

“CSWALA”

Your Gateway to Tech Success

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MINI LAB PROJECT REPORT

**This Report Presented in Partial Fulfillment of the course CSE316:
Software Project III in the Computer Science and Engineering
Department**



DAFFODIL INTERNATIONAL UNIVERSITY

Dhaka, Bangladesh

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DECLARATION

We hereby declare that this lab project has been done by us under the supervision of **Mehadi Hasan, Lecturer**, Department of Computer Science and Engineering, Daffodil International University. We also declare that neither this project nor any part of this project has been submitted elsewhere as lab projects.




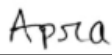

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COURSE & PROGRAM OUTCOME

The following course have course outcomes as following:

Table 1: Course Outcome Statements

CO's	Statements
CO1	Understand software architecture's pivotal role in project success.
CO2	Translate customer requirements into effective software designs.
CO3	Develop user-friendly frontend components using suitable technologies.
CO4	Utilize version control for collaborative software development.

Table 2: Mapping of CO, PO, Blooms, KP and CEP

CO	PO	Blooms	KP	CEP
CO1	PO1	C1, C2	KP3	EP1, EP3
CO2	PO2	C2	KP3	EP1, EP3
CO3	PO3	C4, A1	KP3	EP1, EP2
CO4	PO3	C3, C6, A3, P3	KP4	EP1, EP3

The mapping justification of this table is provided in section 4.3.1, 4.3.2 and 4.3.3.

Table of Contents

Declaration	i
Course & Program Outcome	ii
1 Introduction	1
1.1 Introduction	1
1.2 Motivation.....	1
1.3 Objectives.....	1
1.4 Feasibility Study	2
1.5 Gap Analysis	2
1.6 Project Outcome.....	2
2 Proposed Methodology/Architecture	3
2.1 Requirement Analysis & Design Specification	3
2.1.1 Overview	3
2.1.2 Proposed Methodology/ System Design	3
2.1.3 UI Design	4
2.2 Overall Project Plan	6
3 Implementation and Results	7
3.1 Implementation	7
3.2 Performance Analysis.....	8
3.3 Results and Discussion	8
4 Engineering Standards and Mapping	9
4.1 Impact on Society, Environment and Sustainability	9
4.1.1 Impact on Life.....	9
4.1.2 Impact on Society & Environment	9
4.1.3 Ethical Aspects.....	9
4.1.4 Sustainability Plan.....	9
4.2 Project Management and Team Work	9
4.3 Complex Engineering Problem.....	10
4.3.1 Mapping of Program Outcome.....	10
4.3.2 Complex Problem Solving.....	10
4.3.3 Engineering Activities	11

5 Conclusion	12
5.1 Summary.....	12
5.2 Limitation	12
5.3 Future Work	12
References & Important Links	13

Chapter 1

Introduction

This chapter provides an overview of the project, including its background, the motivation behind its creation, objectives, feasibility analysis, gap analysis, and expected outcomes.

1.1 Introduction

The technology and software learning community often face challenges like scattered resources, lack of structured guidance, and limited access to comprehensive, interactive learning platforms. Additionally, aspiring tech professionals often struggle to find courses tailored to their unique career aspirations, whether in programming, full-stack development, machine learning, data science, or UI/UX design. To address these issues, we designed "Cswala," a website-based application that serves as "your gateway to tech success." Cswala provides a unified space for online learning, offering structured courses, live class sessions, exams, quizzes, and community engagement. With its focus on personalization and career-oriented guidance, Cswala is a one-stop solution for anyone looking to build a successful software-related career.

1.2 Motivation

The motivation behind this project stems from the growing demand for a platform that empowers individuals to pursue successful careers in technology while addressing the limitations of fragmented learning resources. By creating "Cswala," we aimed to bridge the gap between scattered educational tools and a structured, community-driven learning experience. This project not only allowed us to enhance our technical skills by utilizing technologies like HTML, CSS, Tailwind CSS, JavaScript, TypeScript, and React but also gave us the opportunity to contribute meaningfully to the tech education ecosystem. Solving this problem has personal significance as it enables us to support others in achieving their career aspirations while refining our own expertise in creating modern, impactful digital solutions.

1.3 Objectives

The objectives of the "CSWALA" project are as follows:

1. To create a user-friendly platform that provides structured courses for various software-related career paths.
2. To facilitate interactive learning through live class sessions, exams, and quizzes.
3. To ensure seamless community engagement by integrating features for collaborative discussions and knowledge sharing.
4. To offer comprehensive resources for programming, full-stack development, machine learning, data science, engineering, and UI/UX design.

5. To implement personalization features that tailor the learning experience to individual career goals and interests.

1.4 Feasibility Study

Several existing online learning platforms, such as Coursera [1], Udacity [2], and Codecademy [3], provide resources for technology education and skill development. However, these platforms often lack a comprehensive focus on software-related career paths, tailored learning experiences, or interactive community features. Research into tech education platforms highlights the importance of structured, career-oriented content combined with interactive learning and community engagement. While the methodologies of these platforms informed our design, we identified gaps such as a fragmented approach to tech career preparation and limited integration of live sessions and collaborative features. "CSWALA" aims to address these issues by offering a unified platform that combines personalized learning, practical assessments, and community-driven interaction, making it a holistic solution for aspiring tech professionals.

