



جامعة جدة
University of Jeddah

Principle of Software Engineering

CCSW-223

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College of Computer Science and Engineering
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Table of content.....	3
Lab 1: Introduction and Project Definition.....	
Lab 2: Information Gathering.....	
Lab 3: Planning Phase 1.....	
Lab 4: Planning Phase 2.....	
Lab 5: Analysis Phase 1.....	
Lab 6: Functional and Non-Functional Requirements.....	
Lab 7: Analysis Phase 2.....	
Lab 8: Interaction Diagram - UML Sequence Diagram.....	
Lab9: Class Diagram.....	
Conclusion.....	
Suggestion.....	

List of Figures:

Figure 1.1 : Welcome Page	5
Figure 1.2 : Login Page.....	5
Figure 1.1 : Welcome Page	6
Figure 3: Course Registration Page.....	6
Figure 4 : Profile Page.....	6

Project idea/definition:

TechWay is a platform designed for programmers and tech enthusiasts, providing a dedicated space to connect, learn, and explore the world of technology. Our goal is to support developers on their learning journey by offering valuable resources and insights. TechWay also helps users discover professional certification opportunities, guiding them toward career growth in the tech industry.

Prototype of the TachWay app

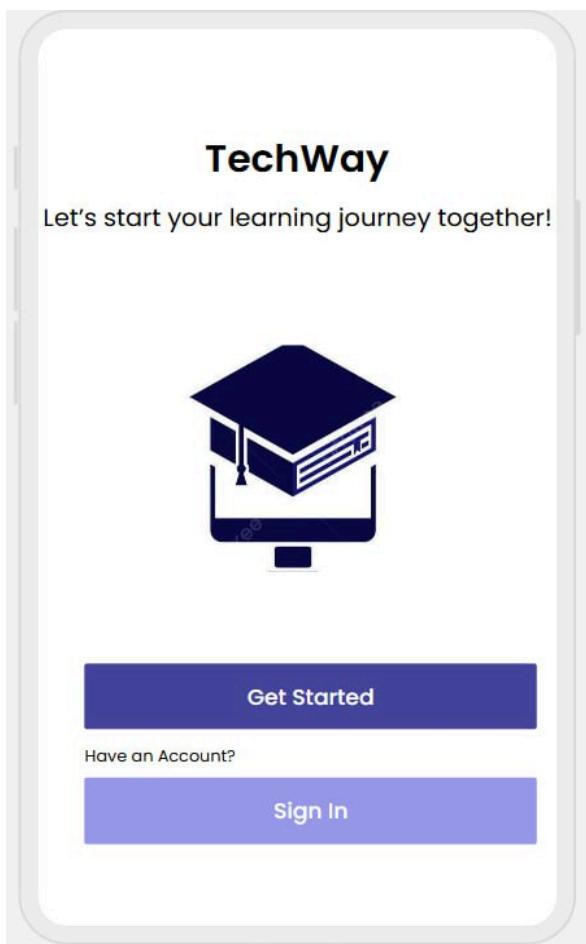


Figure 1.1 : Welcome Page



Figure 1.2 : Login Page

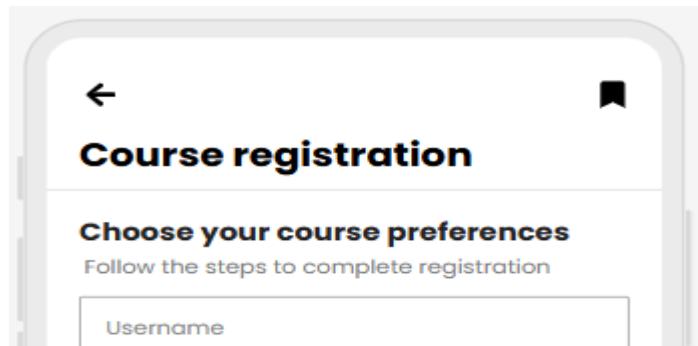
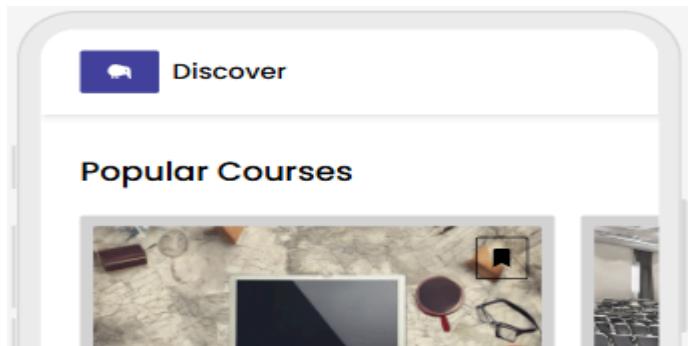


Figure 2: Home Page

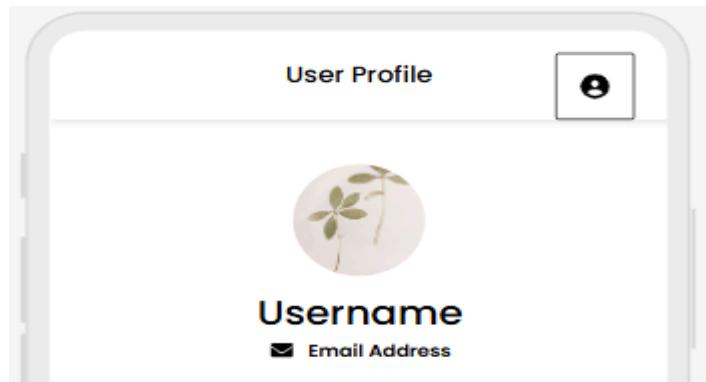


Figure 3: Course Registration Page

Figure 4 : Profile Page

LAB 2

Description of the Problem:

Computer science students often struggle to choose the right specialization, courses, or certifications due to overwhelming options and scattered resources. This uncertainty slows their progress and career growth.

To solve this, we conducted interviews to identify key challenges and developed a comprehensive program that offers structured learning paths, curated courses, and expert consultations from top professionals—helping students make informed decisions and excel in their tech journey

The following important issues were discovered during the interview:

-Difficulty in Choosing the Right Courses:

With an overwhelming number of online courses available, users find it challenging to identify the most relevant and high-quality learning opportunities that match their career goals.

-Limited Networking and Career Guidance :

Students often struggle to connect with industry professionals, mentors, or peers who can provide career advice and industry insights.

-Lack of students' knowledge about computer majors:

Students often lack knowledge about majors and fields due to the ambiguity created by the absence of a reliable source available to everyone.

Difficulty in managing content in terms of updating information:

Information must be updated continuously to keep pace with developments. Content related to computers and technology develops significantly in short periods.

Questions :

Raghad alamri

1-Common Issues in Educational Platforms?

2-Features That Enhance the Learning Experience?

3-Which Platform Would You Like Our Site to Be Similar To?

4-Would You Like a Points System to Motivate Students and Trainers?

5-Do You Think Having Forums or Discussion Groups Would Be Beneficial?

Joud Abdelrahman Alshahrani

1-What is the biggest obstacle you face when learning online?

2-What is the biggest challenge you face when self-learning in computer science fields?

3-What do you think about a points and rewards system to motivate students to learn?

4- How do you prefer the course links and educational platforms to be presented on the app?

5-What features would you like to see in a website dedicated to computer science students?

Dina Abdullah Alharbi:

1-How can the website help both professionals and beginners?

2-What are your favorite educational platforms and why?

3-What are your criteria for choosing online courses?

4- What features do you wish our educational website had?

5-If you had the chance to go back in time after knowing all the specializations, would you choose a different one? Why?

Rauna Al-mazroui

1-What distinguishes our site from other sites?

2- What people want to visit our site?

3- How can we promote our website better?

4- Do you see the importance of updating the information on the site continuously?

5- What technical skills do you have before?

Madhawi Faisal Algrmoul

1. How important is obtaining a certified certificate after completing an online course for you? Why?
 2. Do you prefer short and focused video lessons or long and detailed courses?
 3. How do user reviews and ratings influence your decision when choosing an online course?
 4. What motivates you the most to complete an online course? (Personal growth, career advancement, certifications, competition, etc.)
 5. What are your preferred ways to engage with educational content? (e.g., quizzes, hands-on projects, interactive discussions, etc.)
-

Hadeel Hatem Fallatah

1- What is your major in the College of Computer Science and Engineering?

2- What are the confirmed certificates that you think are useful in your major?

3- which company would you like to work after graduation?

4- How many courses would you like to take during your studies?

5- What are the most important things that the application should provide to help the student?

Conclusion:

The interviews reveal that Tech and computer science learners prioritize platforms with clear organization, user-friendly navigation, and interactive features. Personalized content, such as career guidance tools, integrated development environments, and community-driven features, is highly valued. While gamification elements like points and rewards can be motivating, the quality, accuracy, and relevance of the content remain the top priorities. Professional certifications and multi-device support are considered essential for flexibility and career advancement. Additionally, marketing strategies like SEO and social media outreach are seen as effective in expanding the platform's reach. Learners aim to work at leading tech companies and seek hands-on experience through training programs, project-based learning, and job placement opportunities to support their professional growth.

LAB 3:

Planning Phase 1

1. The purpose of the project

- TechWay is an educational platform that offers an organized learning experience for programmers and tech enthusiasts. By providing carefully

chosen materials, professional advice, and certification chances, the platform seeks to assist computer science students in navigating their career routes.

- Because there are so many online resources available, many students find it difficult to select the best concentration, courses, or certificates. TechWay tackles this problem by offering a methodical approach to education and career advancement.

Considerations:

1-User-Friendly Design:

The platform must be accessible and user-friendly, ensuring that students of multiple technical backgrounds can easily navigate and make use of its features.

2-Content Quality and Relevance:

It is essential to select high-quality educational resources that are frequently updated to reflect industry standards

3-Diverse Learning Paths:

Different students have unique career goals and learning preferences. The platform should offer personalized learning pathways that address various specializations within computer science.

