

# **COMP225 Group Project**

## **Title: Learning Language Platform**

### **Group 5 Team members:**

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### **Deliverable #1**

#### **1.1 Purpose**

- This new software product will help people who want to learn new languages by providing an interactive WebApp to guide them in language learning while teaching them the cultures of the countries where those languages are spoken.

#### **1.2 Document Conventions**

<b>Acronyms</b>	<b>Description</b>
SQL	Structured Query Language
DB	Database
HTML	HyperText Markup Language
CSS	Cascading style sheet
JS	Javascript
API	Application programming interface
UI	User interface
UX	User experience

#### **1.3 Intended Audience and Reading Suggestions**

##### **Developers:**

- Focus on technical specifications, system architecture, APIs, and implementation details.
- Suggested sections: *System Design, Technical Requirements, and API Documentation.*

##### **Project Managers:**

- Understand the project's scope, objectives, milestones, and resource allocation.
- Suggested sections: *Project Overview, Timeline, and Deliverables*.

#### **Marketing Staff:**

- Learn about the product's features, target audience, and unique selling points for crafting effective promotional strategies.
- Suggested sections: *Product Features, User Benefits, and Market Positioning*.

#### **End Users:**

- Understand how to use the product and its benefits, along with any user guidance.
- Suggested sections: *User Guide, Features Overview, and FAQs*.

#### **Testers:**

- Access detailed test cases, known issues, and quality assurance processes to validate the product.
- Suggested sections: *Testing Plan, Bug Tracker, and Known Issues*.

#### **Documentation Writers:**

- Use detailed product descriptions and feature specifications to create comprehensive user manuals or online help resources.
- Suggested sections: *Features, Technical Specifications, and User Scenarios*.

### **1.4 Project Scope**

- This new Language Learning Platform will address the need for learners to gain cultural insights while focusing on learning a new language. By integrating lessons on traditions, customs, and day-to-day cultural practices, the software will enhance the understanding of the language in its natural context, making the learning process more engaging and immersive. Learners will explore the history, art, cuisine, and social norms associated with the language, helping them develop a deeper appreciation of its cultural roots. Additionally, it will include interactive scenarios such as virtual tours, role-playing activities, and real-life dialogues that simulate authentic cultural experiences. By bridging the gap between language and culture, this innovation will equip learners with not only linguistic skills but also the cultural competence necessary for effective communication and meaningful connections.

## 1.5 References

- Adams, S. (2019, July 23). *Game of tongues: How duolingo built a \$700 million business with its addictive language-learning app.* Forbes.  
<https://www.forbes.com/sites/susanadams/2019/07/16/game-of-tongues-how-duolingo-built-a-700-million-business-with-its-addictive-language-learning-app/>
- Baraishuk, D. (2023, July 2). *How to create a language learning app.* Belitsoft.  
<https://belitsoft.com/custom-elearning-development/how-develop-language-learning-app-duolingo>
- Climer, S. (2024, February 9). *The 7 types of stakeholders to involve in your website Redesign Project.* Orbit Media Studios.  
<https://www.orbitmedia.com/blog/stakeholder-interviews/#seven-types-stakeholders>
- Murray, D. E., & McPherson, P. (2004). *Using the web to support language learning.* National Centre for English Language Teaching and Research.
- Ravenscraft, E. (2019, May 4). *500 Days of Duolingo: What you can (and can't) learn from a language app.* The New York Times.  
<https://www.nytimes.com/2019/05/04/smarter-living/500-days-of-duolingo-what-you-can-and-cant-learn-from-a-language-app.html>

## 2.1 Product Perspective

- This is a new software designed to help people to learn new languages and cultures

## 2.2 Product Features (Functions)

- User management
- Progress tracking
- Connect to dictionary API
- Connect to grammar checking application

## 2.3 User classes and Characteristics

- Student: Will use the software to learn
- Teacher: Will use the software to upload learning materials
- System administrators: Will coordination the operations

