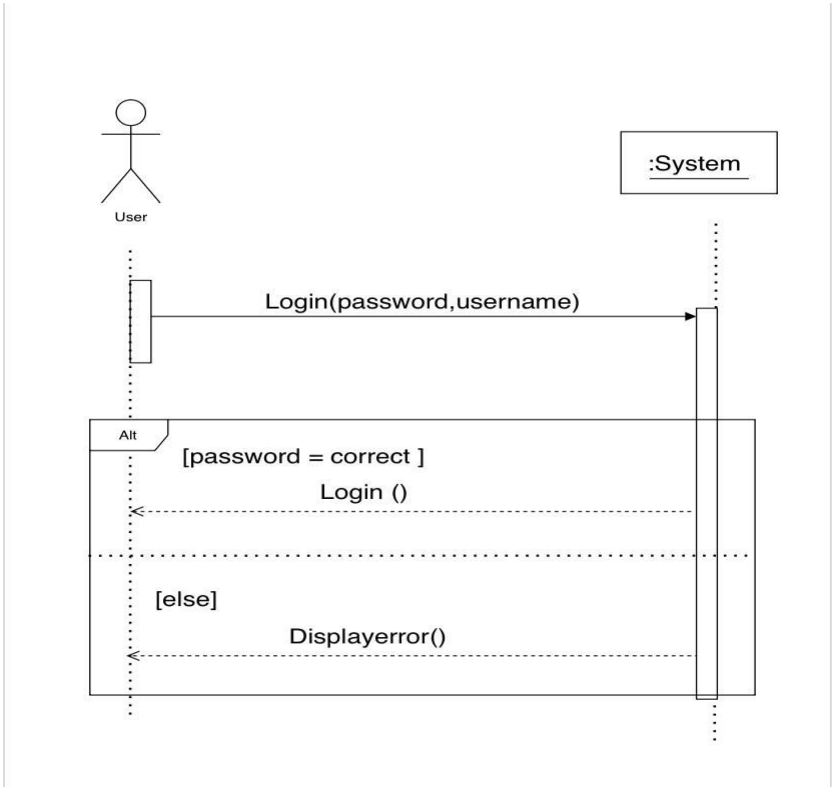
3. Chapter 3

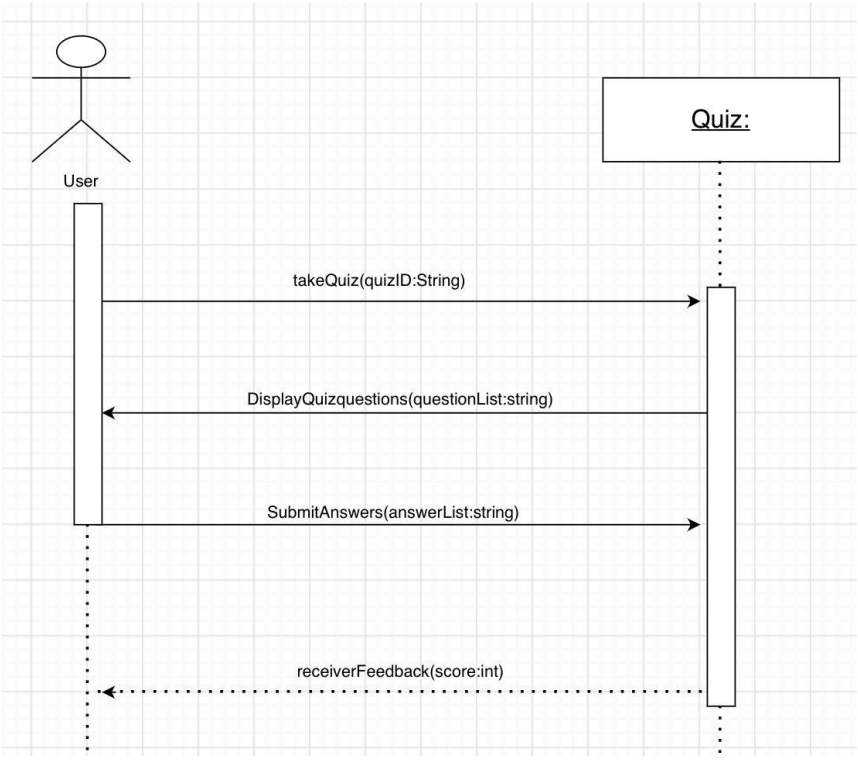
System Class Diagram

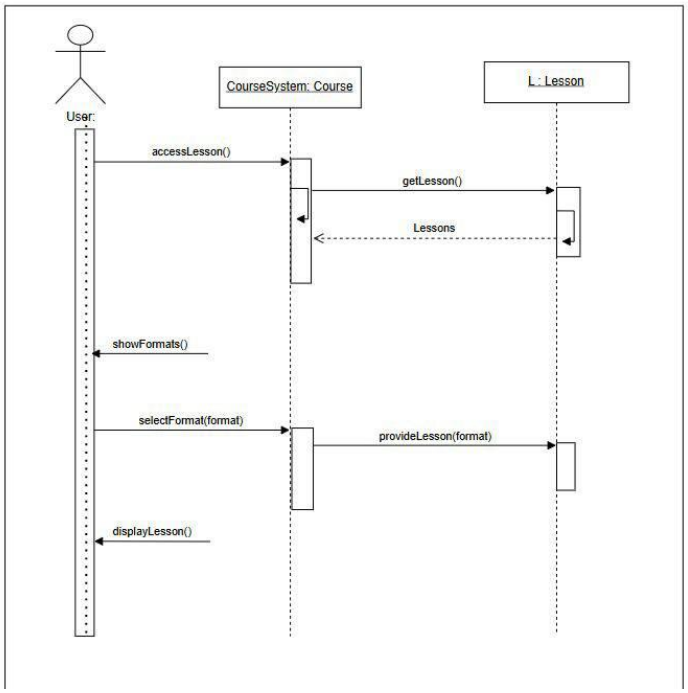