Motivation

1-Addressing Industry Needs:

The tech industry is evolving rapidly, and there is a growing demand for skilled professionals. TechWay aims to connect education and industry requirements, helping students to become job-ready.

2-Empowering Students:

By providing structured guidance and resources, TechWay empowers students to make informed decisions about their careers, enhancing their confidence and motivation.

3-Enhancing Career Opportunities:

The introduction of recognized certification programs will not only boost students' resumes but also increase their employability in a competitive job market

2. Goals of the Project

- The project's objective is to create a well-structured platform that helps students choose appropriate specializations, gives them access to high-quality educational resources, and links them to professional certifications and employment possibilities.

3.Preliminary Report

A. The Problem

- Computer science students face difficulties in choosing the right specialization due to the vast number of unstructured resources.
- Lack of proper career guidance and clear development pathways.
- It is challenging for students to stay up to date with industry changes because educational materials in the tech sector are not updated often.

B. Findings

- Using research and interviews, we determined the following important issues:
- Students struggle to find high-quality courses that align with their career goals.
- A high desire for interactive elements such as forums, individualized learning pathways, and gamification (a system based on points).
- Certification programs that enhance their professional CV are preferred by many students.

C. Recommended Solution

- Develop TechWay as a personalized learning platform that offers structured learning paths, expert guidance, and industry-recognized certifications.
- Incorporate career counseling tools to assist students in researching various tech sectors and making wise choices.
- Implement an incentive-based system, such as a points and rewards program, to increase engagement and motivation.

D. Cost & Schedule Estimates

Phase	Description	Time	Cost
Specification	Defining the platform structure and planning	2 weeks	3000\$
Development	Backend and frontend development ,security implementation	2 month	45000\$
Validation	Testing ,debugging and gathering user feedback	3 weeks	8000\$
Evolution	Applying improvements based on feedback and maintaining system	2 weeks	5000\$
Total		4.5 month	61000\$

LAB 4:

Planning Phase 2

1. Problem Definition

Main Problem:

- 1-Because there are so many unorganized educational resources available, computer science students find it difficult to choose the best specialization
- 2-limited career guidance and unstructured educational paths.
- 3-Students find it challenging to stay up to speed because educational resources in the computer industry are not regularly updated.

Sub-Problems:

- 1-Finding courses of the highest quality that fit the jobs requirements might be challenging.
- 2-Very few interactive and interesting learning resources are available.
- 3-the lack of professional certification courses that improve employment opportunities.

2. Scope and Objectives of the New System

Proposed System: TechWay

Objectives:

- Provide a user-friendly, structured learning platform with high-quality educational content.
- Offer diverse and personalized learning paths tailored to various computer science specializations.
- Introduce certification programs to enhance students' employability.
- Implement career counseling tools to guide students in making informed career decisions.
- Enhance engagement through gamification features like points and rewards.

3. Alternative Solutions

Alternative 1:

Partnering with existing learning platforms (Coursera, Satr) to offer TechWay an organized learning paths.

Alternative 2:

creating a mobile application or browser extension that organizes already-existing online courses into learning pathways.

4. Cost and Benefits Analysis of Alternatives

Alternative 1:

Lower development cost, immediate access to pre existing learning materials.

Alternative 2:

Fast implementation and reduced development costs..

5. Software Impacts

1-integration with third-party APIs for industry updates and content categorization.

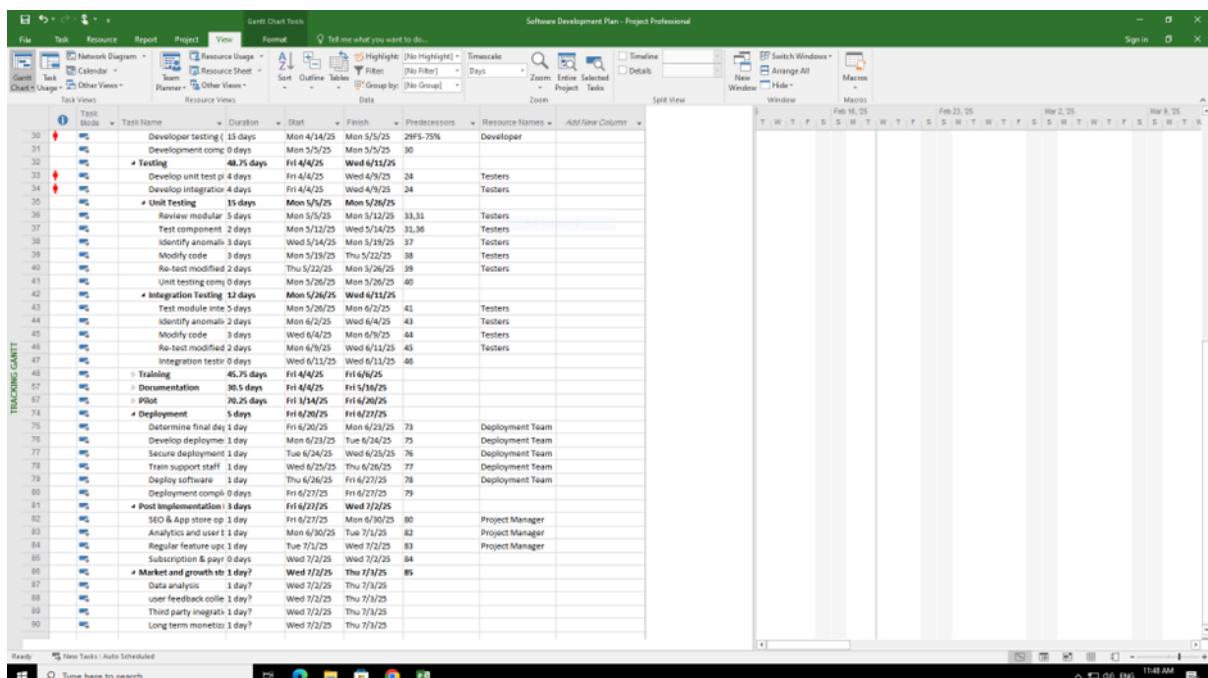
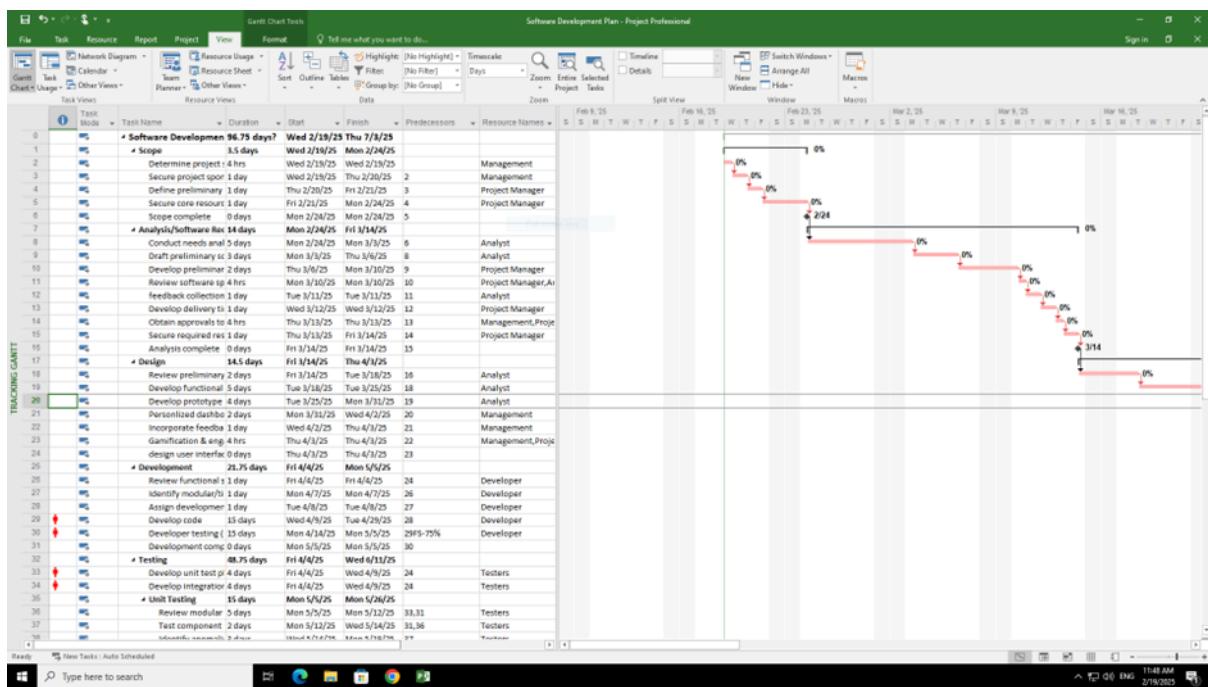
2-Using gamification features in an interactive user interface.

3-Content is updated frequently in order to meet to the needs of the industry.

6. Potential Organizational Changes

Alternative 1 the partnership model was selected because it offers quick access to pre-existing, excellent educational materials, less development costs, as well as less maintenance work.

Project plan (By using Microsoft Project):



Resource Sheet Tools

Software Development Plan - Project Professional

File Task Resource Report Project View Format

Gantt Chart -

Clipboard

Copy -

Format Painter

Font

Schedule

Tasks

Insert

Properties

Information

Notes

Find -

Clear -

Scroll to Task

Add to Timeline

Editing

1 Resource Name Type Initials Group Max % Site Rate Out. Rate Cost/Use Accrue At Base Code Add New Column

1 Management Work M 100% \$0.00/hr \$0.00 Prorated Standard

2 Project Manager Work P 100% \$0.00/hr \$0.00 Prorated Standard

3 Analyst Work A 100% \$0.00/hr \$0.00 Prorated Standard

4 Developer Work D 100% \$0.00/hr \$0.00 Prorated Standard

5 Testers Work T 100% \$0.00/hr \$0.00 Prorated Standard

6 Trainers Work T 100% \$0.00/hr \$0.00 Prorated Standard

7 Technical Communicators Work T 100% \$0.00/hr \$0.00 Prorated Standard

8 Deployment Team Work D 100% \$0.00/hr \$0.00 Prorated Standard

9 Raghad Turkil Work R 100% \$0.00/hr \$0.00 Prorated Standard

10 Dina Alharbi Work D 100% \$0.00/hr \$0.00 Prorated Standard

11 Rauna Al-mazroui Work R 100% \$0.00/hr \$0.00 Prorated Standard

12 Hadeel Hatem Fallatah Work H 100% \$0.00/hr \$0.00 Prorated Standard

13 Joud Abdelfrahman Alsh Work J 100% \$0.00/hr \$0.00 Prorated Standard

RESCUE SHEET

LAB 5

Analysis phase 1

1. List the stockholders of the project

Users: Students who sign up, take classes, and get certified People who use the system to get career coaching

Instructors: Develop instructive programs and communicate with students by giving them feedback and answers ,Offer student assessments, which have an impact on the granting of certificates

System Administrators :are in charge of managing user information, course material, and system operation and maintenance

Course Platforms: External platforms that supply the system with instructional materials. Update course materials and award certifications by integrating with the TeachWay System

Certification Authorities: Organizations or educational institutions that have the authority to accredit system-issued certifications

Developers: The group in charge of creating and managing the system.