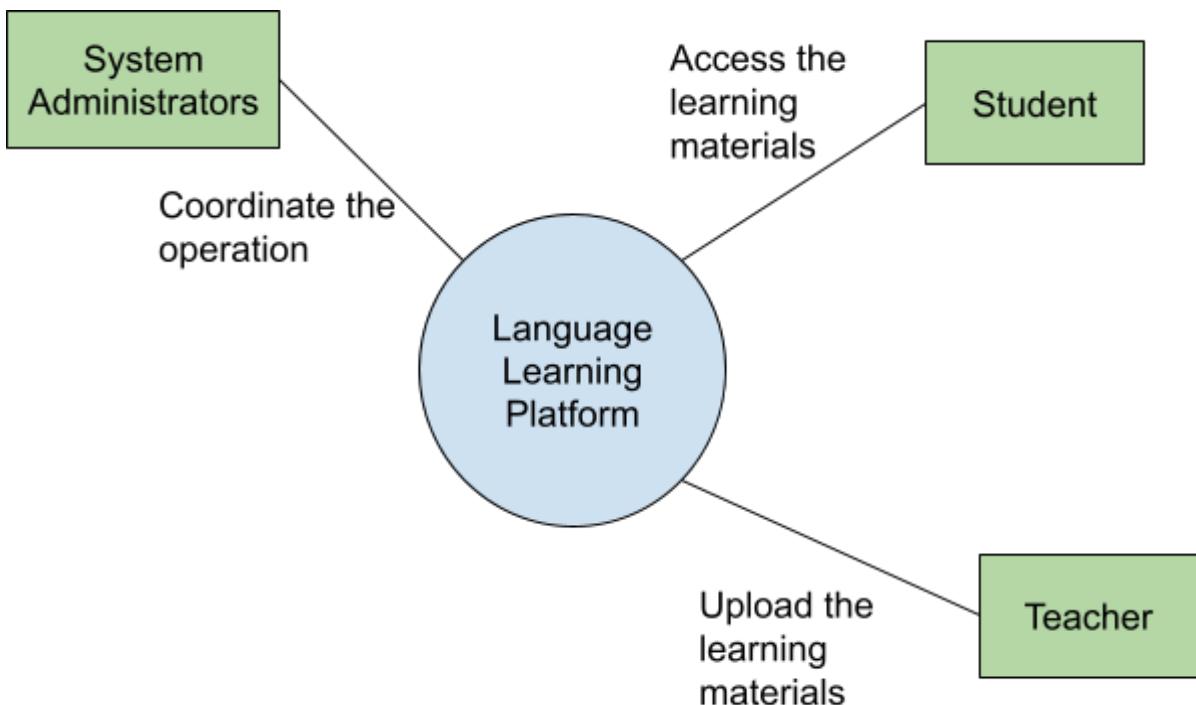
## **2.4 Operating Environment**

- Will run on web server(GoDaddy)
- Will use MySQL to store user data
- Will support various browsers (Chromes, Microsoft Edge, FireFox, Brave)
- Will be developed using HTML, CSS and JS for the front end. And C# for the back end

## **2.5 Assumptions and Dependencies**

- This software assumes users have reliable internet access which enables them to utilize the application effectively without interruptions. Also, the application is expected to function properly across a range of devices, such as desktops and laptops, which ensure accessibility for all users. Furthermore, it is assumed that the learning materials will be relevant and engaging for the target audience, thereby enhancing their learning experience and motivation
- The dependency of this software is that it relies on third-party APIs, a database system, content providers, and cloud hosting services to deliver features like speech recognition, learning resources, scalability, to ensure a positive user experience.

## **3.1 User Interfaces**



### 3.2 Hardware Interfaces

- **User Devices:** Compatible with desktops, laptops, tablets, and smartphones with a minimum of 2GB RAM and an active internet connection.
- **Peripheral Devices:** Optional use of microphones and speakers/headphones for enhanced speech recognition and audio learning.
- **Cloud Infrastructure:** Integration with cloud servers for data storage and processing

### 3.3 Software Interfaces

- **Third-Party APIs:** Integration with APIs for speech recognition, translation services, and content delivery.
- **Database Management:** Interfaces with database systems like MySQL or MongoDB for storing user data, progress, and resources.
- **Cloud Services:** Support for AWS, Azure, or Google Cloud for hosting, scalability, and performance optimization.
- **Content Providers:** Interfaces with external sources for accessing video, articles, and other learning materials.

### Deliverable #2

Stakeholder Register					
Stakeholder Name	Stakeholder Position	External/Internal	Stakeholder contact details	Operational/Executive	Interest (high, medium, low)
Maria Lopez	Project Manager	Internal	maria.lopez@email.com	Operational	high
Kevin Smith	Investor	External	kevin.smith@email.com	Executive	high
Raj Patel	Marketing Officer	Internal	raj.patel@email.com	Executive	high
Jane Doe	End user	External	jane.doe@email.com	Operational	high
John Chen	Software Developer	Internal	john.chen@email.com	Operational	medium
Sarah Kim	UI/UX Designer	Internal	sarah.kim@email.com	Operational	medium
Ahmed Khan	Quality Assurance Tester	Internal	ahmed.khan@email.com	Operational	medium
Emily Johnson	Language Expert	Internal	emily.johnson@email.com	Executive	low
Tom Wilson	Cultural Consultant	Internal	tom.wilson@email.com	Executive	low

### **Deliverable #3**

Question	Stakeholder Position	Answer
Do you need email or SMS marketing features within the system?	Marketing Officer	Email
What integrations with social media or advertising platforms do you require?	Marketing Officer	Facebook
What kind of analytics and reports do you need to track marketing performance?	Marketing Officer	SEO & Web Traffic Reports, Engagement Metrics, Demographics & User Behavior, User Acquisition Reports
What features would help you stay engaged in learning a new language?	Customer (Student)	Exercises, progress tracking
Do you prefer structured courses, self-paced learning?	Customer (Student)	Our customers will be able to track their progress on the platform, they may do self-paced learning or commit to
What frustrations have you faced with other language learning apps?	Customer (Student)	Lack of speaking practice, boring content, and expensive subscription fees.
Would you like personalized learning recommendations?	Customer (Student)	Yes, AI-driven recommendations based on my progress and interests.
What type of data needs to be stored, and how should it be structured?	Database Administrator	User profiles, course content, progress tracking, payment records, and logs in a relational database.
What backup and recovery strategies do you recommend?	Database Administrator	Daily automated backups with cloud storage and disaster recovery plans.
How should database performance be optimized for a large user base?	Database Administrator	Indexing, caching, load balancing, and database sharding.
What kind of content (videos, quizzes, assignments) do you want to upload?	Teacher	Video lectures, quizzes, assignments, and downloadable PDFs.
Do you need automated grading or manual feedback features?	Teacher	A mix of both: automated grading for quizzes and manual feedback for assignments.
What user authentication and access control features are needed?	System Administrator	Multi-factor authentication (MFA), role-based access

