Internship as a Front-End Developer

by

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An internship report submitted to the Department of Computer Science and Engineering
in partial fulfillment of the requirements for the degree of
B.Sc. in Computer Science

Department of Computer Science and Engineering
Brac University
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Declaration

It is hereby declared that

1. The thesis submitted is my/our own original work while completing degree at Brac University.
2. The thesis does not contain material previously published or written by a third party, except where this is appropriately cited through full and accurate referencing.
3. The thesis does not contain material which has been accepted, or submitted, for any other degree or diploma at a university or other institution.
4. We have acknowledged all main sources of help.

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Approval

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Abstract

This report details my learning and experiences from my internship at Headroom Group as a front-end developer intern. I was fully engaged in the dynamic and ever-evolving field of web development throughout 6 months, with a primary focus on front-end technologies and methods. I worked on a number of projects throughout the internship with the goals of improving user interface design, boosting website speed, and using responsive web design concepts. During my internship as a front-end developer at Headroom Group, I worked on a variety of web projects, which helped me expand my abilities and obtain real-world experience. I worked with the programming team, took part in code reviews, and helped with the user interface design throughout my internship. I'll go over my main duties, the technologies I worked on developing my skills in HTML, CSS, JavaScript, and contemporary front-end frameworks like React.js, the difficulties I ran into, and the insightful things I discovered throughout my internship in my report. I will also draw attention to particular projects where I significantly improved the user interface and general functionalities. I worked directly with senior developers and designers to create visually beautiful and interactive web applications from wireframes and mock-ups. In order to provide a seamless user experience, I also helped to ensure cross-browser compatibility and enhance accessibility standards. This report outlines my experiences, contributions, the difficulties encountered, the abilities developed, and the successes attained throughout the internship. It examines how theoretical knowledge acquired in the classroom is put to use in real-world situations, as well as how professional development is achieved through mentor-ship and practical experience. All in all, this internship helped me build a strong foundation in front-end development, sharpened my problem-solving skills, and gave me the chance to put. [1]

Acknowledgement

I want to start by giving thanks to my all-powerful Allah, who made it possible for me to finish my internship without any problems. Second, I want to express my gratitude to Jony Dev, sir, my co-supervisor, for his thoughtful counsel and assistance during our work. He was modest and gave me advice when I needed it. Thirdly, I received guidance throughout my internship from Dr. Md. Golam Rabiul Alam and Arif Shakil, sir. And lastly, thanks to my parents for their unwavering support. It couldn't have happened without them. I am about to graduate with my parents' love, prayers, and kind support. [9]

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Chapter 1

INTRODUCTION

1.1 About Internship

An internship gives recent graduates and students alike the ability to adapt to real-world workplace procedures and put their knowledge to use. Students have the chance to obtain experience relevant to their course of study. In essence, this facilitates the student's transition from the academic realm to the real world of labor. Businesses will also have a better understanding of their new intern and be able to place them in the most suitable roles according to their needs. In light of all of this, an internship also helps students get professional experience, which later improves their résumé and raises its worth. The popularity of internships is gradually growing, and some students would rather complete an internship than write a thesis paper. At BRAC University, doing an internship or writing a thesis paper are requirements for students. Even though there may not be as many students choosing BRAC as their internship provider, those who do so are supported well by the school and encouraged to absorb as much knowledge and experience as they can from the workplace. As long as the specialization is related to their degree, students are allowed to select any concentration for their internship. For students to be qualified, an internship at a respectable organization must last six months, and they must have earned more than 72 university credits. I chose to do an internship rather than write a thesis paper while I was a student at BRAC University. Headroom Group was my choice for an internship employer. Headroom offers pre-engineered steel construction, architectural/interior design, and engineering services to both domestic and international clients. My goal is to gain as much knowledge as I can to help me in my future academic and professional endeavors.

1.2 About this Report

I have to submit a report that will serve as the foundation for my evaluation at BRAC University because this internship counts toward the requirements of my bachelor's program. I've discussed the workplace culture and atmosphere, the lessons I've learnt, and my experience working at Headroom in my report. It will also include a thorough summary of the project I have worked on and the activities I have been doing as an intern.