1.5 Gap Analysis

Existing platforms often fail to:

1. Provide a comprehensive, career-focused repository of resources for all major software-related fields, including programming, full-stack development, machine learning, data science, and UI/UX design.
2. Foster meaningful community interactions and collaborative learning experiences for aspiring tech professionals.
3. Offer tailored and personalized learning pathways to meet the unique career goals and preferences of users.

By addressing these gaps, "Cswala" establishes itself as a unique and innovative solution for individuals pursuing successful careers in technology.

1.6 Project Outcome

The "Cswala" project resulted in a functional prototype that integrates all the planned features:

1. A homepage showcasing key courses, career paths, and personalized learning recommendations.
2. Dedicated pages for course catalogs, live class sessions, exams, quizzes, user profiles, and progress tracking.
3. A visually appealing and responsive interface built using HTML, CSS, Tailwind CSS, JavaScript, TypeScript, and React.
4. A personalized AI assistant, "Cswala AI," designed to address unique user problems when admins are unavailable, accessible through a navigation bar and integrated into a Vercel-hosted web app for real-time assistance.
5. A platform prototype that fosters community engagement, personalized learning, and seamless

problem-solving for users.

These outcomes provide a solid foundation for future development and expansion into a fully functional, career-oriented learning and support application.

Chapter 2

Proposed Methodology/Architecture

This chapter outlines the methodology and architecture used in developing the "CSWALA" tech learning platform and website project. It includes the requirement analysis, design specification, user interface (UI) design, and the overall project plan.

2.1 Requirement Analysis & Design Specification

2.1.1 Overview

The "Cswala" project aimed to create an engaging, user-friendly platform for individuals seeking to build successful careers in technology. The requirement analysis identified key challenges, including scattered resources, lack of structured learning paths, and limited interactive features for aspiring tech professionals. The design specification focused on addressing these issues by developing a comprehensive solution that offers structured courses, personalized learning experiences, live sessions, quizzes, and community-driven engagement. Additionally, the integration of "Cswala AI" enhances real-time support, ensuring users receive tailored assistance whenever needed.

2.1.2 Proposed Methodology/ System Design

To develop "CSWALA," the Agile methodology was selected as the project development approach. This methodology enabled iterative development, with continuous feedback and flexibility for improvements. The key phases were:

- **Requirement Analysis:** Identifying user needs and challenges, particularly focusing on career-oriented learning paths and support features.
- **System Design:** Creating the platform architecture and UI layouts, ensuring an intuitive, responsive design tailored to users' needs.
- **Implementation:** Developing the front-end using HTML, CSS, Tailwind CSS, JavaScript, TypeScript, and React, while integrating "CSWALA AI" for personalized user assistance.
- **Testing:** Ensuring the functionality, performance, and usability of all features, including live sessions, quizzes, and user profiles.
- **Deployment and Maintenance:** Deploying the platform, gathering user feedback, and providing ongoing support and updates to improve the user experience.

This iterative process ensured continuous refinement and alignment with user needs, fostering the development of a fully functional and responsive learning platform.

The logical flow of the platform is depicted in Figure 2.1.

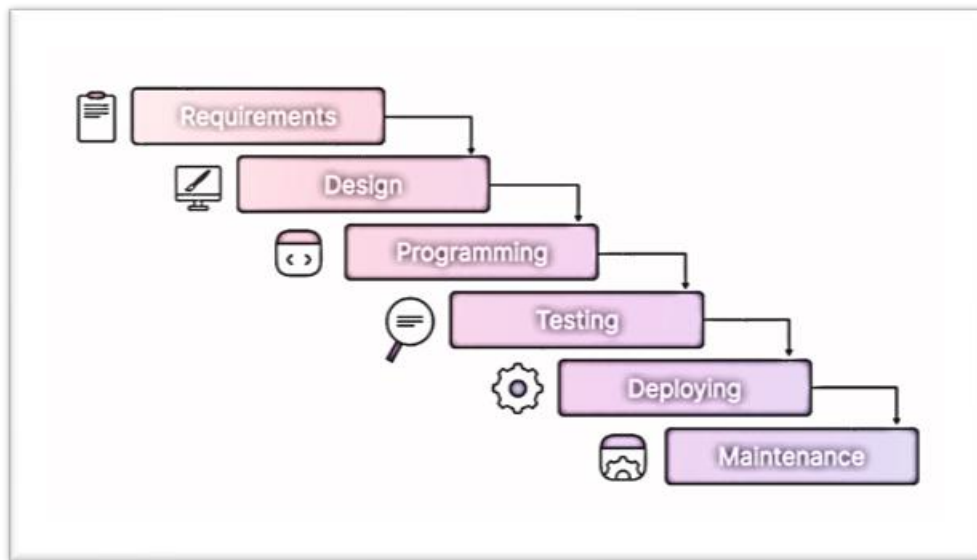


Figure 2.1: Waterfall Model

2.1.3 UI Design

The UI design for "CSWALA" prioritized accessibility, simplicity, and an engaging user experience. Figma was used to create a detailed prototype, ensuring a cohesive and user-friendly interface. Key design principles included:

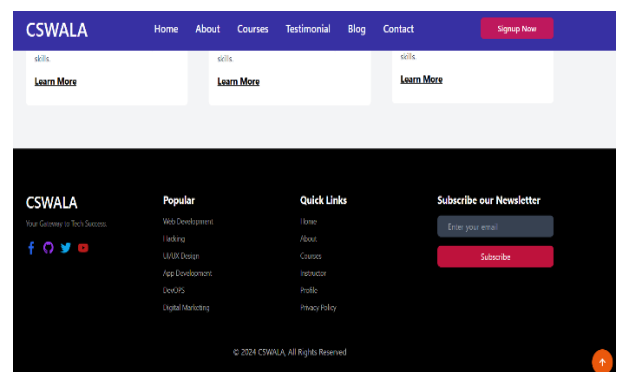
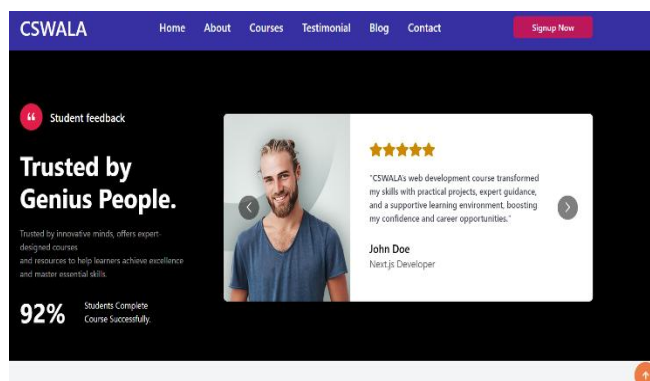
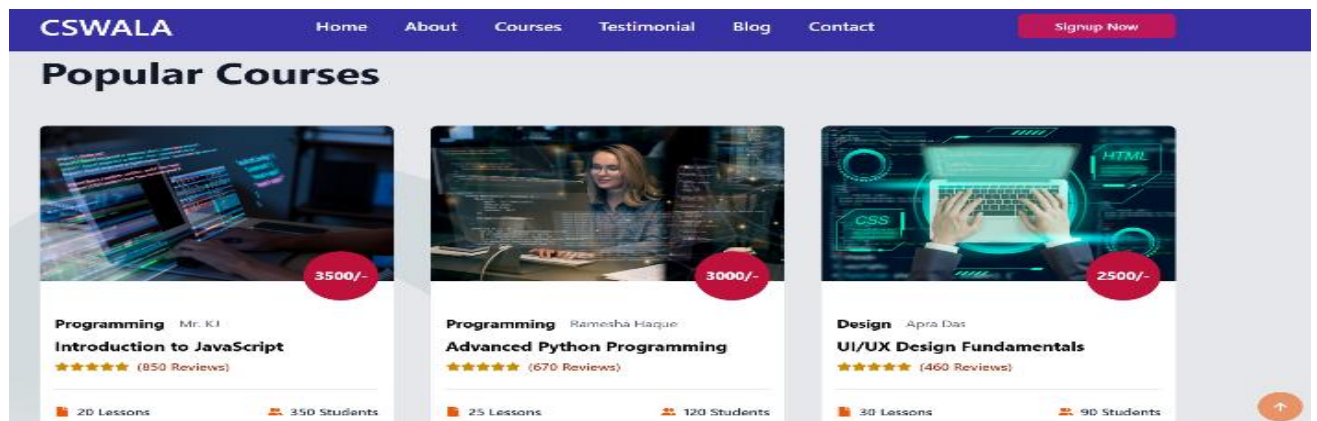
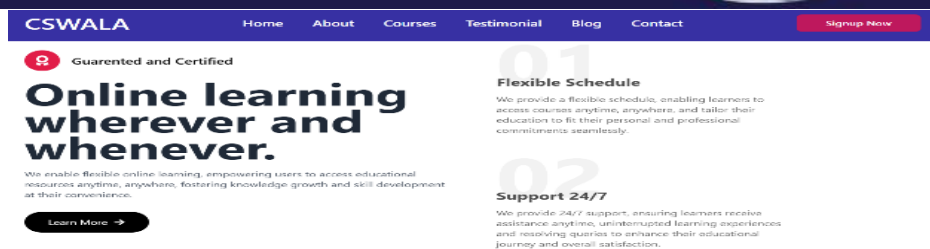
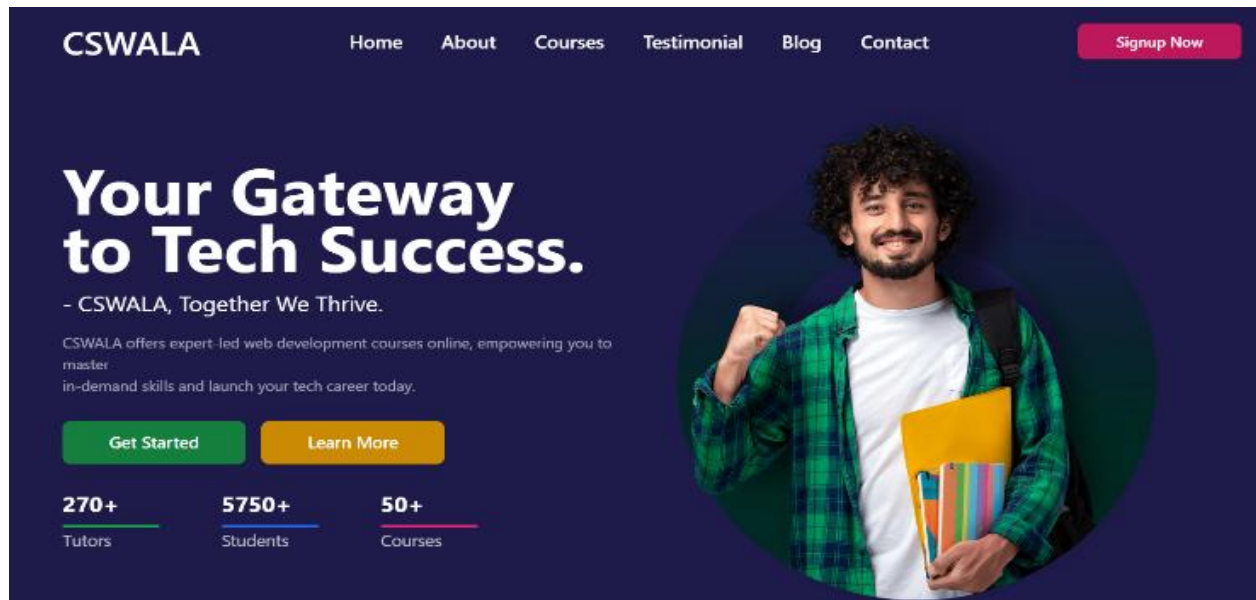
- **Consistency:** Uniform design elements across all pages to create a seamless experience.
- **Responsiveness:** Layouts that adapt to different screen sizes, ensuring usability across devices
- **Clarity:** Easy navigation with clear, well-organized content for an intuitive user journey.