What logging and monitoring tools are necessary for system maintenance?	System Administrator	Real-time logs, alerts, and dashboards using tools like Prometheus and Grafana.
What security measures should be in place to prevent cyber threats?	System Administrator	Firewalls, DDoS protection, regular security audits, and penetration testing.
What tools do you need to efficiently handle support tickets?	Customer Support Representative	A ticketing system with priority tagging, canned responses, and integration with a CRM.
Do you need a chatbot or AI-assisted support for common queries?	Customer Support Representative	Yes, an AI chatbot to handle FAQs and escalate complex issues to human agents.
What communication channels (email, live chat, phone) should be available for support?	Customer Support Representative	Live chat and email support

## **Deliverable #4**

### **Functional Requirements**

ID	Requirement Title	Description	Priority (QDF)	Requirement Originator
FR01	User Management System	Implement a user management module that allows learners, teachers, and system administrators to register, log in, and manage their profiles.	High	Project Manager
FR02	Progress Tracking	Provide learners with a feature to track their learning progress, view achievements, and access learning history.	High	Software Developer

FR03	Dictionary Integration	Connect the application to an external dictionary API for instant word lookups and definitions during lessons.	Medium	Language Expert
FR04	Grammar Checking Tool	Integrate a grammar-checking API to help learners identify and correct grammatical mistakes in their exercises	Medium	UI/UX Designer
FR05	Cultural Learning Content	Develop interactive cultural lessons focusing on history, art, cuisine, and social norms to enhance language learning.	High	Cultural Consultant
FR06	Interactive Scenarios	Create role-playing and real-life dialogue activities that simulate authentic cultural experiences for learners.	High	Project Manager

## Non Functional Requirements

ID	Requirement Title	Description	Priority (QDF)	Requirement Originator
NFR01	Cross-Browser Compatibility	Ensure that the application supports major browsers, including Chrome, Microsoft Edge, Firefox, and Brave.	High	Quality Assurance Tester

NFR02	Scalability	Design the system to handle an increasing number of users and data efficiently through cloud infrastructure.	High	Project Manager
NFR03	Performance Optimization	Optimize the application to load pages and process user requests within 2-3 seconds.	High	Software Developer
NFR04	Responsive Design	Ensure the application is compatible with desktops, laptops, tablets, and smartphones for a seamless user experience.	High	UI/UX Designer
NFR05	API Reliability	Ensure stable and reliable integration with third-party APIs for dictionary and grammar-checking services.	Medium	Software Developer
NFR06	API Reliability	Ensure stable and reliable integration with third-party APIs for dictionary and grammar-checking services.	Medium	Software Developer
NFR07	Usability and User Experience	Create a user-friendly interface with intuitive navigation and accessible content for learners of all levels.	High	UI/UX Designer

## Part B

Deliverable #1

Use cases			
Use Case name	List of related Requirements ID	Actor (s)	Brief Description
Manage Registration	FR01	Learners, Instructors, System administrators	<p>The actors (Instructors and Learners) will click on the create user button and fill out a registration form with personal details. The system will create a new account and send a confirmation email upon submission.</p> <p>For the login process, actors enter their credentials to access their profile. The system authenticates and redirects them to their dashboard.</p> <p>To manage profiles, actors can update personal information, change passwords, and manage privacy settings through their profile interface.</p>
<b>**Highest Priority**</b> Access Learning Materials	FR02	Learners, System administrators	The learner accesses interactive language lessons related to the culture of the language's origin, along with role-playing scenarios simulating real-life cultural experiences.
Refer to Dictionary	FR03	Learners, System administrators	Learners use the Dictionary by searching for words, with the system retrieving definitions, pronunciations, and example sentences via an external API. The learner reviews this information to understand word meanings, helping to expand vocabulary and improve comprehension for more effective language learning.

Check Grammar	FR04	Learners, System administrators	Learners use the Grammar Checking Tool by entering text, which the system analyzes via an external API. It highlights errors, offers explanations, and suggests corrections. Learners review and apply changes to improve accuracy.
Track Progress	FR05	Learners, System administrators	Learners view a dashboard showing their learning progress, achievements, and history. The system visualizes data in an engaging format. Actor selects and engages with interactive cultural lessons, enhancing their language skills through immersive content.

## Deliverable #2

**Use case:** Access Learning Materials

**Literation:** Mar 3, 2025 by yeung

**Primary actor:** Learner

**Goal:** To learn new languages through an interactive language learning platform that integrates cultural lessons, role-playing scenarios, and real-life simulations.

### Preconditions:

- The learner must have an active account and be logged into the platform.
- The platform must have learning materials available for the selected language.
- A stable internet connection is required for accessing multimedia content and interactive scenarios.

**Trigger:**

The learner selects a language and initiates a lesson on cultural and linguistic aspects and achieves particular language levels.