1.3 Objective

This report's main goal is to record my job experience and the knowledge I acquired while working as a front-end developer at Headroom Group for six months. Completing this report is necessary to fulfill the internship requirements of BRAC University's Computer Science and Engineering department. It attempts to give a general summary of Headroom Group, their offerings, and the projects I worked on. It also considers how this time affected my professional growth. This report's primary objective is to provide an overview of the technical know-how and abilities I gained throughout my internship. I want to emphasize, in particular, how working on real-world projects helped me improve my skills in front-end development, user interface design, and teamwork. In addition, I hope to provide some insights into the tools and techniques I employed throughout my internship, like Figma for design collaboration, GitHub for version control, and several testing frameworks for functionality and responsiveness validation. This report emphasizes not just the technical aspects but also my professional development. I gained invaluable experience in time management, communication, and user and client needs adaptation working with a dynamic team at Headroom Group. The capacity to concentrate on activities for extended durations while engaging with others to maintain project workflow utilizing platforms like GitHub was a noteworthy learning outcome. These qualities have improved both my technical and interpersonal capabilities and are crucial for my future professional pursuits. Additionally, this research aims to give a succinct overview of Headroom Group's offerings and the kind of projects they work on, providing insight into their contributions to the web development sector. This report, which reflects on my time at the organization, assesses how the internship has aided in my professional and personal growth by highlighting the particular duties and obstacles I encountered and the strategies I used to overcome them. [11]

1.4 Methodology

This report is primarily based on my personal experience with information from other websites, with a focus on the knowledge and experience I gained during my internship at Headroom. . I used a methodical approach that stressed collaboration, innovation, and user-centered design during my internship, with my main duty being the creation of visually appealing and useful web pages that enhanced the user experience as a whole. I started by thoroughly studying the project requirements and the target audience in order to accomplish this. In order to create design concepts that were in line with user needs, I produced wireframes and prototypes using programs like Figma, which functioned as the final web page's blueprint. The designs of these prototypes were improved and made fit for use by iterating them in response to input. I designed the website's icons, banners, and other visual elements in addition to the user interface components. These materials were enhanced for usability and visual appeal in addition to adhering to the company's branding criteria. My emphasis on user-centered design made sure that each component made a good contribution. Working with developers to transform design concepts into fully working websites was a crucial aspect of my workflow. We used a mobile-first strategy to make sure these designs were deployed responsively across different devices. In order to address any discrepancies that emerged, we employed testing tools to

verify the web pages' functionality and responsiveness across various screen sizes and browsers. Ensuring that the features and interfaces were extensively tested was one of the most important parts of the development process. We used automated and manual testing techniques to confirm responsiveness, functionality, and usability. Cross-browser testing was done using tools like 'Chrome DevTools' and 'BrowserStack' to ensure compatibility on a range of devices. Furthermore, we used the Jest and React Testing Library for unit testing to make sure that each component performed as planned and didn't introduce errors when updates were made. We used GitHub's issue tracker to manage and monitor issues. Here, we logged, prioritized, and allocated team members to bugs and feature requests. This made it possible for us to monitor our progress, work together to find solutions, and make sure that every task was finished ahead of schedule for the project. [11]

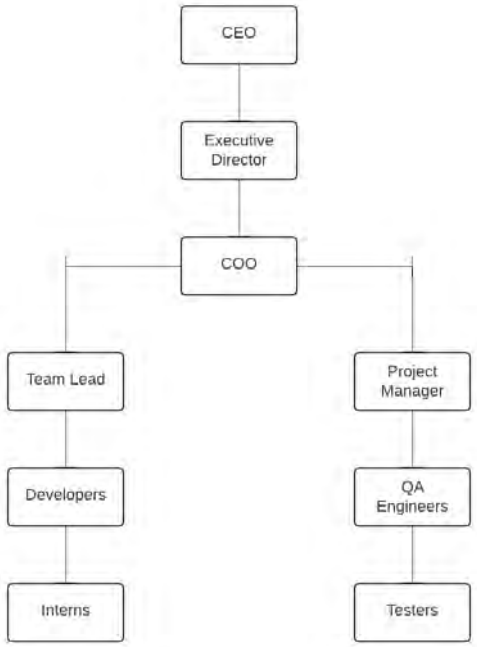

Figure 1.1: Team Organogram

I was able to make sure that the finished product satisfied both user and technical criteria by putting a strong emphasis on a user-centered approach, verifying designs through rigorous testing, and keeping an organized workflow with appropriate version control. I was able to produce interesting and useful web pages thanks to this process, which helped the project succeed as a whole. [11]

Chapter 2

COMPANY PROFILE

2.1 Overview

The company Headroom Group provides a variety of services. Travel guides, interior design services, construction management, design and events, and apparel accessory creation are just a few of the many services they provide. In 2000, the Headroom Group was founded as an architectural, engineering, and construction company. Headroom Group, based in Kakrail, provides a highly pleasant work atmosphere where a group of skilled and seasoned developers create top-notch software and solutions that their clients may utilize.