2. Identify the scope of the work.

The Current Situation: The system offers an educational platform that enables users to sign up for classes, finish them, and obtain electronic grades.

Teachers design classes and communicate with students by answering questions and providing comments.

Instructor ratings and attendance rates are used to determine certificate issuance
External platforms are integrated into the course content, which is updated often

The Context of the Work:

Primary Inputs: These comprise student questions, course selection, user registration, and content updates from outside platforms. Primary Outputs: Providing users with career guidance, granting access to course materials, and awarding certificates.

Interaction Between Entities: Students seek academic assistance from professors, and credentials are automatically granted upon fulfillment of prerequisites.

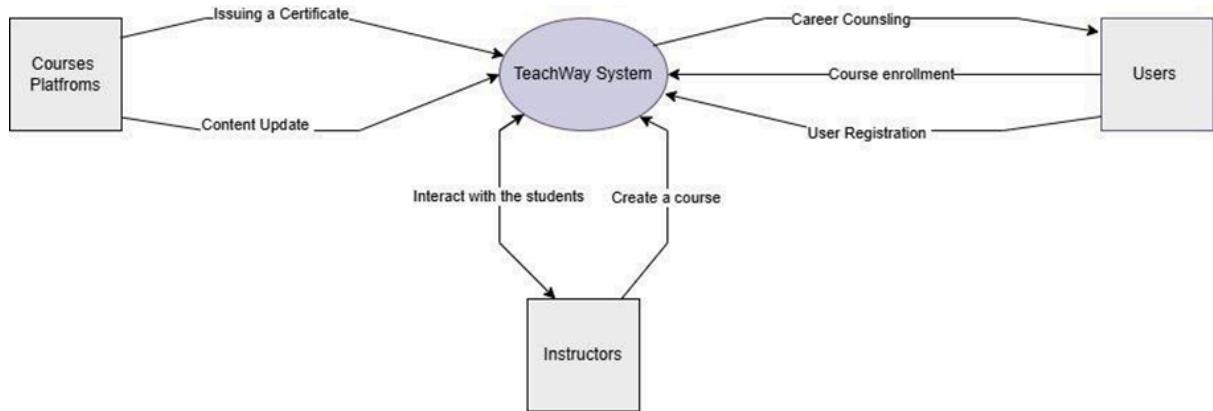
Constraints & Challenges:

Guaranteeing the caliber of instructional materials

Effectively overseeing interactions between teachers and students

Controlling the process of awarding certificates according to precise standards like attendance and assessments

3. Draw context diagram of your project



4. Conduct an event table for your project

Event Name	Input	Output	Summary
User Registration	Student details (name , email, etc)	Confirmation	A new student registers on the platform to access Learning resources
Course Enrollment	Student selects a course/path	Access granted to course content	The student enrolls in a learning path/course offered by the platform.
issuing certificates	Course attendance rate ,Instructors ratings	Issuance of electronic certificate	The student has completed the course in full, and the system automatically issues an electronic certificate.
Career Counseling	Student's profile and learning progress	Career path suggestions	The system recommends possible career paths based on the student's profile.
Instructors Interact with Students	Inquiries and questions of the students	Instructors's replies, notes , comments	Instructors interact with students by answering inquiries and questions
Update Content	New educational content available	Updated learning paths	The platform receives new courses or content from third-party providers.

LAB 6

Functional and Non-Functional Requirements

Functional Requirements:

ID	Requirement Definition
FR1	Login account
FR1.1	The user must enter email information to log in to the account.
FR2	Display courses
FR2.1	The system shall display multiple courses and allow users to search using keywords, categories, and filters such as whether it is an online course and the time of availability
FR3	Career path counselling
FR3.1	The system shall provide possible career path recommendations based on user specified preferences and profile.
FR4	Receive Notification
FR4.1	The system shall notify the user when they receive messages and courses starting time.
FR5	Support and Help
FR5.1	The system shall provide help when the user faces problems and allow them to send complaints.
FR6	Apply for courses
FR6.1	The system shall allow users to apply for multiple courses and manage their applications(edit, cancel, or track application status).
FR7	Course Feedback.
FR7.1	The system shall allow users to rate and provide feedback on completed courses.

Non-functional Requirements: Software Interface:

SI1: The system must integrate with external platforms or applications such as Learning Management Systems (LMS) or data analysis tools via API to improve the learning experience and personalize recommendations.

User Interface:

UI1: The user interface should be intuitive and easy to use for tech enthusiasts and developers, allowing them to easily access courses and interact with content.

UI2: The system should allow full customization of the interface based on user needs and preferences.

System Performance:

SP1: The system should support at least 1000 concurrent users without affecting performance, ensuring a fast response to all user commands.

SP2: The system should have a response time of less than 2 seconds for all user interactions.

SP3: The system should efficiently handle high traffic loads during peak usage hours.

Security:

SE1: The system should have strong protection for users' personal data, including passwords and personal information, using encryption and HTTPS.

SE2: Multi-factor authentication should be provided to ensure secure access to accounts.

SE3: The system should have the ability to restrict unauthorized access through a role-based permission management system.

Scalability:

SC1: The system must be scalable to include new courses and certifications from additional providers with the ability to easily add new categories through an admin panel.

Availability:

AV1: The system should have an uptime of at least 99.5% to ensure continuous availability.

AV2: Technical support should be available to users at all times via email, live chat, or an AI chatbot.

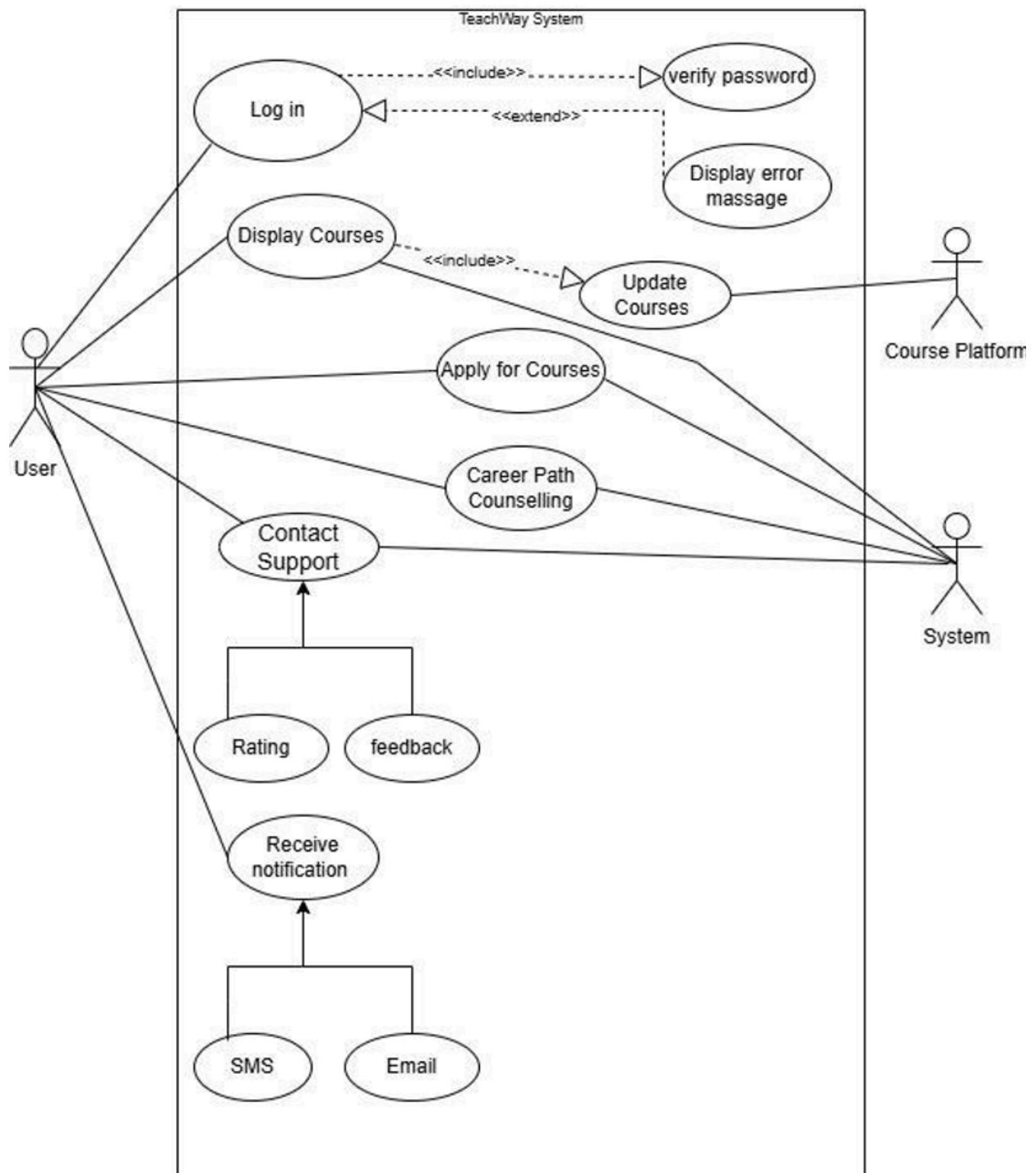
Device Compatibility:

DC1: The system should support all types of devices, including mobile phones, tablets, and desktop computers, and be compatible with different operating systems like iOS, Android, and Windows.