#### **Scenario:**

1. The learner login into the platform
2. The learner navigates to the language learning section
3. The learner selects a lesson from the available options
4. The system loads the content, such as video lessons, cultural quizzes, and role-playing activities.
5. The learner engages with the lesson, answering questions and interacting with multimedia content.
6. The system provides real-time feedback and progress tracking based on the learner's performance.
7. The system displays the summary when learner completed the lesson

#### **Exceptions:**

- No Content Available: If lessons for the selected language are not available, the system displays a message and suggests alternative languages or topics.
- Incomplete Lesson: If the learner exits before completing the lesson, progress is auto-saved for resumption later.

**Priority:**High

**When Available:** Upon product launch, accessible to all registered learners.

**Frequency of Use:** Multiple times per week, depending on learner engagement.

**Channel to Actors:** Web application

#### **Channels to Secondary Actors:**

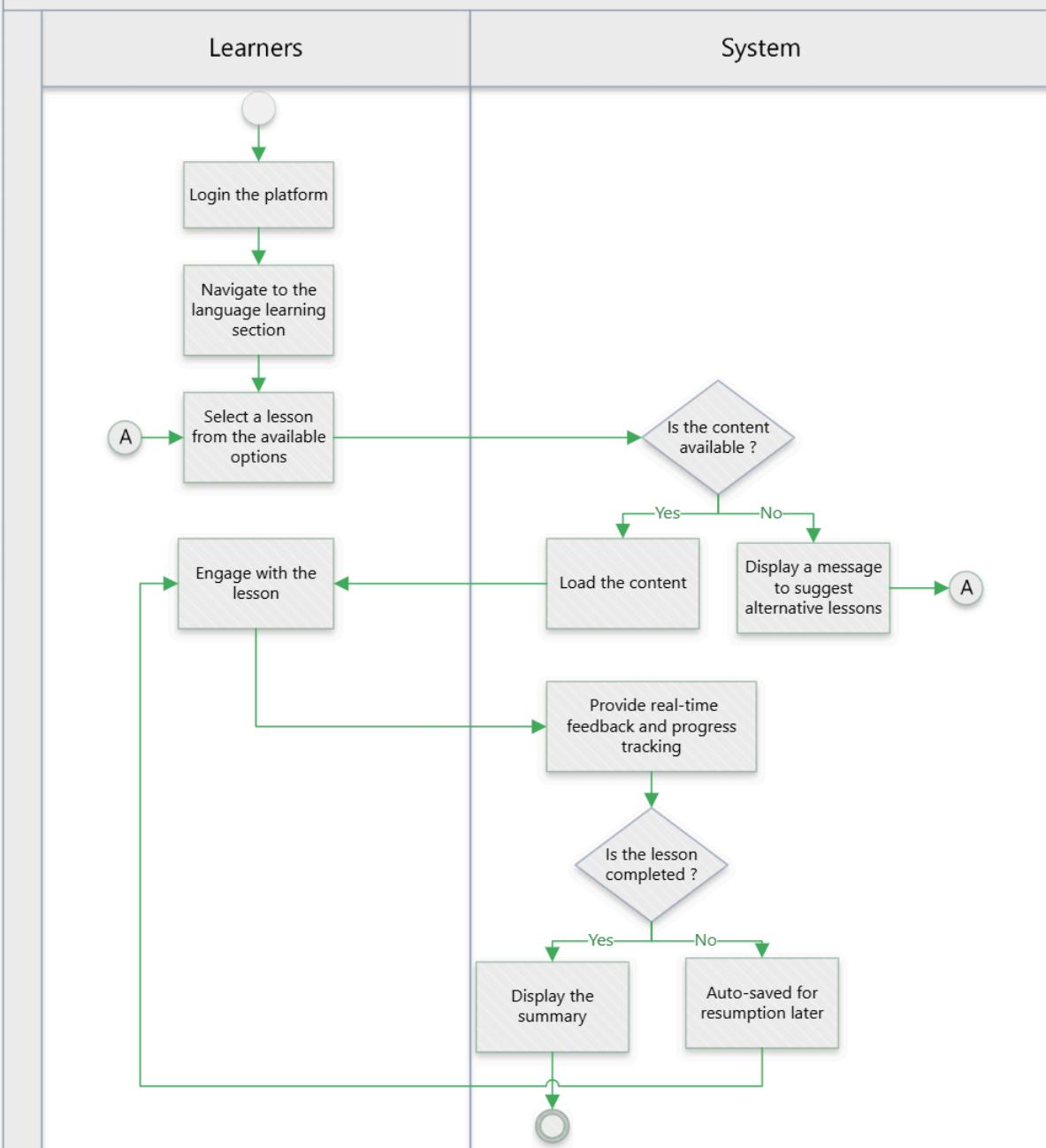
- Teachers: Can upload and manage cultural learning materials.
- System Administrators: Can monitor content availability and troubleshoot technical issues.

#### **Open Issues:**

- Determining the most effective way to personalize cultural lessons based on learner progress and preferences.
- Ensuring lesson content remains up-to-date and relevant for various cultural contexts.
- Integrating AI-driven interactive scenarios for a more immersive learning experience.