Sequence Diagrams



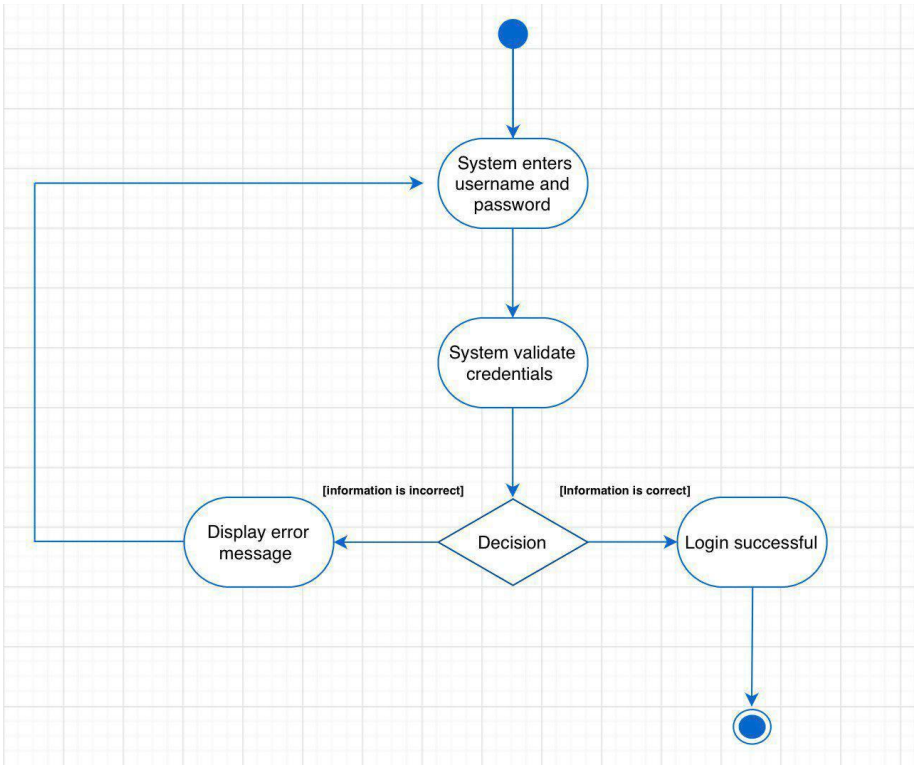

User
:System
Login(password,username)
Alt
[password = correct]
Login ()
[else]
Displayerror()