2.2 Vision and Mission

The goal of Headroom Group has been to rank among the nation's leading on-service providers. Their goal is to offer the people of Bangladesh and the world first-rate services. Headroom's technical and design experts use state-of-the-art technologies in close coordination with their partners and associates to offer clients nationwide "design and build" solutions for their construction projects. Headroom's tailored and eco-friendly design solutions outline a creative workflow that combines technical and project management expertise with human resources to provide appealing, economical, and useful design solutions.

2.3 How Does Headroom Group Work

To bring out and give the best, a business needs the right setup. The structures that follow will describe how Headroom Group operates thanks to the diligence and commitment of the team's skilled and knowledgeable developers and engineers.

2.3.1 Partners and Sponsors

Headroom Group collaborates with a variety of partners and sponsors, though much of this information remains confidential. The company's strategic partnerships help shape its approach to project execution and client relations, ensuring that all projects are delivered with the highest standards of quality and innovation.

2.3.2 Program Management

With the assistance of a group of project managers, architects, engineers, and technicians, Headroom is managed by architects and engineers with degrees from both domestic and foreign universities and fifteen to twenty years of professional experience. The architectural and interior design process compliance criteria are reflected in our design and project management solutions. We currently have sixteen employees working in a state-of-the-art setting that allows us to provide both interior and architectural design solutions and the construction of pre-engineered steel structures.

2.3.3 Product Ownership

At the heart of Headroom's client-centric approach is the concept of "Product Ownership." Each client appoints a Product Owner who is responsible for gathering requirements and ensuring that project deliverables align with client expectations. The Product Owner acts as a bridge between the client and the project team, facilitating smooth communication and timely delivery.

2.3.4 Quality Assurance

Every project team at Headroom adheres to stringent quality control procedures. Headroom's specialized design and management solutions guarantee the delivery of high-quality final goods at incredibly low prices. Their ability to provide our clients with the correct processes, people, and technology is the foundation of our success.

2.3.5 Core Business Philosophy

Headroom is committed to providing its clients with genuine value through ethical project management and design. The company's fundamental tenet is to assist clients in realizing their goals and dreams by offering state-of-the-art design solutions and interior design execution. Our ultimate goal is to return value to our clients by sharing our knowledge and experience with them.

2.4 What Headroom Group Do

The Headroom Group offers the people of Bangladesh a variety of services. Their most popular services include interior design and architecture. On the other hand, they also offer services including business consulting, trip booking, and event management. Experienced team leaders and project managers design and construct these services. The Headroom team works to give its clients the greatest and most advanced services possible after investors and stakeholders take care of their basic necessities. [4]

2.4.1 Headroom Interior Design

Central to our philosophy is the belief that architecture and design go beyond mere structures; they serve as catalysts for urban and social transformation. Headroom's projects are fueled by the mission to enhance cities and make them better places to

live. Whether it's conducting feasibility studies, master planning, or providing full-service architecture, headroom shapes environments that inspire positive change.[4]

2.4.2 Headroom IT Solution

Headroom provides all-inclusive IT solutions in the dynamic digital world. Custom software development, website design, and digital marketing services are our team's areas of expertise. By arming companies with state-of-the-art technology, Headroom enables them to improve their online visibility and optimize their processes, helping them to maintain a competitive edge in the market. [4]

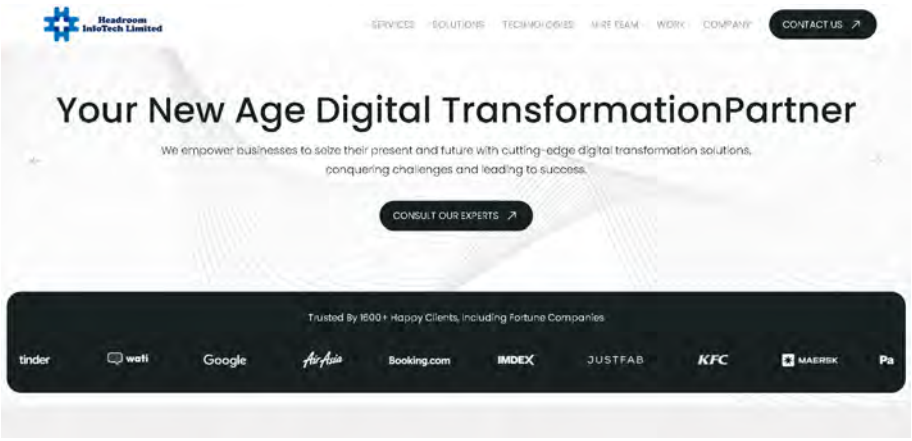

Figure 2.1: https://www.headroominfotech.com/

2.4.3 Headroom Architecture and Design

Headroom offers interior design services that combine style and utility in a seamless manner. The designers work directly with customers to create customized environments that reflect their vision and lifestyle from idea to completion. Interiors are no longer just rooms that we design; we use them to communicate our uniqueness and purpose. [4]