Tailwind CSS and DaisyUI were used for styling, providing a modern and visually appealing design. Specific UI elements for each page included:

- **Homepage:** A clean layout featuring personalized course recommendations and key career paths, with a carousel to highlight trending topics.
- **Course Details Page:** A detailed view of each course with descriptions, schedules, and user ratings.
- **Classes Page:** An easy-to-navigate layout with live sessions, upcoming classes, and a prominent search bar for quick access.
- **FAQ Page:** An organized list of frequently asked questions, with a clear, searchable format.
- **Customized AI Chatbot:** Integrated across every page, providing real-time support and personalized assistance to users.

These design choices ensured that the platform was both functional and visually appealing, offering an enhanced learning experience for users.

Here is the Figma design [\[link\]](#) and some screenshots.



[Designed by Kamrujjaman Tuhin, 1815]

CSWALA
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Courses
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Ask AI

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Learn C++

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[Desktop View]

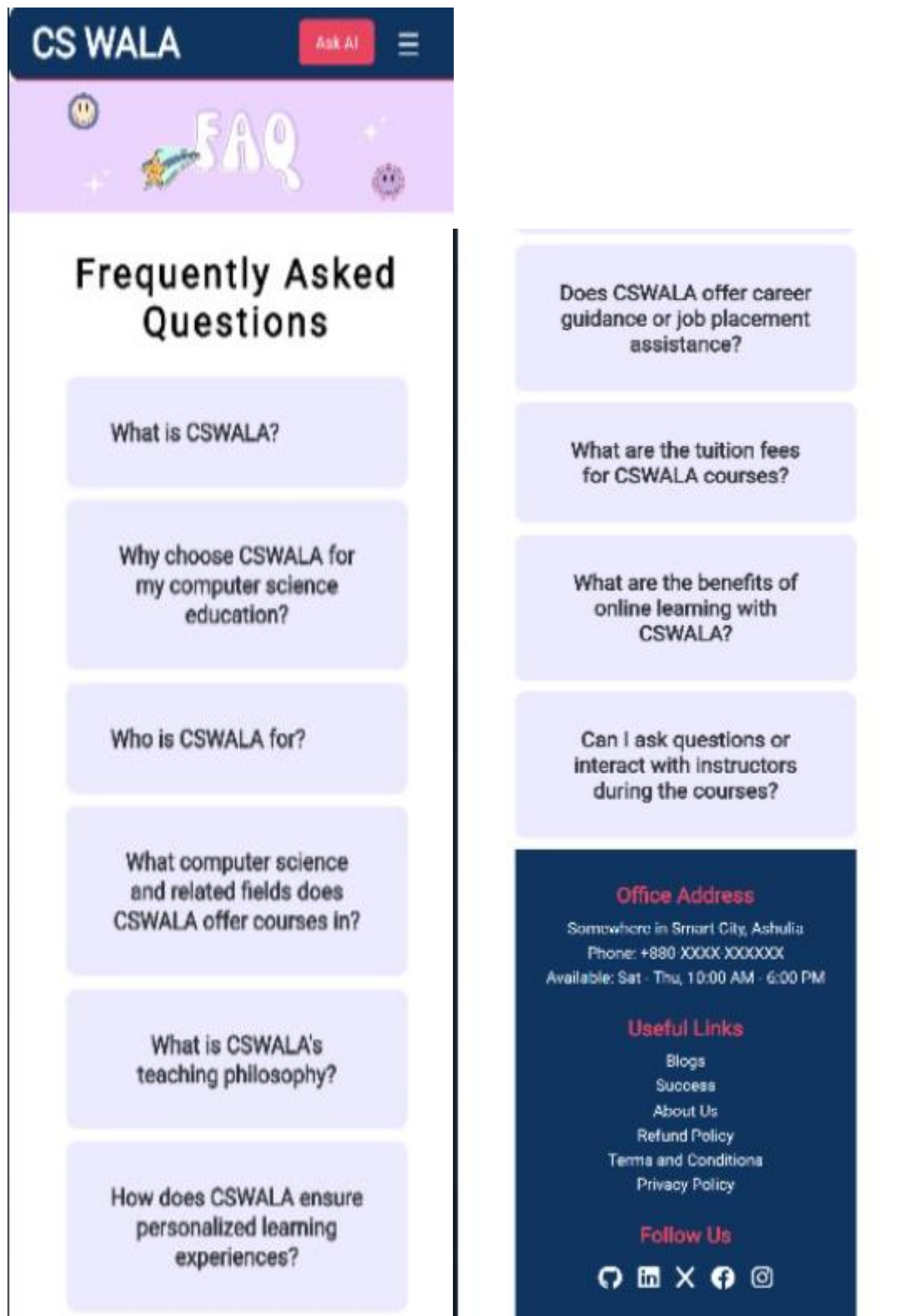
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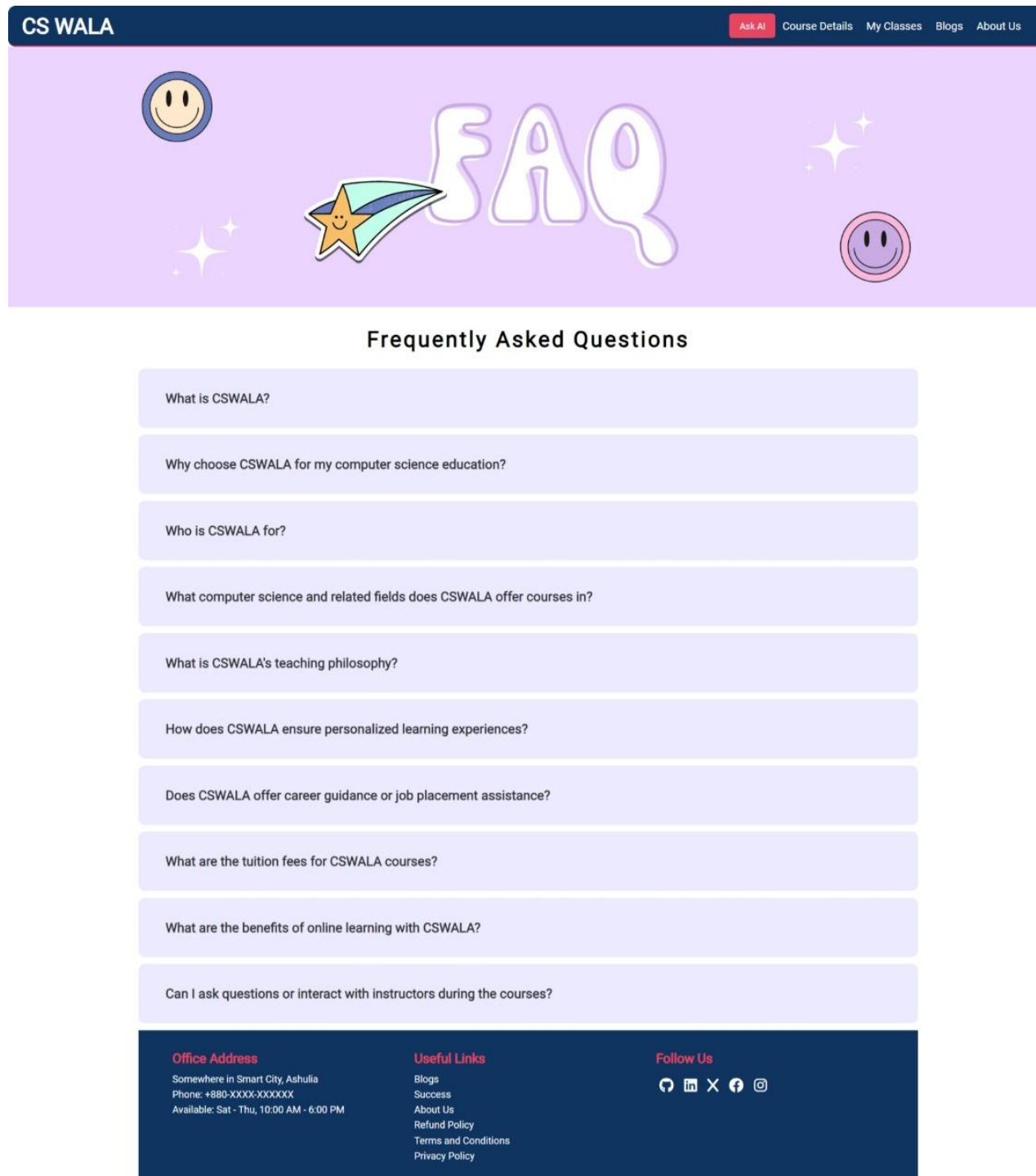
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[mobile view]

[Designed by Shahriar Nafis Ovi, 1824]





[Desktop View]
[Designed by Apra Rani Das, 1823]

Hey there! I'm RAWNOK

Dive into my world, and you will uncover more than just a name, you will meet the person behind the pixels.