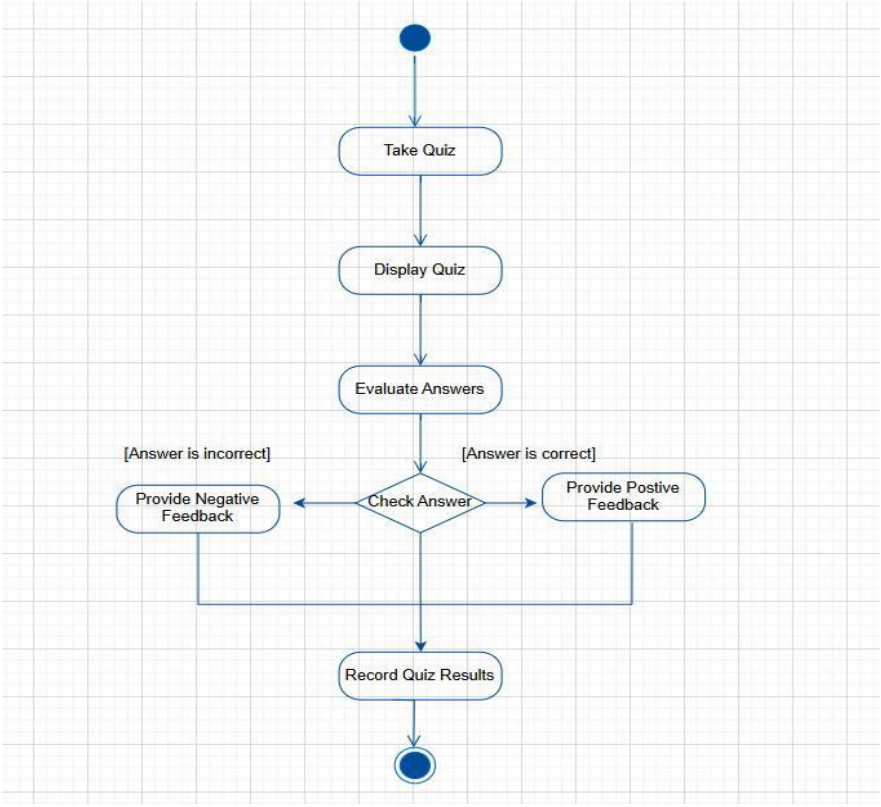

User
Quiz:
takeQuiz(quizID:String)
DisplayQuizquestions(questionList:string)
SubmitAnswers(answerList:string)
receiverFeedback(score:int)