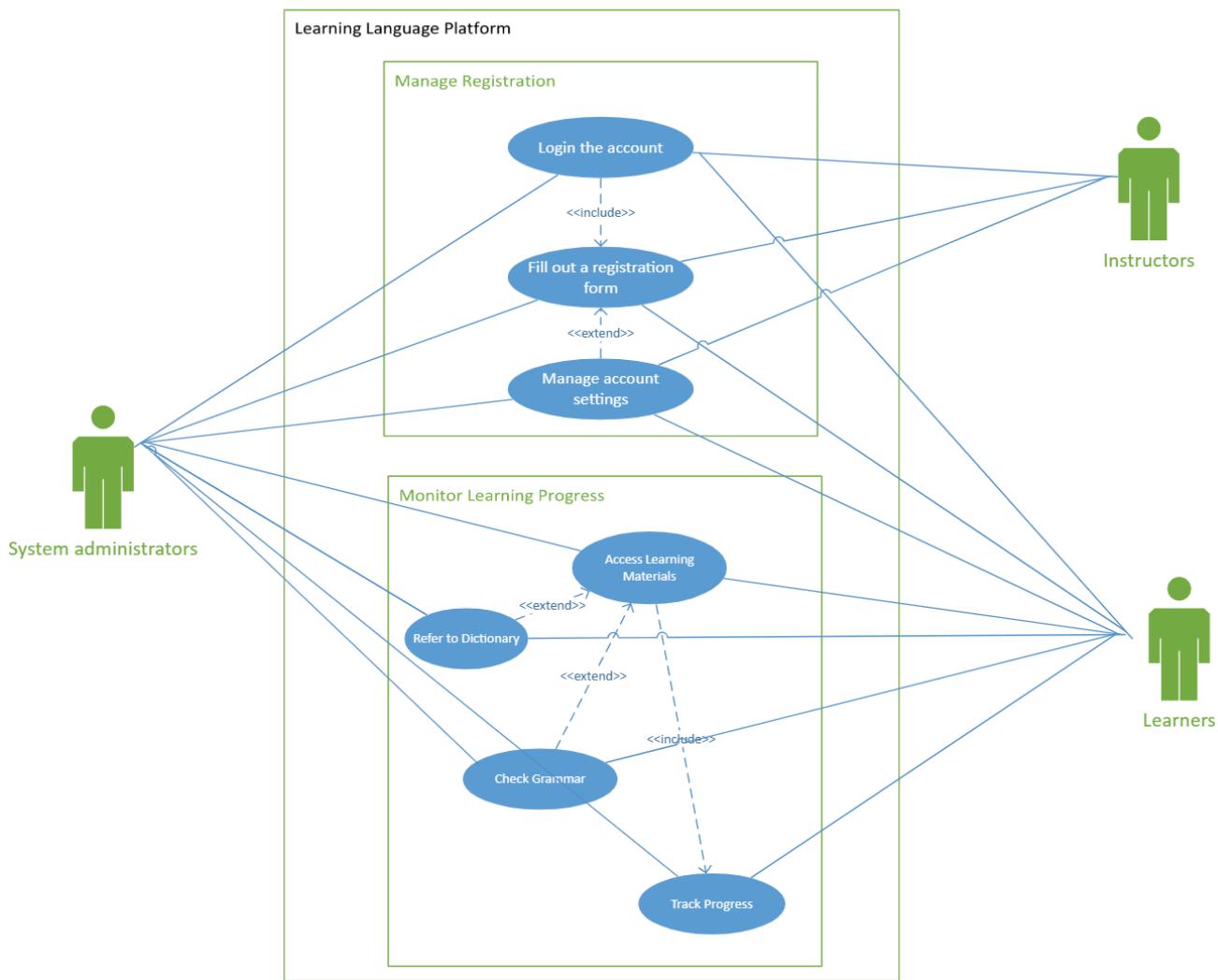
#### **Swimlane Diagram**

## Access Learning Materials



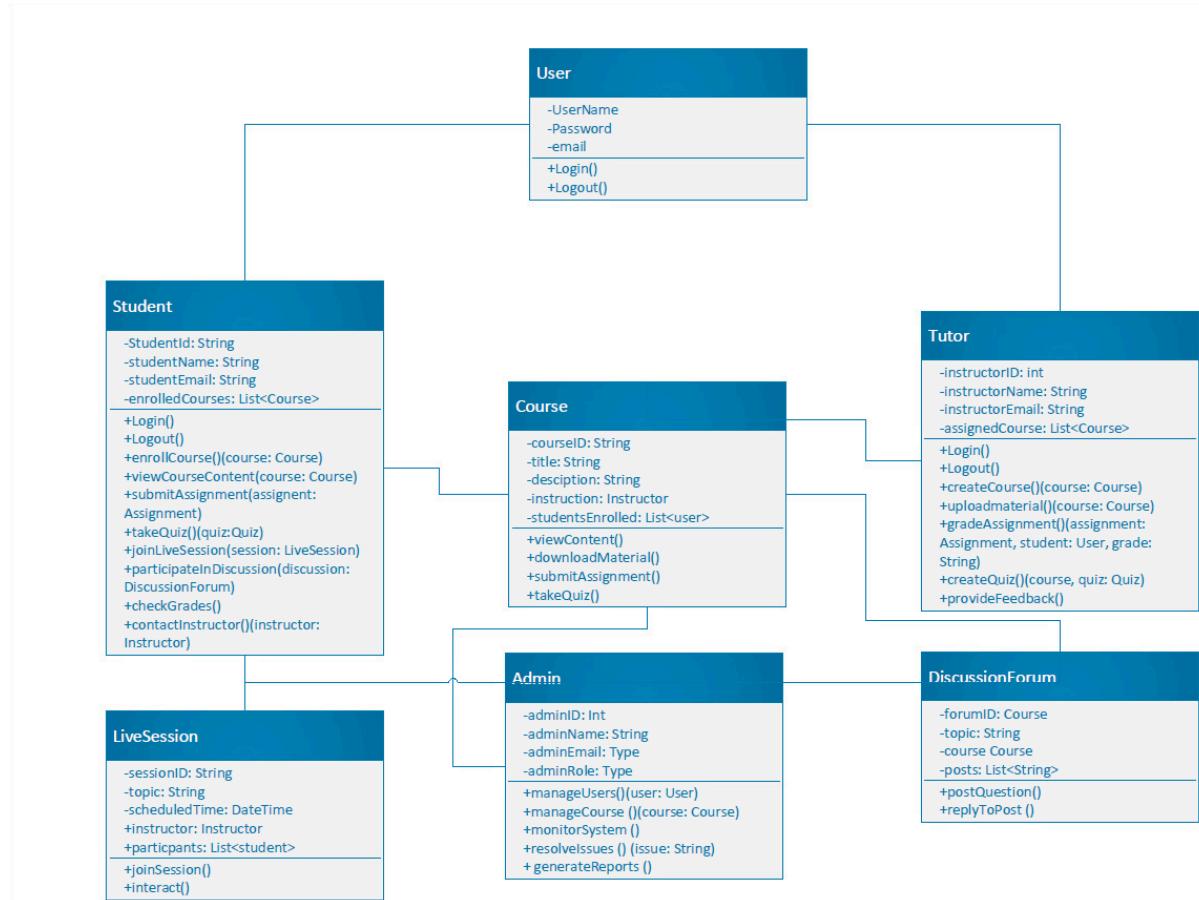
### Deliverable #3

#### Use Case Diagram



## Deliverable #4

### Class Diagram



## Deliverable #5

### Class Responsibility Collaborator (CRC)

<b>Class name:</b> Student	
<b>Responsibility:</b>	<b>Class Collaborations (other classes):</b>
<ul style="list-style-type: none"> <li>Submit Assignment</li> </ul>	<ul style="list-style-type: none"> <li>DiscussionForum</li> <li>Instructor</li> </ul>
<ul style="list-style-type: none"> <li>Take quiz</li> </ul>	<ul style="list-style-type: none"> <li>DiscussionForum</li> <li>Instructor</li> </ul>
<ul style="list-style-type: none"> <li>Participate in discussion</li> </ul>	<ul style="list-style-type: none"> <li>DiscussionForum</li> <li>Instructor</li> </ul>
<ul style="list-style-type: none"> <li>Check the grade of assignment and overall course</li> </ul>	<ul style="list-style-type: none"> <li>DiscussionForum</li> <li>Instructor</li> </ul>
	<ul style="list-style-type: none"> <li>DiscussionForum</li> </ul>

• Contact the instructor through email	• Instructor
• Login and Logout the language learning platform	• Admin
• Enroll target language course	• Course