Hire Me



♥ About Me



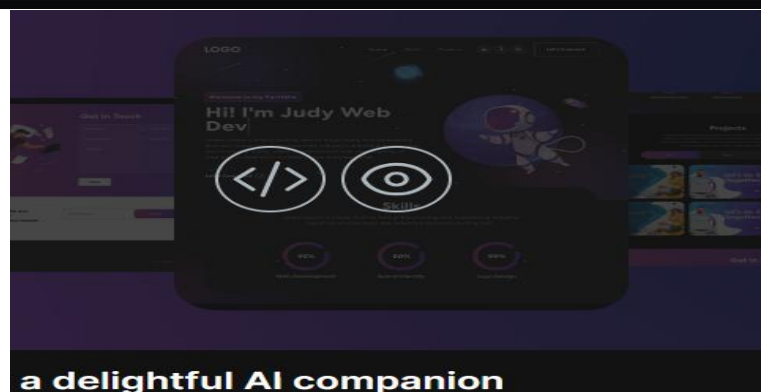
CS WALA

Meet CS WALA AI

Your delightful AI chatbot

Enter a topic and the AI will generate a delightful response.

Type here...



[Developed & Designed by Ramesha Rawnok Haque,1665]

Fig 2.2: UI Design of “CSWALA”

You can check out our web app from the following links:

- Initial Design: [\[Link\]](#)
- Responsive and better Design: [\[Link\]](#)
- CSWALA-AI Design: [\[Link\]](#)

2.2 Overall Project Plan

The project plan followed a timeline divided into phases:

1. **Week 1-2:** Requirement analysis and identification of user needs, focusing on career-oriented learning paths, interactive features, and personalized user experiences.
2. **Week 3-4:** Design specification and UI prototype development in Figma, ensuring a cohesive and user-friendly interface.
3. **Week 5:** Front-end implementation using HTML, CSS, Tailwind CSS, JavaScript, TypeScript, and React, including the integration of the personalized AI assistant ("CSWALA AI") for real-time support.
4. **Week 6:** JavaScript basics for DOM manipulation and interactivity. Understanding event listeners and manipulating the DOM to enhance user interaction.
5. **Week 7:** Testing and refining the platform for usability, ensuring all pages and features work seamlessly across devices and meet user needs.
6. **Week 8:** Learning about GitHub elements, including creating branches, pushing code to branches, making pull requests, and updating the GitHub wiki for better version control and project documentation.
7. **Week 9-10:** Final review, submission of the project, and documentation of the development process design decisions, and future enhancement plans.

The Agile methodology facilitated flexibility and iterative improvement, ensuring continuous feedback, reducing risks, and improving the overall quality of the final deliverable.

Chapter 3

Implementation and Results

This chapter outlines the implementation process of the "CSWALA" a website based e-learning project focusing on the front-end development using HTML, CSS, Tailwind CSS, TypeScript, JavaScript, next.js and React. It also presents a performance analysis and discusses the results obtained during the project's development.

3.1 Implementation

The implementation of the "CSWALA" platform focused primarily on front-end development, using a modern tech stack to ensure a responsive, user-friendly, and interactive interface. The project followed the Agile methodology, enabling iterative development and continuous improvement. This process began with detailed planning, designing the user interface using Figma, and translating the design into a functional and interactive web application.

The core technologies used for front-end development included:

- **HTML:** To create the structure and foundation of the web pages.
- **CSS:** For basic styling and design enhancements.
- **Tailwind CSS:** For utility-first styling, allowing for rapid and consistent design implementation.
- **TypeScript:** To add type safety and improve code reliability.
- **JavaScript:** For DOM manipulation and interactive features, enhancing user experience.
- **React:** To build reusable components and efficiently manage the state of the application.
- **Next.js:** For server-side rendering and optimizing performance, ensuring fast load times and improved SEO.

This technology stack enabled the seamless integration of key features such as the homepage, course details, classes, FAQ pages, and the "CSWALA AI" chatbot, providing users with an interactive and supportive learning experience.

The website was divided into several core pages:

- Homepage (done by Kamrujjaman Tuhin, 1815)
- Module/ Video Watching Platform (done by Shahriar Nafis Ovi, 1824)
- CSWALA AI (done by Ramesha Rawnok Haque, 1665)
- Frequently Asked Questions- FAQ (done by Apra Rani Das, 1823)
- Course Page (done by Khalid Anwar Antur, 1553)

GitHub was extensively used throughout the development process for version control:

- Branches were created for each feature being developed, enabling team members to work on different sections without conflict.
- Each member committed their changes to their respective branches.
- These branches were merged into the main branch after thorough testing and review, ensuring a smooth development process and reducing errors.

- Additionally, the team deployed the website using **GitHub Pages**, which allowed for easy and efficient hosting directly from the repository. This deployment method ensured that the website could be accessed live and updated seamlessly with each new commit.

The development team ensured that the website had a responsive layout to guarantee accessibility across devices. The homepage was designed to include essential elements like the header, carousel, popular categories, and footer. A clean, user-friendly interface was maintained, with a focus on visual appeal and easy navigation.