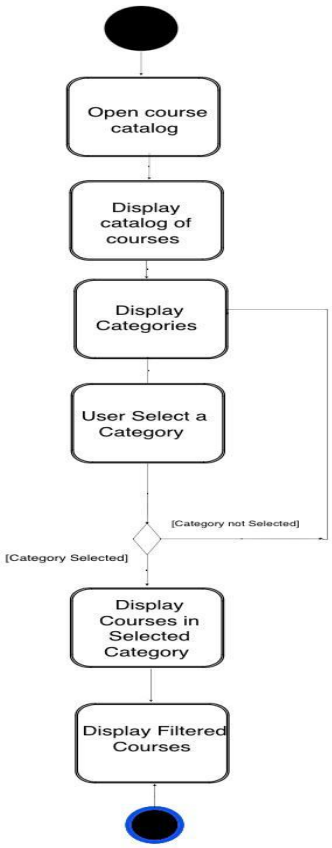


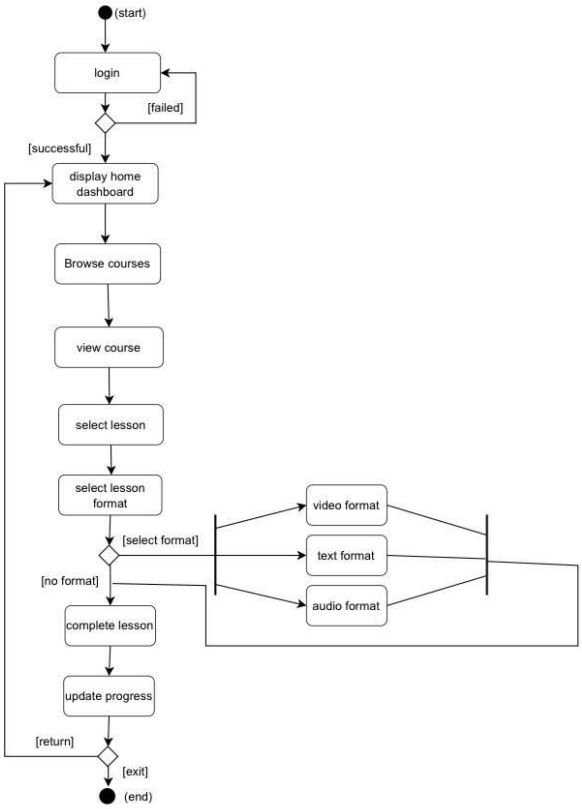
4.Chapter 4

Activity Diagrams

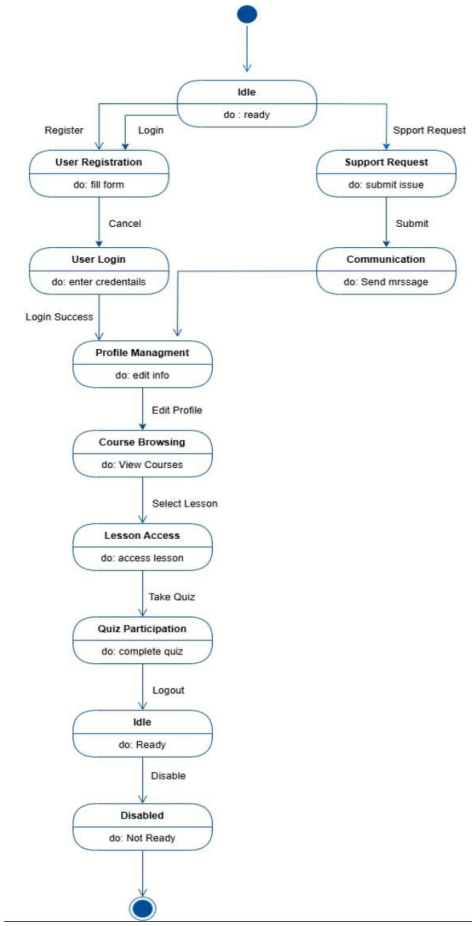



Take Quiz
Display Quiz
Evaluate Answers
[Answer is incorrect]
[Answer is correct]
Provide Negative Feedback
Check Answer
Provide Postive Feedback
Record Quiz Results


Open course catalog
Display catalog of courses
Display Categories
User Select a Category
[Category not Selected]
[Category Selected]
Display Courses in Selected Category
Display Filtered Courses

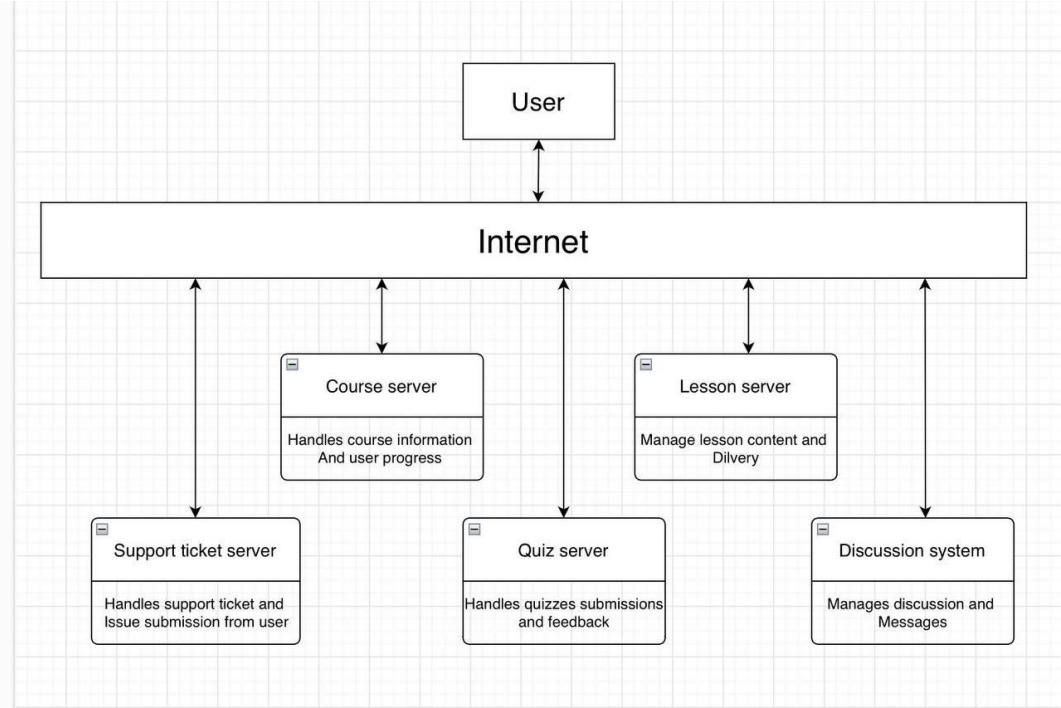


State Diagram



5. Chapter 5

Architecture Diagram



We believe that the optimal architecture for our online learning platform for special needs education is the client-server architecture. This approach is essential as it allows multiple users to access the system concurrently, facilitating a range of activities such as browsing courses, participating in lessons, taking quizzes, engaging in discussions, and submitting support tickets.