DC2: The system should provide a consistent user experience across all devices with smooth interaction between them.

Lab7

Use case diagram :



UC1: Log in

Scope: TeachWay System

Level: User login process

Primary Actor: User

Precondition: user has an account in the system

Stakeholders and Interests:

- The user desire to access and use services and courses.
- System: Checks the login information If it is correct.

Scenario of UC1:

- 1-The user types in their login information.
- 2-The password is verified by the system.
- 3-The system grants the user access if the password is correct.
- 4-The system displays an error message if the password was entered incorrectly.

UC2:contact Support

Scope: Support System

Level: Helping Users

Primary Actor: User

Precondition: The user is facing a problem or request or question

Stakeholders and Interests:

- User: requires help with an a problem or request or question
- System: Offers both technical and user support

Scenario of UC2:

- 1-The user chooses "Contact Support."
- 2-Support options are offered through the system (for example, chat, email).
- 3-After choosing a support option, the user gets in touch with support.

UC3: Course Display

Scope: Course Platform

Level: Information Display

Primary Actor: User

Precondition: The user must be pre-logged in

Stakeholders and Interests:

- User: Wants to explore available courses
- Platform: Offers updated course listings

Scenario of UC3:

- 1-The choice made by the user is "Display Courses."
- 2-The list of available courses is collected by the system.
- 3-The user is shown the course list by the system.

UC4:apply for courses

Scope: Course Platform
Level: Interaction with the Course
Primary Actor: User
Precondition: The user has access to courses and is logged in
Stakeholders and Interests:

- User: Wants to sign up for course
- Platform: oversees course registration

Scenario of UC4:

- 1-After choosing a course the user submits an enrollment registration.
- 2-The enrollment request is sent to the system.
- 3-After receiving the request, the system updates the Course Platform.
- 4-The Course Platform confirms the enrollment to the system.
- 5-The user receives a notification from the system about successful enrollment.

UC5:Career Path Counselling

Scope: TeachWay System.
Level: User guidance.
Primary Actor: User.
Precondition: User must be logged in.
Stakeholders and Interests:

- **User:** Seeks career guidance.
- **System:** Provides career recommendations.

Scenario of UC5:

- 1- The user selects "Career Path Counselling."
- 2- The system requests user details.
- 3- The system analyzes the data and provides recommendations.

UC6:Provide Feedback & Rating

Scope: TeachWay System.

Level: User experience evaluation.

Primary Actor: User.

Precondition: User must have interacted with courses or support.

Stakeholders and Interests:

- **User: Wants to share feedback.**
- **System: Collects feedback to improve services.**

Scenario of UC6:

Scope: TeachWay System.

Level: User experience evaluation.

Primary Actor: User.

Precondition: User must have interacted with courses or support.

Stakeholders and Interests:

- **User:** Wants to share feedback.
- **System:** Collects feedback to improve services.

1. The user selects "Provide Feedback & Rating."
2. The system displays a list of interacted courses or support sessions.
3. The user chooses a course or support session to rate.
4. The user submits a rating and optional feedback.
5. The system stores the feedback for service improvement.

UC7 : Receive Course Notifications

Scope: Notification System

Level: Communication and Alerts

Primary Actor: User

Precondition: The user has notifications enabled

Stakeholders and Interests:

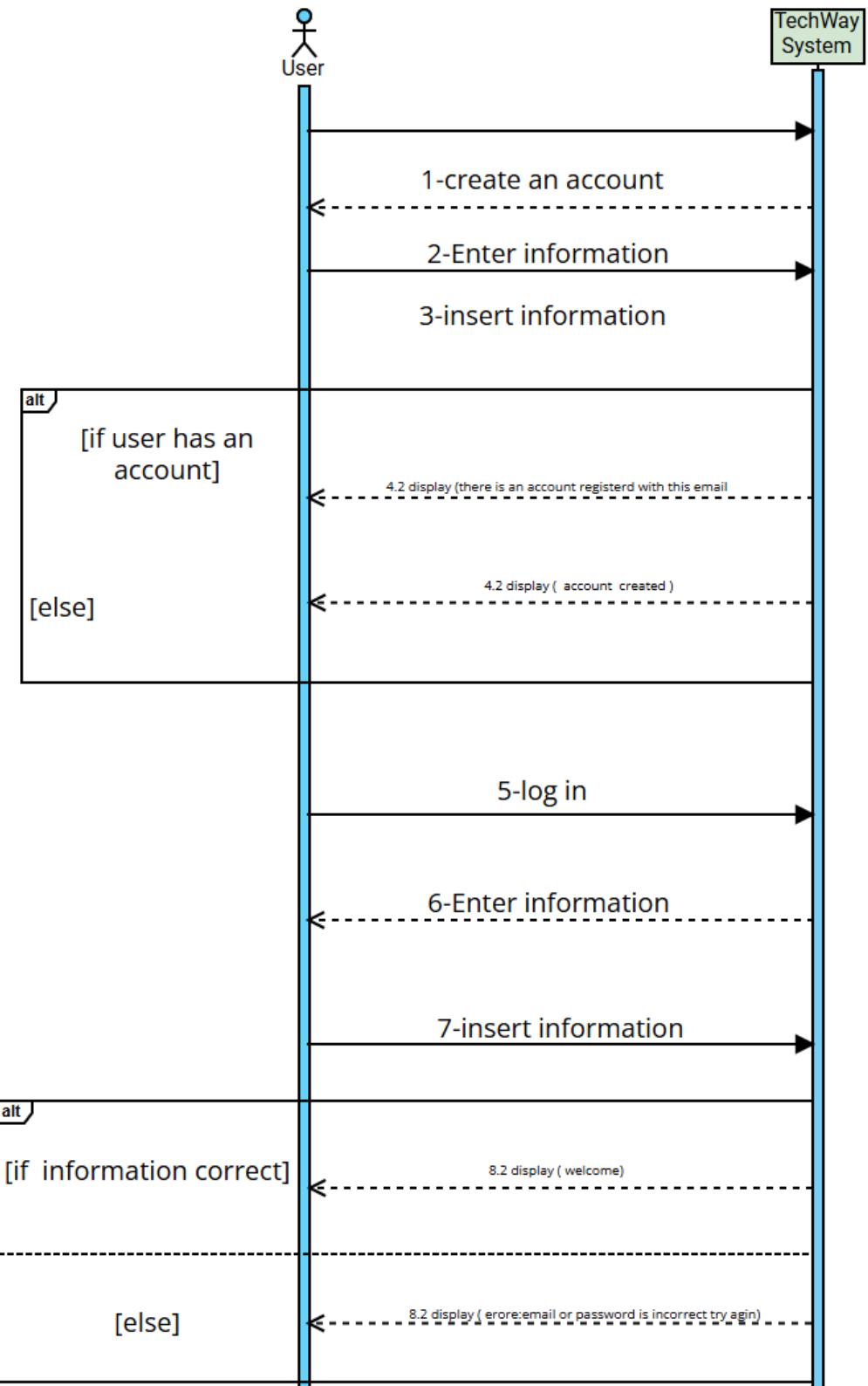
- **User:** Wants to stay updated on course updates, deadlines, and announcements
- **System:** Ensures timely communication of relevant updates

Scenario of UC7:

- 1- The user subscribes to course notifications.**
- 2- The system monitors course updates.**
- 3- The system sends notifications when updates occur.**

Lab 8:Sequence Diagram

“Log in” Sequence Diagram:

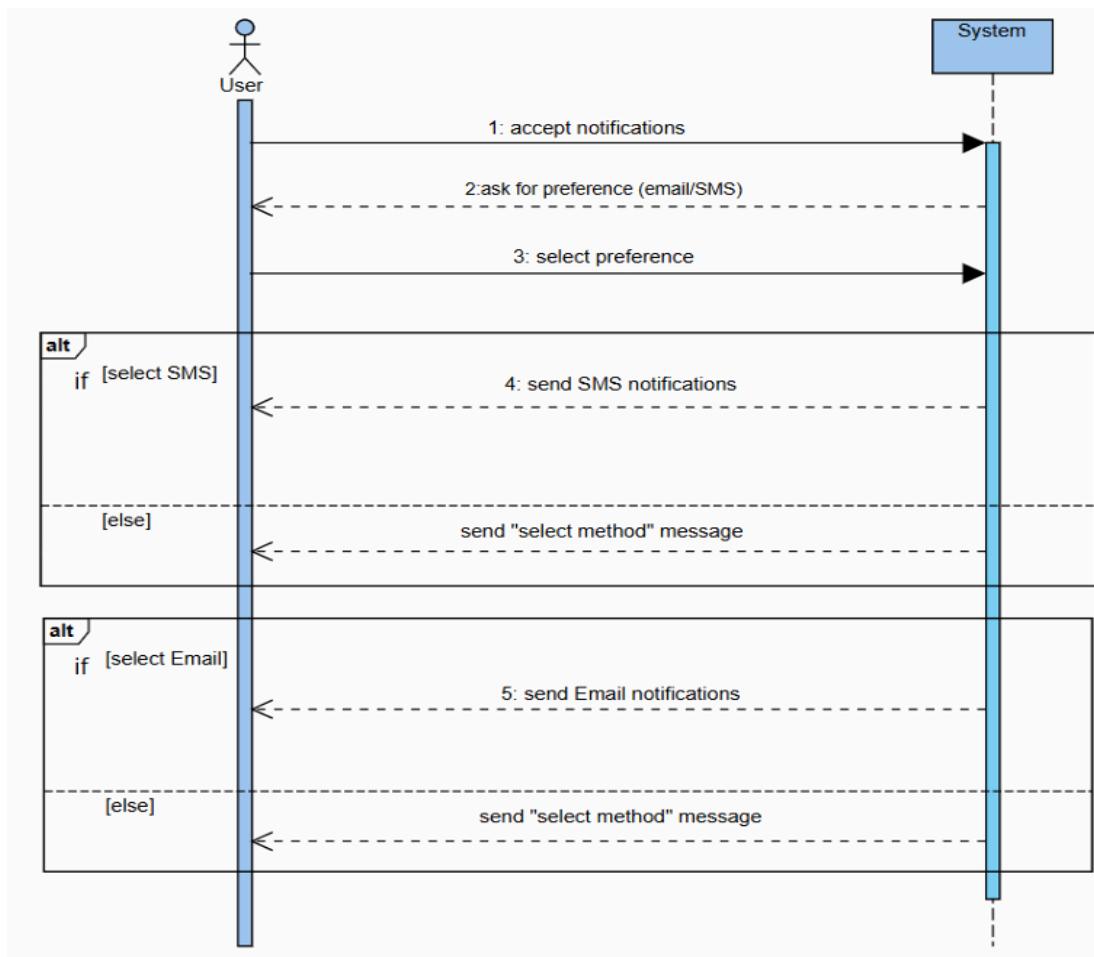


- Describe the main objects (2 in this case):
 - User
 - System

 - Describe the main flow of events / scenario.
1. After accessing the system, the user decides to sign up.
 2. The user is prompted by the system to input the necessary data.
 3. Information is entered by the user.
 4. The system determines whether the user has an account already:
 - The system shows "There is an account registered with this email" if the user has an account.
 - If not, "Account created" is shown by the system.
 5. The user then logs in.
 6. The user is prompted by the system to enter their login information.
 7. The user inputs the login information.
 8. The system verifies that the data is accurate:
 - "Welcome" is shown by the system if it is correct.
 - If not, "Error: Email or password is incorrect, try again" is shown by the system.

System Response	Actor
The System requests to enter information	The User selects “Create an Account”
The System checks if an account exists	The User enters information
If exists → display “There is an account registered with this email”	
Else → display “Account created”	
The System requests login credentials	The User selects “Log In”
	The System requests login credentials
If correct → display “Welcome”	
Else → display “Error: Email or password is incorrect, try again”	

“Receive notification” Sequence Diagram:



This scenario outlines how the user interacts with the system to activate and configure the notification feature. After choosing to receive notifications, the system prompts the user to select their preferred delivery method—either SMS or Email. Based on their choice, the system delivers future alerts accordingly. If the user does not select a method, the system reminds them to make a selection.

-Describe the main objects

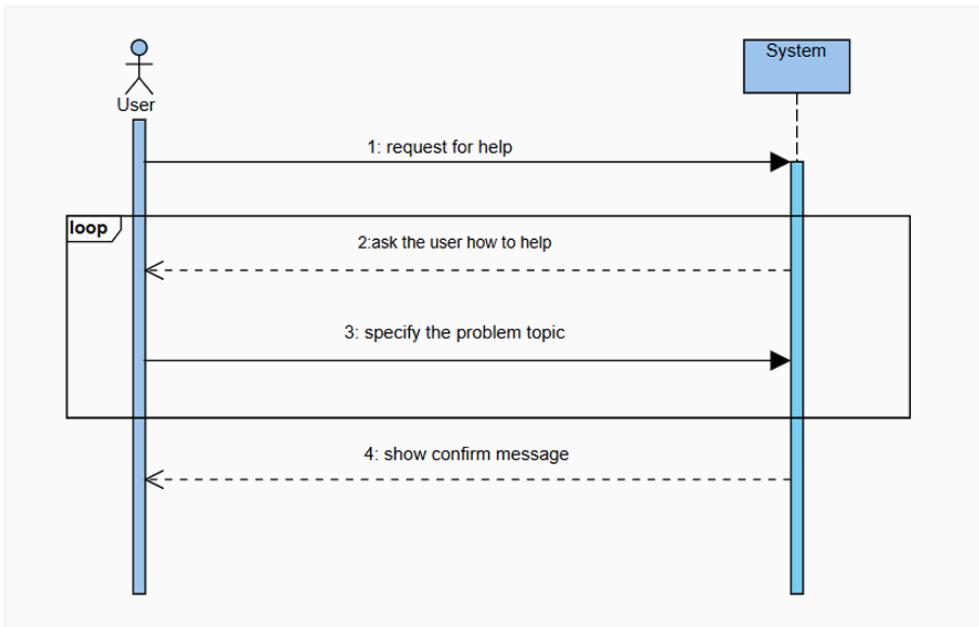
1. User (Student)
2. System
3. Notification Channels (SMS / Email)

-Describe the main flow of events / Scenario:

1. User accepts to receive notifications
2. System asks user to choose a preferred method (Email or SMS)
3. User selects their preferred method
4. If user selects SMS → System sends notifications to the phone number
5. If user selects Email → System sends notifications to the student's email
6. If user does not select a method → System prompts the user to make a selection

Actor	System Response
User accepts notifications	
	System asks for preferred notification method (Email or SMS)
User selects a method	
	System records the chosen preference
If user selects SMS	
	System sends notification to user's phone number
If user select Email	
	System sends notification to user's email address
If user select nothing	
	System prompts the user to select a notification method to proceed

“Help and Support” Sequence Diagram:



This scenario describes how a student interacts with the system to receive assistance when encountering an issue. The system guides the user through a step-by-step process, starting from the initial request for help to confirming the support request. The communication ensures the student specifies their issue clearly, and the system confirms receipt of the support request.

-Describe the main objects

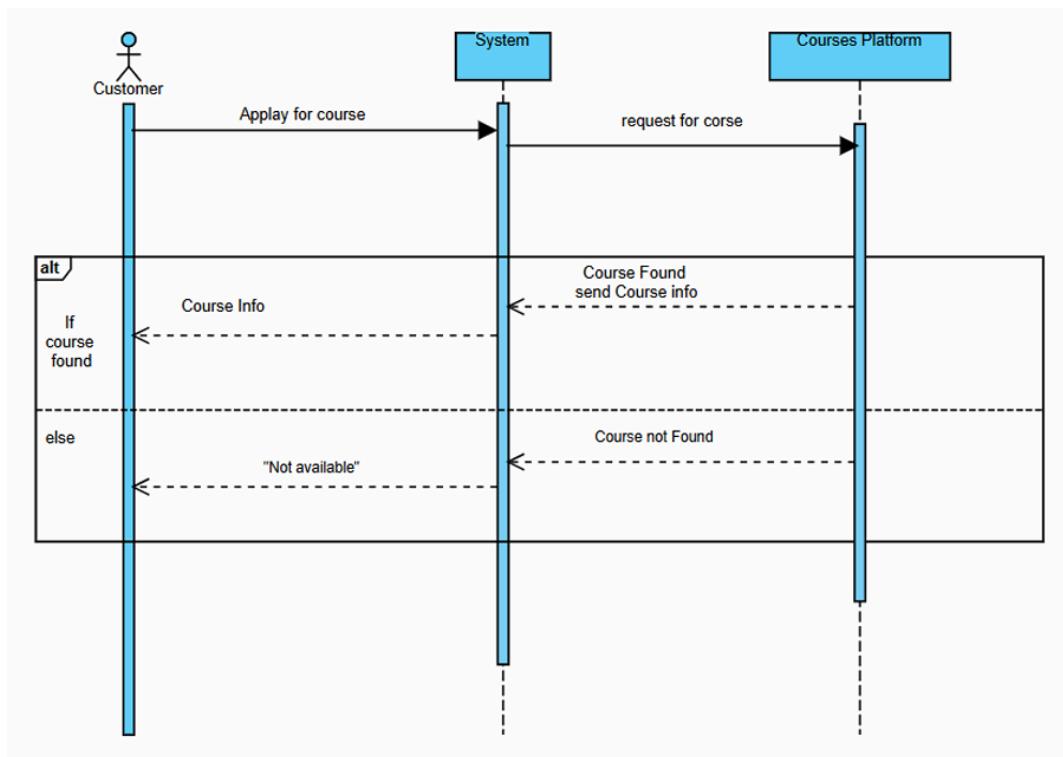
1. User (Student)
2. System
3. Support Interface

-Describe the main flow of events / Scenario:

1. User requests help through the system
2. System asks how the user would like to be helped
3. User specifies the problem topic
4. System shows a confirmation message verifying the support request

Actor	System Response
User requests help	
	System asks the user how it can help
	User specifies the topic of the problem
	System confirms receipt of the support request with a confirmation message

“Apply for course” Sequence Diagram:

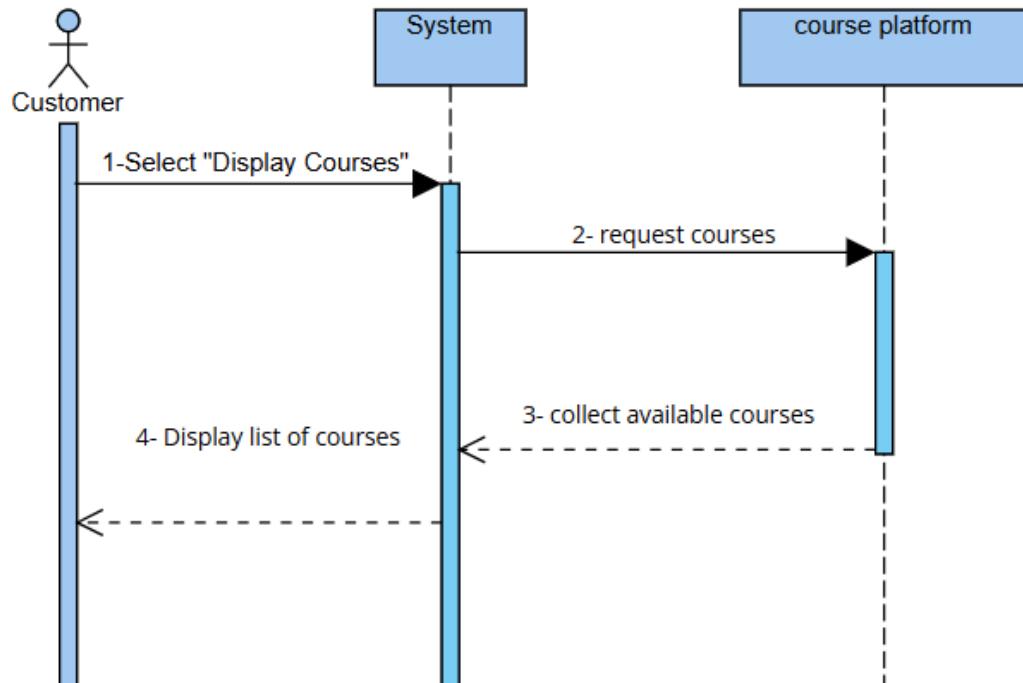


Consider a Scenario for a customer applying for a course through an online system. The customer wants to apply for a course. They send a request through the system. The system then forwards the request to the Courses Platform to check if the course is available. The Courses Platform checks and sends back either the course information (if found) or a "not available" message. The system then informs the customer about the result.