• Join Live session	• LiveSession

<b>Class name:</b> LiveSession	
<b>Responsibility:</b>	<b>Class Collaborations (other classes):</b>
<ul style="list-style-type: none"> <li>• Allow the students and instructor session</li> </ul>	<ul style="list-style-type: none"> <li>• Course</li> <li>• Instructor</li> <li>• Student</li> </ul>
<ul style="list-style-type: none"> <li>• Students and instructors can interact</li> </ul>	<ul style="list-style-type: none"> <li>• Instructor</li> <li>• Student</li> </ul>

<b>Class name:</b> Course	
<b>Responsibility:</b>	<b>Class Collaborations (other classes):</b>
<ul style="list-style-type: none"> <li>• Students view the learning content</li> </ul>	<ul style="list-style-type: none"> <li>• Student</li> <li>• Instructor</li> </ul>
<ul style="list-style-type: none"> <li>• Students download the learning material</li> </ul>	<ul style="list-style-type: none"> <li>• Student</li> <li>• Instructor</li> </ul>
<ul style="list-style-type: none"> <li>• Students submit the assignment</li> </ul>	<ul style="list-style-type: none"> <li>• Student</li> <li>• Instructor</li> </ul>
<ul style="list-style-type: none"> <li>• Students take quiz</li> </ul>	<ul style="list-style-type: none"> <li>• Student</li> <li>• Instructor</li> </ul>