The Github Project Repository: [\[Link\]](#)

Github Braches: [\[Link\]](#)

Github Wiki: [\[Link\]](#)

CSWALA-AI: [\[Link\]](#)

3.2 Performance Analysis

The performance analysis of the "Cswala" platform evaluated various aspects, including load time, responsiveness, and functionality across different devices and browsers. Key points of analysis included:

- **Page Load Time:** The platform was optimized for fast loading by employing techniques such as code splitting, server-side rendering with Next.js, and compressing media assets. This ensured minimal delays in page rendering, enhancing user experience.
- **Responsiveness:** A mobile-first design approach was adopted, ensuring that all pages, including the homepage, course details, and chatbot interface, were responsive and displayed correctly across devices such as smartphones, tablets, and desktops.
- **Interactive Features:** Interactive elements, including the course search, quiz functionality, and the "CSWALA AI" chatbot, were thoroughly tested to ensure smooth performance, fast response times, and seamless interactions.
- **Cross-Browser Compatibility:** The platform's functionality and design were tested across multiple browsers, including Chrome, Firefox, Safari, and Edge, to ensure consistent performance.

The analysis confirmed that "Cswala" meets the desired performance benchmarks, providing users with a responsive, and reliable learning platform.

3.3 Results and Discussion

The front-end development of the "CSWALA" platform was successfully completed, and all the core features were implemented and fully functional. Key features such as online classes, course details, quizzes, and the personalized "CSWALA AI" chatbot were seamlessly integrated, providing a dynamic and interactive user experience tailored to aspiring tech professionals.

While the project achieved its objectives, some challenges were encountered, particularly in maintaining consistent design across different screen sizes and ensuring smooth interaction with dynamic components like the chatbot and search functionality.

The platform met the goals of creating a centralized and engaging space for tech education, with a user-friendly and responsive design that catered to diverse devices and browsers. However, certain areas could be improved in the future, such as:

- **Personalization:** Incorporating more advanced personalization features, such as machine learning for tailored course recommendations, could significantly enhance user experience.
- **User Feedback:** Real-world user feedback could provide valuable insights for further optimization and refinement of features.

Overall, the project was a success, and the team's collaborative efforts using GitHub ensured smooth version control and efficient development. The deployment on Vercel provided an easily accessible and functional platform, completing the development cycle with an active online presence.

Chapter 4

Engineering Standards and Mapping

This chapter outlines the engineering standards followed during the development of the "CSWALA" platform. It emphasizes the societal, educational, and ethical implications of the project, along with strategies for long-term sustainability. The chapter also delves into project management methodologies, cost considerations, and the collaborative efforts of the team. Finally, it aligns the project's problem-solving strategies and technical activities with the defined program outcomes.

4.1 Impact on Society, Environment and Sustainability

4.1.1 Impact on Life

The "CSWALA" platform positively impacts users' lives by providing accessible, high-quality resources for building tech careers. It fosters skill development through interactive online classes, quizzes, and detailed course materials. The integration of the "CSWALA AI" chatbot ensures personalized support, empowering users to overcome unique challenges. This platform not only enhances technical expertise but also promotes continuous learning and career advancement in the ever-evolving tech industry.

4.1.2 Impact on Society & Environment

The "CSWALA" platform contributes positively to society by democratizing access to tech education, breaking down barriers for individuals from diverse backgrounds to pursue successful careers in technology. By fostering skill development and career readiness, it helps bridge the digital divide and empowers underrepresented communities in the tech industry.

From an environmental perspective, the platform's focus on online learning minimizes the need for physical resources like printed materials and reduces the environmental footprint associated with traditional classroom setups. Additionally, the encouragement of remote learning reduces travel-related emissions, contributing to a more sustainable mode of education delivery.

4.1.3 Ethical Aspects

The "CSWALA" platform upholds ethical standards by ensuring all content respects the intellectual property rights of educators and contributors. It creates a safe, inclusive, and respectful environment for users to learn and engage. The platform prioritizes user privacy by adhering to data protection regulations and employing secure practices to safeguard personal information. By promoting equitable access to resources and opportunities, "CSWALA" champions fairness and integrity in the digital education space.

4.1.4 Sustainability Plan

The sustainability plan for "CSWALA" focuses on continuous feature development, integrating user feedback, and expanding course offerings to stay aligned with evolving industry trends. Collaborations with educators, industry professionals, and tech organizations will ensure the platform remains a trusted and relevant learning resource. Additionally, regular updates to the "CSWALA AI" chatbot and the inclusion of advanced technologies will keep the platform innovative and engaging, fostering long-term user engagement and community growth.

4.2 Project Management and Team Work

Cost Analysis

The project was developed as a semester-long activity, with minimal expenses focused on front-end development tools and prototyping platforms like Figma.

- **Primary Budget:**
 - Tools: Free (HTML, CSS, Tailwind CSS, Next.js, React are open-source)
 - Prototyping: Figma (Free Plan)
 - Total Cost: \$0

- **Alternate Budget:**
 - Paid hosting services and premium prototyping tools
 - Estimated Cost: \$500

Revenue Model

A potential revenue model for the "CSWALA" platform includes:

- 1.Subscription Plans:** Providing premium access to advanced courses, personalized study plans, and exclusive features like extended "CSWALA AI" capabilities.
- 2.Advertising:** Collaborating with tech companies, training institutes, and educational tool providers for targeted advertisements.
- 3.Affiliate Marketing:** Partnering with software and hardware providers to promote industry-relevant tools and resources.
- 4.Certification Fees:** Offering verified course completion certificates for a nominal fee.
- 5.Sponsorships:** Engaging with organizations to sponsor specific courses or events on the platform.