- Describe the main objects (3 in this case):
 1. Customer
 2. System
 3. Courses Platform
- Describe the main flow of events / scenario:
 1. Customer sends a request to apply for a course.
 2. System forwards the request to the Courses Platform.
 3. Courses Platform checks for course availability.
 4. If the course is found, the Courses Platform sends back the course info.
 5. If the course is not found, the Courses Platform sends a "Not available" message.
 6. System informs the Customer based on the response.

Actor	System Response
Customer applies for a course	
	System forwards the request to the Courses Platform
	If <u>course</u> found:
	Courses Platform checks for course availability.
	If course found → System sends course info to Customer
	If course not found → System informs Customer "Not Available"

“Display courses” Sequence Diagram:



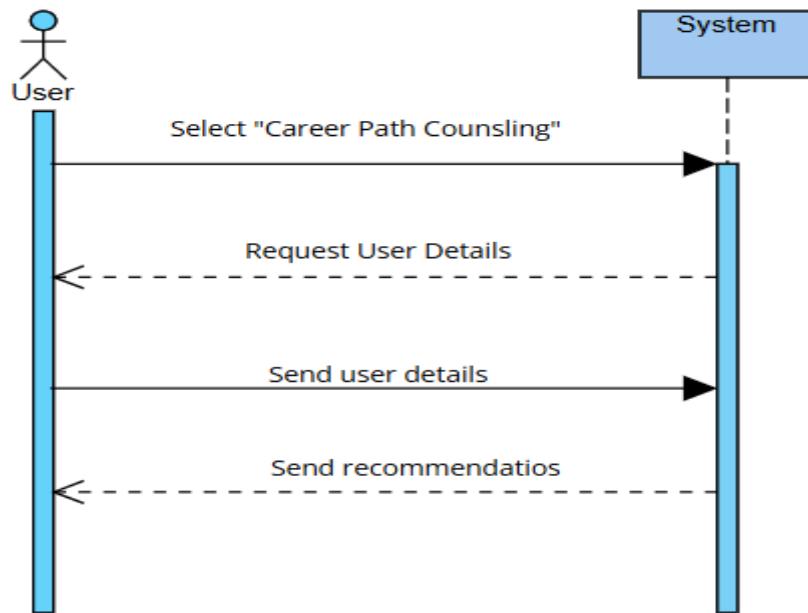
Consider a Course Display Scenario for a user looking into available courses on an online learning platform. The user chooses the option to view available courses. The system then sends a request to the Course Platform to request the most recent list of available courses. After reviewing the request and collecting the available courses, the Course Platform returns the results to the system. The user gets provided with the course list by the system. This allows the user to browse over the available courses before selecting one to apply for.

- Describe the main objects (3 in this case):
 1. User
 2. System
 3. Course Platform
- Describe the main flow of events / scenario.
 1. User selects the option to "Display Courses."
 2. The system sends a request to the Course Platform for available courses.
 3. The course Platform collects and returns the course list.
 4. The system displays the list of available courses to the User.

The Use Case 3 column format is shown below:

Actor	System Response
User selects "Display Courses."	
	System sends a request to the Course Platform for courses list.
	Course Platform collects and returns the available course list.
	System displays the list of courses to the User.

“Career Path Counselling” Sequence Diagram:



Describe the main objects (2 in this case):

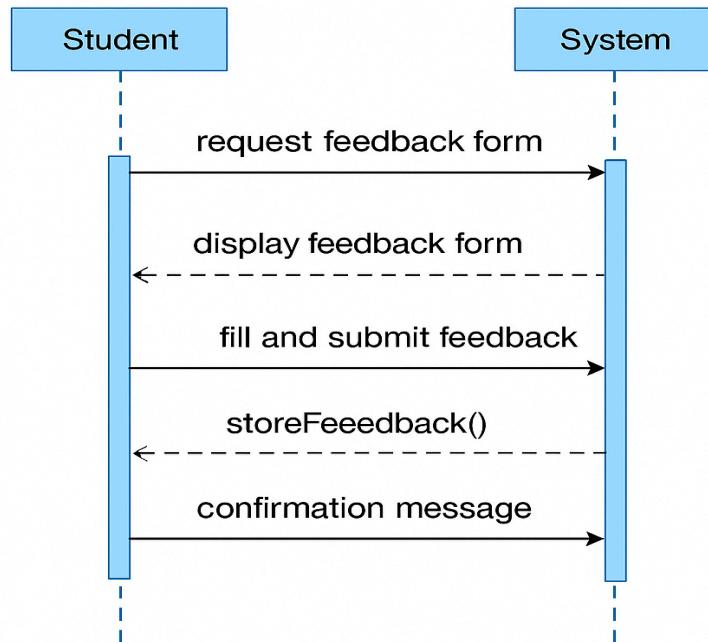
- User (the person who is requesting career path counseling)
- System (the system that provides career recommendations)

Description of the main flow of events / scenario:

1. The User selects the "Career Path Counselling" option from the system interface.
2. The System requests the User's details necessary for generating a recommendation (such as skills, interests, or goals).
3. The User provides the required information.
4. The System processes and analyzes the provided data and send recommendation

Actor	System Response
The User selects the "Career Path Counselling"	
	The System requests the User's details
User provides the required information.	
	send recommendation

"Provide Feedback" Sequence Diagram:



Describe the main flow of events / scenario:

- 1) Student
- 2) System

• Describe main flow of events / scenario:

1. The user selects the option "Provide Feedback."
2. The system respond and displays the feedback form.
3. The student submits the filled form.
4. System stores the feedback.
5. System sends a confirmation message to the student.

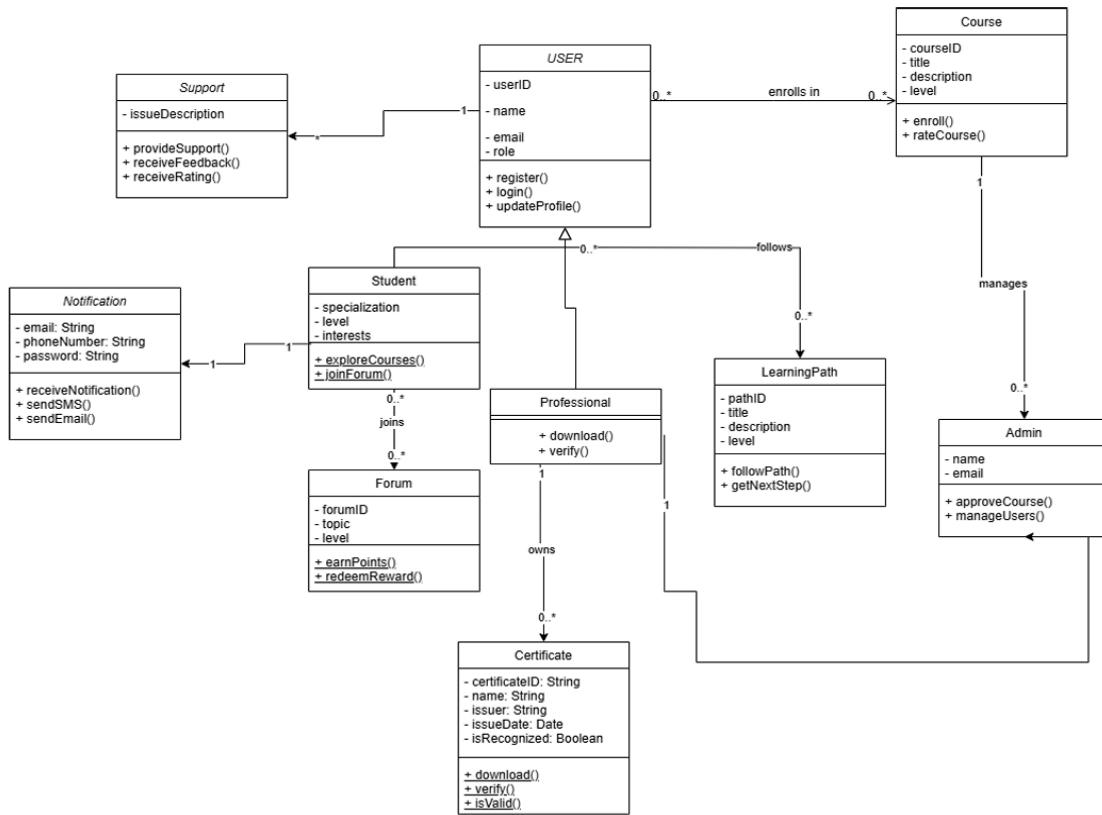
The Use Case 3 column format is shown below:

Actor	System Response
Student selects "Provide Feedback."	
	<u>System displays the feedback form</u>
Student submits the filled form	
	<u>System stores the feedback.</u>
	<u>System sends confirmation message to the student</u>

Lab 9 :

Class Diagram & Class Analysis

The class diagram:



Description:

This class diagram represents an educational and career development platform called TechWay, designed to support students and professionals in exploring learning paths, earning certificates, and interacting with the tech community.

The User class is the base class, and it is extended by Student and Professional types.