2.4.4 DeshiTour

'DeshiTour' is a subsidiary company owned by Headroom Group. It is an all-in-one travel platform where anyone can book a hotel, air ticket, bus ticket, and tour package from anywhere. The company wants to offer information, pricing, availability, and booking capabilities for air travel, hotels, vacation packages, buses, trains, sightseeing activities, inter-city and point-to-point taxis, homestays, and cruises through an advanced transaction platform consisting of mobile apps, websites, and 24/7 customer service centers. 'DeshiTour' is a global network for real-time travel bookings that seeks to connect more than 750 airlines, 2,2000 activities, and 1,400,000 hotels worldwide. One of the main features of the 'DeshiTour' platform is sustainable travel, with an emphasis on eco-friendly travel methods that contribute to the preservation of the environment and local culture while creating jobs for locals in the future. [2]

2.5 Recruitment Process

The HR team's primary goal when it comes to CV sourcing is to use sourcing channels like LinkedIn, 'Bdjobs', etc. to draw in qualified candidates for open positions. In the meanwhile, HR fills jobs with candidates based on recommendations from within the company. Candidates are required to submit a cover letter and CV to HR. After accepting that, a brief on-call interview is scheduled to establish rapport, and a time for an in-person interview is set for a later date. The executive director of headroom and the head of the IT division then conducted an interview with me to ascertain my area of competence and provide accommodations. In addition to my educational background and professional experience, they were interested in my personal life, including my hobbies and interests. The interview was fascinating and highly interactive.

2.6 Workplace Details

The company's main method of communication is through WhatsApp. Announcements pertaining to the company are shared on WhatsApp, allowing users to respond and share their emotions collectively. The fingerprint scanner at the workplace is used for employee regular access in addition to the attendance sheet. The company has flexible timing Start time for our office is 10:00 am and concludes at 6:00 pm. Additionally, if an employee is unable to attend for any reason, he or she must notify the company's HR department. Using WhatsApp, any employee may connect with other employees. The organization employs the tracking tool, where anyone may submit a leave application or he can inform the HR. Headroom offers a vibrant, upbeat, and welcoming work environment. The office is staffed by two people. The employees in the office are available to assist and supply whenever you need anything. Our staff members have unlimited access to tea and coffee. We occasionally take breaks for refreshments in the middle of our work. We also have adequate time for prayer and our lunch break. Additionally, the workplace provides afternoon snacks.