<b>Class name:</b> Instructor	
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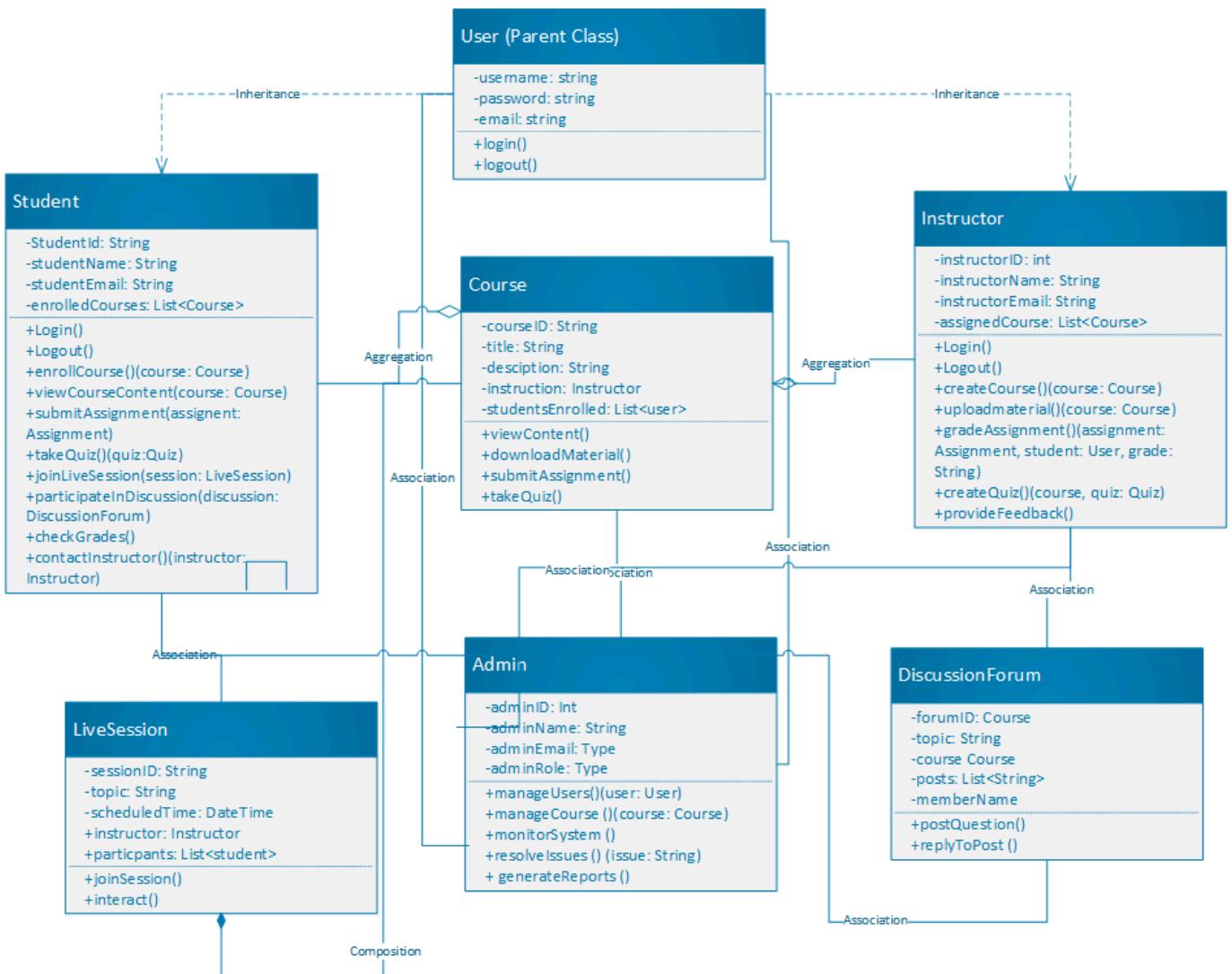
<b>Responsibility:</b>	<b>Class Collaborations (other classes):</b>
• Login and Logout the language learning platform	• Admin
• Provide feedback for the assignment and question	• Student • DiscussionForum
• Create a new course and chapter	• Course
• Upload learning material	• Course
• Grade assignment and quiz	• Course
• Create quiz	• Course

<b>Class name: DiscussionForum</b>	
<b>Responsibility:</b>	<b>Class Collaborations (other classes):</b>
• Post question	• Instructor • Student
• Reply to post	• Instructor • Student

<b>Class name: Admin</b>	
<b>Responsibility:</b>	<b>Class Collaborations (other classes):</b>
• Manage users	• Instructor • Student
• Manage course	• Instructor • Student • Course
• Monitor system	• Course • LiveSession • DiscussionForum • Instructor

	<ul style="list-style-type: none"> <li>• Student</li> <li>• Course</li> <li>• LiveSession</li> <li>• DiscussionForum</li> <li>• Instructor</li> <li>• Student</li> </ul>
• Course	