A Student can enroll in multiple Courses, join Forums, and explore learning opportunities based on interests and specialization.

A Professional can download and verify certificates, and they are linked to issued Certificates.

The course is managed by an Admin, and students can enroll in and rate these courses.

The LearningPath class represents structured educational tracks that students can follow to achieve their career goals.

Notification is used to inform users through email or SMS.

Support handles user issues and feedback.

The Forum class provides discussion spaces for students to interact and earn points or rewards.

Certificate represents digital certifications awarded to users after completing certain requirements.

An Admin manages users and approves courses on the platform.

Class Analysis Document What is Class Analysis?

Class analysis is the process of identifying and organizing the main classes in a software system based on the problem domain. It helps clarify the structure and role of each class, their relationships, and how they interact within the system. This process is fundamental in designing object-oriented software and contributes to building a robust class diagram.

Types of Analysis Classes :

1. Entity Classes: These represent the core data or concepts in the system and usually contain attributes and essential business logic. (e.g., User, Course, Certificate)

2. Boundary Classes: These manage the interaction between the system and external actors (users or systems). They handle user inputs and outputs. (e.g., Notification, Support)

3. Control Classes: These control and coordinate the flow of operations in the system between entity and boundary classes. (e.g., controllers, if implemented).

Analysis Classes in TechWay Project

Class Name	Type	Purpose
User	Entity	Main user of the system. Parent to Student, Professional, and Admin.
Student	Entity	Engages with learning paths, courses, and community forums.
Professional	Entity	Holds certificates and engages in platform activities.
Admin	Entity	Manages users, content, and the structure of the platform.
Course	Entity	Represents educational materials that users can enroll in.
Certificate	Entity	Represents official certifications earned by professionals.
LearningPath	Entity	Contains a sequence of courses tailored for specific learning goals.
Forum	Entity	Enables discussions and knowledge exchange between users.
Notification	Boundary	Manages alerts and updates sent to users via email or SMS.
Support	Boundary	Handles help requests and support interactions.

Conclusion

This lab allowed us to understand how to model real-world systems using class diagrams. Through our project 'TechWay', we identified the main entities, their relationships, and interaction mechanisms to build a complete object-oriented model.

The Interviews:

Joud Abdelrahman Alshahrani

a)First interview:

Name: Bashayer AlOtibi

Major: Data science student

Email: Bashayer1222@gmail.com

Date of interview: 29/1/2025

What is the biggest obstacle you face when learning online?

Lack of direct interaction with instructors and peers

What is the biggest challenge you face when self-learning in computer science fields?

Difficulty staying committed and completing courses

What do you think about a points and rewards system to motivate students to learn?

A great idea that would make learning more enjoyable

How d

o you prefer the course links and educational platforms to be presented on the app?

A categorized list based on fields and specializations

What features would you like to see in a website dedicated to computer science students?

Support tools like an integrated development environment within the website

b)Second interview:

Name: Farah Alyoubi

Major: Cyber Security student

Email: Fcyber4@gmail.com

Date of interview: 1/2/2025

What is the biggest obstacle you face when learning online?

A lack of face-to-face communication with peers and teachers

What is the biggest challenge you face when self-learning in computer science fields?

Difficulty staying committed and completing courses

What do you think about a points and rewards system to motivate students to learn?

I don't think it's important; the quality of content matters more

How do you prefer the course links and educational platforms to be presented on the app?

Personalized recommendations based on my interests and level

What features would you like to see in a website dedicated to computer science students?

Support tools like an integrated development environment within the website

c) Third interview information:

Name: Shoug Alharbi

Major: Artificial intelligence student

Email: Shoug222@gmail.com

Date of interview: 1/2/2025

What is the biggest obstacle you face when learning online?

Absence of incentives and continuous follow-up to complete learning

What is the biggest challenge you face when self-learning in computer science fields?

Lack of high-quality Arabic content

What do you think about a points and rewards system to motivate students to learn?

It might be useful, but it's not essential

How do you prefer the course links and educational platforms to be presented on the app?

A list with categories according to expertise and fields

What features would you like to see in a website dedicated to computer science students?

A roadmap for each specialization with suggested learning paths

Rauna Ayman Al-mazroui

a)First interview:

Name:shahad al-harbi

Major: Computer science graduate

Email:shahadx23@gmail.com

Date of interview: 2/2/2025

1- What distinguishes our site from other sites?

I can access the site from any device or any browser or search engine, as it supports access by computer and phones and arranges items and data clearly and thoughtfully so that it is not annoying to the eye

2- What people want to visit our site?

People who want to change their major at the university

Or they want to add technical computer skills besides their specialty

3- How can we promote our website better?

By making it compatible with search engines in order to appear at the top of the search pages

4- Do you see the importance of updating the information on the site continuously?

Yes, it is very important to update, science is evolving and new information is constantly being discovered.

5- What technical skills do you have before?

Programming languages such as Java and C++

b)Second interview:

Name: reem khalid

Major:high school student

Email:reemx37@gmail.com

Date of interview: 4/2/2025

1- What distinguishes our site from other sites?

Contains customer service any technical support in order to provide communication with users of the site to solve problems that may

They face it on the site or for inquiries

2- What people want to visit our site?

High school students where they want to explore disciplines clearly and simplified

3- How can we promote our website better?

Email marketing by sending messages

To people who might be interested, such as computer students at university.

4- Do you see the importance of updating the information on the site continuously?

Yes, it is very important to update, science is evolving and new information is constantly being discovered.

5- What technical skills do you have before?

The use of Photoshop and graphic design

c) Third interview information:

Name: lama al-ghamdi

Major: Data science student

Email: lamaalg27@gmail.com

Date of interview: 6/2/2025

1- What distinguishes our site from other sites?

Easy to navigate between pages in addition to providing a high level of protection for personal information and data of site users

2- What people want to visit our site?

University students and professors

3- How can we promote our website better?

Using social media platforms to promote the website

4- Do you see the importance of updating the information on the site continuously?

No, because I see that they are basics, they are fixed and do not change, so they should not be updated continuously.

5- What technical skills do you have before?

Ability to quickly write and create databases using programs such as MySQL

Hadeel Hatem Fallatah

First Interview information:

Name: Hala Al-Farhan

Major: software Engineering

mail: hala9@gmail.com

Date of interview: 7/2/2025

1: What is your major in the College of Computer Science and Engineering?

Software Engineering

2: What confirmed certificates do you think are useful in your major?

Microsoft Certified: Azure Developer Associate

This certification is important because cloud computing is widely used, and many companies require developers who understand Azure services.

3: In which company would you like to work after graduation?

SAP or Oracle

Both companies are known for developing enterprise software, and I would love to be part of a team that works on large-scale business solutions.

4: How many courses would you like to take during your studies?

Seven to ten courses

I think this number is balanced, as it allows me to gain knowledge in different areas while still having time for hands-on projects.

5: What are the most important things that the application should provide to help the student?

Training programs, project ideas, and job opportunities.

It should help students improve their technical skills, offer real-world projects to work on, and connect them with potential employers.

Second interviewee Information:

Name: Noor Al-Mutair

Major: Cybersecurity

mail: noor@gmail.com

Date of interview: 7/2/2025

1: What is your major in the College of Computer Science and Engineering

Cybersecurity

2: What confirmed certificates do you think are useful in your major?

Certified Ethical Hacker (CEH) and CompTIA Security+

These certifications provide essential knowledge in ethical hacking, network security, and risk management, which are key areas in cybersecurity.

3: In which company would you like to work after graduation?

cybersecurity firm like Palo Alto Networks or IBM Security

These companies specialize in cybersecurity solutions, and working there would allow me to develop my skills in protecting systems and preventing cyber threats.

Q4: How many courses would you like to take during your studies?

Four to six courses

I want to focus on practical cybersecurity skills while balancing my studies with hands-on experience.

5: What are the most important things that the application should provide to help the student?

Cybersecurity challenges, certification prep, and internship listings.

It should offer security labs, practice tests for certifications, and internship opportunities to gain real-world experience.

Third Interviewee Information:

Name: sara fallatah

Major: Artificial intelligence

mail: sarafr@gmail.com

Date of interview: 6/2/2025

1: What is your major in the College of Computer Science and Engineering?

Artificial Intelligence

2: What confirmed certificates do you think are useful in your major?

Google TensorFlow Developer and AWS Certified Machine Learning

These certifications provide strong foundations in AI model development and cloud-based machine learning, which are essential in this field.

3: In which company would you like to work after graduation?

DeepMind or OpenAI

These companies are leading AI research, and I would love to contribute to advancements in artificial intelligence and machine learning.

4: How many courses would you like to take during your studies?

More than ten courses

AI is a broad and evolving field, so I want to take as many courses as possible to build a strong foundation.

5: What are the most important things that the application should provide to help the student?

AI projects, coding challenges, and mentorship programs.

It should provide AI-based projects, practical coding exercises, and mentorship from industry professionals to help students grow.

Raghad Turki Alamri**First Interviewee Information :**

Name: Renad Alselmi Job: Computer science student

Common Issues in Educational Platforms?

A common issue in educational platforms is complex navigation, where users struggle to find the content they need

Features That Enhance the Learning Experience?

A key feature that enhances the learning experience is a simple, user-friendly interface. An intuitive design and easy navigation help users quickly access content, making the learning process more efficient and enjoyable.

Which Platform Would You Like Our Site to Be Similar To?

I'd suggest making the platform similar to Duolingo. Its simple interface, clear learning path, and level placement test provide a smooth and engaging learning experience.

Would You Like a Points System to Motivate Students and Trainers?

Yes, a points system would be great. It motivates both students and trainers to stay engaged and continue learning.

Do You Think Having Forums or Discussion Groups Would Be Beneficial?

Yes, forums or discussion groups would be beneficial for sharing experiences, asking questions, and discussing ideas.

Second Interviewee Information :

Name: Jana Alharthy Job: Cybersecurity Student

Common Issues in Educational Platforms?

A common issue is outdated content and a system that isn't regularly updated. This reduces the platform's effectiveness, and keeping both the content and system updated ensures relevance and improves user experience.