4.3 Complex Engineering Problem

4.3.1 Mapping of Program Outcome

The project's solution aligns with the following program outcomes (POs):

Table 4.1: Justification of Program Outcomes

PO's	Justification
PO1	Applied fundamental knowledge of front-end development tools to create an interactive, user-friendly platform.
PO2	Analyzed user needs to design a cohesive and engaging user interface

	addressing fragmented spaces.
PO3	Developed a structured front-end design that integrates usability, accessibility, and aesthetic considerations.

4.3.2 Complex Problem Solving

The project addresses complex problem-solving categories, as mapped below:

Table 4.2: Mapping with complex problem solving.

Category	Rationale
EP1: Depth of Knowledge	Focused on comprehensive front-end development expertise, using tools like Tailwind CSS and NEXT.js, JS.
EP2: Range of Conflicting Requirements	Balanced cultural inclusivity with user interface simplicity.
EP3: Depth of Analysis	Analyzed user interaction patterns to design intuitive features.
EP4: Familiarity of Issues	Addressed common challenges in creating personalized, engaging platforms.
EP5: Extent of Applicable Codes	Followed web accessibility guidelines and best practices.
EP6: Stakeholder Involvement	Incorporated user feedback during prototyping.
EP7: Interdependence	Facilitated a collaborative environment for personalized learning

4.3.3 Engineering Activities

The engineering activities for the project are mapped as follows:

Table 4.3: Mapping with complex engineering activities.

Activity	Rationale
EA1: Range of Resources	Utilized free and open-source tools effectively for development.
EA2: Level of Interaction	Designed interactive interfaces, such as the online-class feature.
EA3: Innovation	Developed a unique platform that empowers users to build tech careers through personalized learning experiences, fostering innovation in online education.
EA4: Consequences for Society and Environment	Promoted sustainable learning practices and community building.
EA5: Familiarity	Applied familiar frameworks (HTML, CSS, Tailwind CSS, React) to maximize project feasibility.

Chapter 5

Conclusion

This chapter provides a concise overview of the "CSWALA" project, highlighting its key features, achievements, and impact on users. It also discusses the challenges faced during development, including design consistency and dynamic component interactions. Additionally, the chapter outlines potential areas for future enhancements, such as advanced personalization features and user feedback integration, to further expand and improve the platform.

5.1 Summary

The "CSWALA" project aimed to create a comprehensive platform for individuals pursuing careers in tech, providing access to online classes, quizzes, and personalized learning experiences. The project successfully developed a user-friendly interface with features such as personalized AI support, detailed course information, and interactive quizzes. Using front-end technologies like HTML, CSS, Tailwind CSS, TypeScript, JavaScript, Next.js, and React, the team created a responsive and visually appealing platform that meets the needs of tech learners. Adhering to the waterfall development model, the platform enables users to access essential resources for career growth while ensuring a seamless and engaging experience.

5.2 Limitation

Despite its achievements, the "CSWALA" project had a few limitations:

- **Scope Restriction:** The project focused primarily on front-end development, with limited back-end functionality such as user authentication, database integration, and server-side operations.
- **Prototype Only:** The deliverable was a front-end design prototype, and the platform was not fully deployed for live use, lacking back-end integration for complete functionality.
- **User Testing:** Due to time constraints, extensive user testing could not be conducted, meaning some areas for usability improvement may have been overlooked.
- **Content Management:** The platform does not yet feature dynamic content management.

5.3 Future Work

To further develop and improve the "CSWALA" platform, the following areas can be explored in future work:

- **Back-End Development:** Implementing server-side functionality, including user authentication, database integration, and a scalable content management system to support dynamic course updates and user-generated content.
- **Dynamic Features:** Enhancing the platform with a content management system.
- **Mobile Optimization:** Development of a dedicated mobile app for more convenient access and learning on the go.
- **Advanced Personalization:** Providing personalized course suggestions based on their learning preferences and progress.

- **Community Features:** Expanding community engagement by incorporating discussion forums, live events, and peer-to-peer interactions to foster a collaborative learning environment.
- **Sustainability Metrics:** Adding features that encourage sustainable tech practices, such as carbon footprint tracking for online learning and promoting energy-efficient usage.

By addressing these areas and exploring new possibilities, "CSWALA" can evolve into a comprehensive, interactive platform that continues to empower tech learners worldwide.

References & Important Links

[1] **Coursera**. Available at: <https://www.coursera.org/>

[2] **Udacity**. Available at: <https://www.udacity.com/>

[3] **Codecademy**. Available at: <https://www.codecademy.com/>

- **Visual Studio Code**. Code editor used for development. Available at: <https://code.visualstudio.com>.
- **Google Chrome DevTools**. Debugger tool used for inspecting elements and debugging front-end code. Available at: <https://developer.chrome.com/docs/devtools/>.
- **Figma**. Tool used for prototyping and designing the website interface. Available at: <https://www.figma.com>.
- **Tailwind CSS Documentation**. Official documentation for Tailwind CSS. Available at: <https://tailwindcss.com/docs>.
- **Next.js Documentation**. Official documentation for Next.js components. Available at: <https://nextjs.org/>

Important Links:

CSWALA GitHub Repository. Available at: <https://github.com/ovishkh/CSWALA>

CSWALA GitHub Branches. Available at: <https://github.com/ovishkh/CSWALA/branches>

Figma: [\[Link\]](#)

CSWALA-AI: [\[Link\]](#)

Thank you from **Our Team Tengen**.