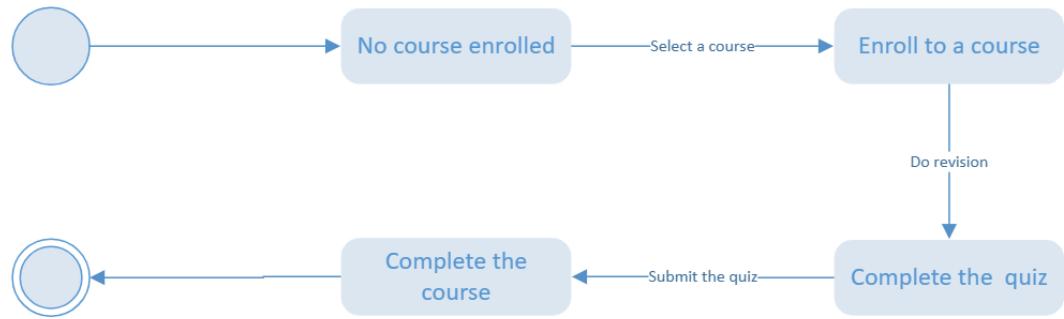
## Deliverable #6



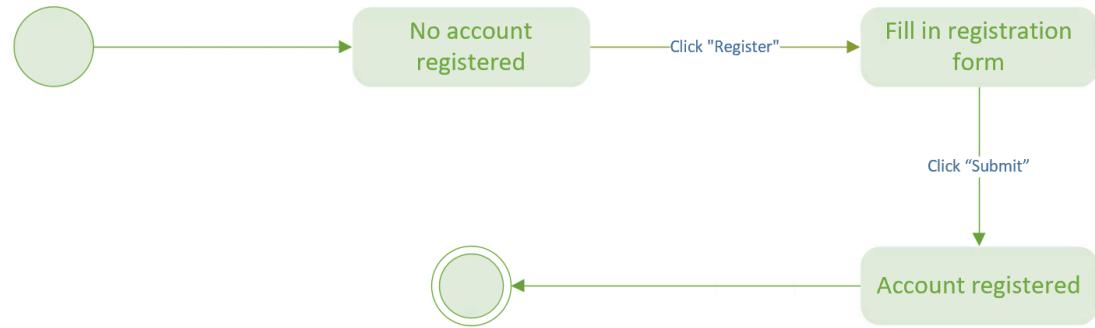
## Part C

### Deliverable #1

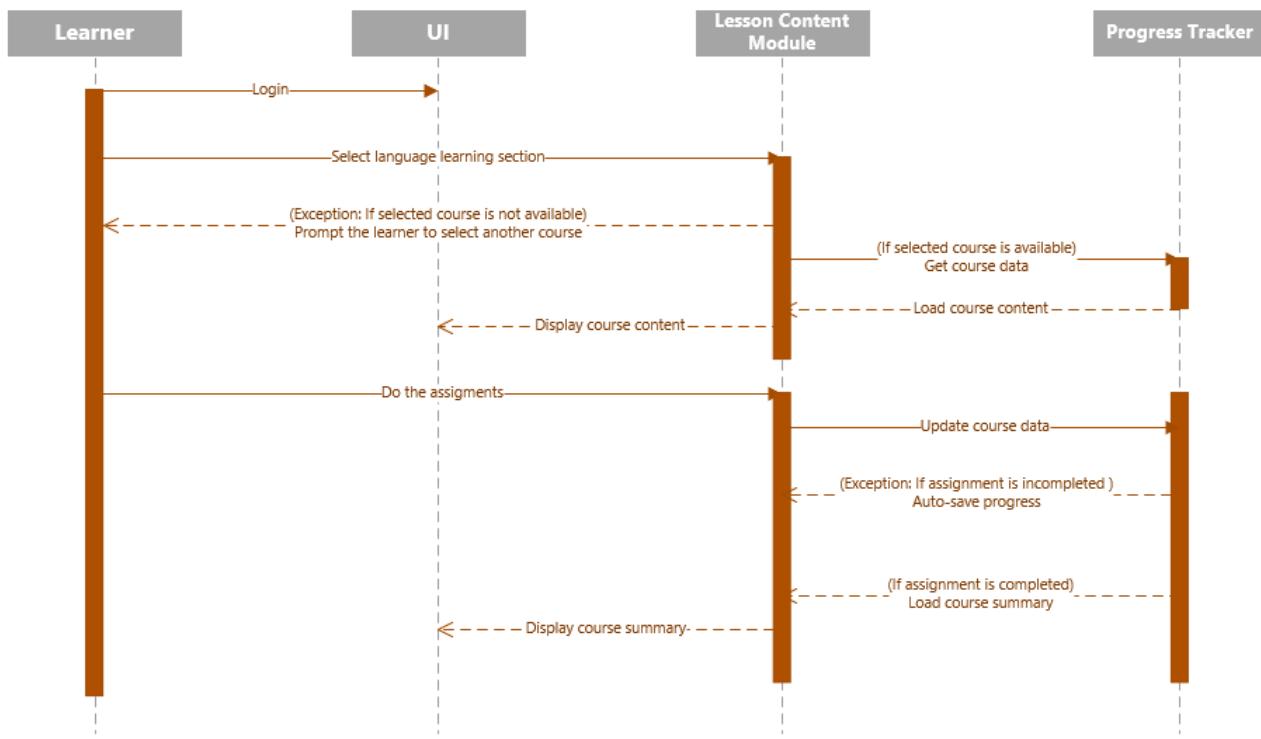
State diagram 1: Transitions between Student class and Course class



State diagram 2: Transitions between User class and Instructor class



## Deliverable #2



### Deliverable #3

Attribute	Metric
1. Ambiguity	<b>3 occurrences of ambiguous modifiers</b> (e.g., "many", "large", etc.).
2. Completeness	<b>0 instances of "TBA" or "TBD"</b>
3. Understandability	<b>13 sections/subsections</b>
4. Volatility	<b>0 change</b>
5. Traceability	<b>13</b>

<b>6. Model clarity</b>	<b>One UML model</b> <b>0 descriptive pages per model</b> <b>0 UML errors</b>
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