Features That Enhance the Learning Experience?

The presence of AI technologies on the platform enhances the learning experience by providing personalized recommendations, making the experience more engaging and tailored to the user.

Which Platform Would You Like Our Site to Be Similar To?

I would suggest making the platform similar to Khan Academy. Its feature of personalized recommendations based on the student's level creates a tailored learning experience, helping users progress at their own pace.

Would You Like a Points System to Motivate Students and Trainers?

Yes, a points system would be beneficial. It fosters healthy competition, which can drive higher engagement and motivation for both students and trainers to stay active and improve their progress.

Do You Think Having Forums or Discussion Groups Would Be Beneficial?

Yes, having forums or discussion groups would be beneficial. They provide a platform for sharing ideas and opinions, which can enhance understanding and foster a collaborative learning environment.

Third Interviewee Information :

Name: Lama Alshehri Job: Data Science student

Common Issues in Educational Platforms?

A common issue is an unattractive and incompatible UI. If the interface isn't user-friendly or optimized for all devices, it can negatively impact the user experience and engagement.

Features That Enhance the Learning Experience?

Multi-device support is essential for enhancing the learning experience. It allows users to access the platform seamlessly on both computers and mobile devices, providing flexibility and convenience for learning anytime, anywhere.

Which Platform Would You Like Our Site to Be Similar To?

I'd suggest making the platform similar to Duolingo. It has an easy-to-use and engaging design, and its clear structure guides users through a learning path suited to their level, ensuring a smooth and effective experience.

Would You Like a Points System to Motivate Students and Trainers?

Yes, a points system would be beneficial. It boosts both efficiency and motivation for trainers, encouraging them to stay engaged and actively contribute to the learning process.

Do You Think Having Forums or Discussion Groups Would Be Beneficial?

Yes, forums or discussion groups would be beneficial. They allow users to share knowledge and gain insights from others' expertise, fostering a collaborative learning environment.

Dina Abdullah AlHarbi

First Interviewee Information :

Name:Sara Alharbi

Job:Security Governance Specialist

Email:Saraa99@gmail.com

Date of interview: 1/2/2025

How can the website help both professionals and beginners?

I think for beginners is to provide courses with different levels of difficulty. start with a simple project then progress to more complex projects. As for professionals it might help to offer courses when new tools are required in their work.

What are your favorite educational platforms and why?

I prefer Coursera because its content is specialized and the platform constantly updates its offerings to match with current trends.

What are your criteria for choosing online courses?

The first thing I look for is how up to date the content are. The tech field changes frequently, so I don't want to learn outdated tools. I also care about reviews from previous students and look for courses that offer accredited certifications.

What features do you wish our educational website had?

Career path questions. interactive guides like 'What's Your Tech Personality?' or 'Do you enjoy puzzles?' and get matched to fields like mbti tests.

If you had the chance to go back in time after knowing all the specializations, would you choose a different one? Why?

Honestly, no. Cybersecurity is my passion. It's a field that's always evolving, and I enjoy the constant learning and problem solving it requires.

Second Interviewee Information :

Name: Taif AlOtaibi

Job:Program Manager

Email:Engtay02@gmail.com

Date of interview: 1/2/2025

How can the website help both professionals and beginners?

By providing clear and organized learning paths for beginners. As for professionals it helps to acquire new certificates to improve resumes.

What are your favorite educational platforms and why?

I prefer Satr because it offers a unique blend of practical skills and hands-on learning experiences.

What are your criteria for choosing online courses?

The most important thing for me is having plenty of practical exercises and I also look for courses that simulate real-world programming problems.

What features do you wish our educational website had?

A side by side chart comparing fields like job descriptions , salaries, day-to-day tasks, and tools used.

If you had the chance to go back in time after knowing all the specializations, would you choose a different one? Why?

No. Software engineering allows me to be creative. I love building things from scratch and solving complex problems through code.

Third Interviewee Information :

Name: Raghad Henawi

Job: Data Science Graduate

Email:RayJaafrh@gmail.com

Date of interview: 1/2/2025

How can the website help both professionals and beginners?

By providing a feature to allow users to chat with each other to share thoughts and professionals offer help to beginners.

What are your favorite educational platforms and why?

Coursera for its wide range of courses. The platform provides certificates upon completion, which can improve my resume.

What are your criteria for choosing online courses?

I look for courses that offer strong final projects similar to what we see in the job market. I also care about courses that focus on new technologies like artificial intelligence.

What features do you wish our educational website had?

Let users type skills they have and see which fields fit them.

If you had the chance to go back in time after knowing all the specializations, would you choose a different one? Why?

yes.If I could go back, I might choose artificial intelligence instead of data science. It's fun but AI seems to match my interests and the job description I want.

Madhawi Faisal Algrmoul

First Interviewee Information :

Name: Lama Mohammad

Job : Software Engineer

Email:[_](#)

Date of interview: 20/1/2025

1. How important is obtaining a certified certificate after completing an online course for you? Why?

"It's very important for me because certificates add value to my resume and help in job applications. Having a recognized certification shows employers that I'm dedicated to advancing my skills."

2. Do you prefer short and focused video lessons or long and detailed courses?

"I prefer short lessons. They are easier to digest and fit better into my busy schedule. I appreciate getting to the point quickly."

3. How do user reviews and ratings influence your decision when choosing an online course?

"I always check reviews before enrolling. If a course has bad ratings, I won't waste my time on it. Positive reviews give me confidence that I'm making the right choice."

4. What motivates you the most to complete an online course?

"Career advancement. I take courses to improve my skills and get better job opportunities. The more I learn, the more value I can offer in my profession."

5. What are your preferred ways to engage with educational content?

"Quizzes and hands-on projects. I learn best by doing. The more interactive the course, the better."

Second Interviewee Information :

Name: jouri al gamadi

Job : UX/UI Designer

Email:

Date of interview: 5/2/2025

1. How important is obtaining a certified certificate after completing an online course for you? Why?

"I don't really care about certificates. I learn for knowledge, not for credentials. The real value for me is in the learning process itself."

2. Do you prefer short and focused video lessons or long and detailed courses?

"I like long, detailed courses because they provide in-depth knowledge. I prefer exploring a topic fully rather than just scratching the surface."

3. How do user reviews and ratings influence your decision when choosing an online course?

"I rely more on recommendations from professionals or peers rather than reviews. If someone I trust suggests it, that's enough for me."

4. What motivates you the most to complete an online course?

"Personal growth. I just love learning new things. It's not about external rewards, but about expanding my mind."

5. What are your preferred ways to engage with educational content?

"I prefer interactive discussions and group activities. Learning with others makes it more enjoyable, and I get to hear different perspectives."

Third Interviewee Information :

Name: Dareen Alzahrani

Job : Student

Email:

Date of interview: 5/2/2025

1. How important is obtaining a certified certificate after completing an online course for you? Why?

"It depends. If the certificate is recognized by companies, then yes, it's important. Otherwise, I just focus on the knowledge. I want a certificate that adds value."

2. Do you prefer short and focused video lessons or long and detailed courses?

"A mix of both is ideal. Short videos for quick learning, and detailed courses when I need a deeper understanding of a topic."

3. How do user reviews and ratings influence your decision when choosing an online course?

"Reviews help, but I also check the course syllabus to see if it matches my needs. If the content is relevant, I'll take it regardless of the ratings."

4. What motivates you the most to complete an online course?

"Competition! If I see my peers learning something, I want to stay ahead. It keeps me motivated to keep up and improve."

5. What are your preferred ways to engage with educational content?

"Self-paced assignments and practical case studies. I like applying what I learn in real-world scenarios, it helps me understand the concepts better."

Conclusion:

To summarize, the "TechWay" platform addresses the critical needs of computer science students and technology enthusiasts by providing a structured, user-friendly learning experience. Through curated courses, professional certification opportunities and career counseling tools, TechWay empowers learners to make informed decisions and achieve their academic and career goals. By integrating games, interactive forums and continuous updates that align with industry standards, the platform creates an engaging environment that supports both beginners and professionals in their educational journey. We believe TechWay has the potential to significantly improve the learning experience, career preparation and engagement in the tech industry.

Suggestions:

- Interactive challenges: Introduce coding challenges and hackathons on the platform to improve practical skills and encourage healthy competition among users.
- Career fairs and internships: Work with companies to host virtual career fairs and internship programs directly through TechWay.
- AI-powered recommendations: Utilize AI tools to recommend courses, certifications and career paths based on the user's interests and learning progress.
- Mentorship program: Create a mentorship matchmaking feature to connect students with industry experts who can provide one-on-one mentorship and career advice.
- Mobile app enhancement: Develop a dedicated mobile app for TechWay to provide seamless access to learning resources anytime, anywhere.
- Scholarship Notifications: Add a feature to notify students about scholarships, grants and funding opportunities in their field of study.

Task table:

Lab	Task	Details
Lab 1	Introduction and Project Definition	- Introduce project “TechWay” and define its goal (support tech learners).
Lab 2	Information Gathering	- Problem description. - Interview questions and responses.
Lab 3	Planning Phase 1	- Define project purpose, motivation, goals. - Preliminary report (problem, findings, recommended solution). - Cost and schedule estimates.
Lab 4	Planning Phase 2	- Problem definition (main and sub-problems). - Scope and objectives of TechWay. - Alternative solutions. objectives of TechWay. Cost/benefit analysis. - Software impacts and organizational changes.
Lab 5	Analysis Phase 1	- Identify stakeholders. - Scope of the work. - Draw a context diagram (mentioned but not shown). - Conduct

Lab 6	Functional and non-functional). Requirements	- List system requirements (functional and non-functional).
Lab 7	Analysis Phase 2	- Create Use Case Diagram. - Write detailed use case scenarios.
Lab 8	Interaction Diagrams	- Draw Sequence Diagrams for: Receive Notification, Help and Support, Apply for Course.
Lab 9	Class Diagram	- Draw Class Diagram for TechWay. - Class analysis (Entity, Boundary, Control classes).
Conclusion	Final Summary	- Discuss project findings and what was learned from modeling “TechWay”.