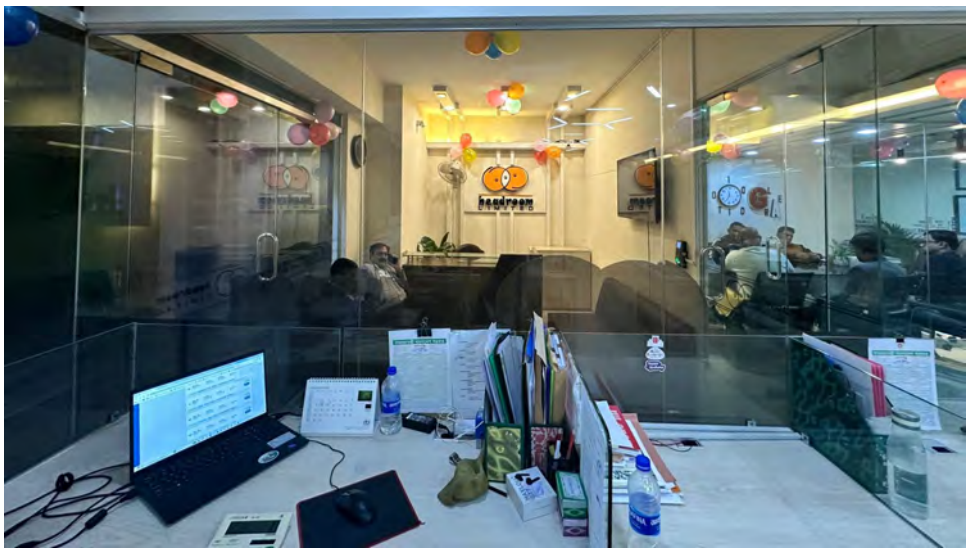

Figure 2.2: Inside Office

If an employee is unable to attend the office for a specific reason, he or she can work from home. However, one has to inform the manager of the department about the issues. During remote hours an employee has to give updates to the superiors and other team members so that they can sync with others. Our company has been flexible in remote communication since Covid-19. That time all office operations went remotely. It was a hard time back then but our company has adapted through challenges. If you are doing a job in a random company, the workplace environment really matters. It affects employee's performance and mental health. Creating a positive environment is necessary for every commercial office or workplace. Thus, I would say, our office offers a decent, positive work-friendly environment for the employees. Our superiors are more professional and friendly towards their employees. Also, our HR Shafiq bhai is a guy with a chill mindset, who never complains about anyone. That is why, it is a perfect workplace for any person.

2.7 Projects

At the moment, Headroom is engaged in a number of initiatives. The majority of them are private and won't be made public until later. However, the public can access part of this project's information.

2.7.1 Gazipur Five-Star Hotel and Resort

This esteemed project will be led by Headroom Architecture Engineering, a proud affiliate of Headroom Group. Experts in plumbing, electrical systems, structural engineering, architectural design, fire safety, and building, Headroom is committed to bringing Gazipur to life with distinction and originality. [5]

2.7.2 Jolshiri Residential Project

In Rupganj Upazila, Narayanganj District, 'Jolshiri Abashon' is a residential development that is now under construction. It was primarily created by 'Jolshiri Abashon' Corporation, a sister corporation of the Army Officers Housing Scheme. One of their projects also involves Headroom Group. They have established a solid reputation for dependability and superiority in the fields of civil construction, hospitality design, and interior design. [5]

2.7.3 Kuakata Five-Star Hotel

Windsor, Berkshire, England is home to the InterContinental Hotels Group (IHG), a British global hospitality firm also referred to as IHG Hotels Resorts. The two new properties that 'InterContinental Properties Group (IHG)' signed in Kuakata increased the company's presence in Bangladesh. [5]

2.7.4 Bangabandhu Corridor (BGB)

From product development to architecture, Headroom's creative professionals are crucial in shaping the vision and aesthetic of several projects. A combination of practical design abilities and creative intuition is used to envision and plan a project's

structural and visual elements. Another project of Headroom Group is the BGB Monitoring Room at BGB Bangabandhu Corridor. [5]

Chapter 3

TRAINING PHASE

3.1 Overview

A major step forward in one's academic and professional lives is the chance to serve as an intern for a company. Gaining work experience is highly advantageous in today's competitive employment market. Additionally, it facilitates students' seamless transition from the classroom to the workplace after their studies are eventually over. It can be difficult to apply theoretical knowledge in practice. It's crucial to keep in mind that industry procedures differ. As an intern at Headroom Group, The front-end development team was given my task. This internship is a great opportunity for me to get experience and learn new things while working here, in addition to being a requirement for graduation from BRAC University. When I first started out, I knew very little about how workplaces operate, much less in the midst of a pandemic. I had excellent guidance and ease of use from my Headroom supervisor at every stage of the process. Since interns at Headroom Group are not sent in the field right away, this was a formal training phase. My supervisor has guided me through a number of my internship phases thus far. I've included a number of screenshots that are included in the report. [1] [9]

3.2 Working Summary

I was first instructed to learn more about the company's technologies and frameworks before I started working. First, I downloaded Sublime Text and coded as I learned. I was given a daily/weekly task that I had to finish by the deadline and turn in to my superior, who would review it and provide feedback based on my work. In the paragraphs that follow, I have categorized my learning outcomes. In order to get more knowledgeable about the field, I took the "Meta Front-End Developer Professional Certificate" course on Coursera.com and heeded the advice of my superior. Additionally, I took help from ChatGPT for better understanding and created my own documentation for it. [1] [9]

3.2.1 Tailwind CSS

Tailwind CSS's utility-first approach to styling provides both simplicity and efficiency, which are essential in the quickly changing realm of web development. Developers can drastically cut down on development time and complexity by using

pre-defined utility classes directly in HTML rather than creating bespoke CSS. This speeds up the process by making the code easier to read and maintain. Additionally, Tailwind easily interfaces with well-known component libraries like DaisyUI and Headless UI, which offer customized user interface elements to speed up interface creation. Animate.css and Framer Motion are two animation libraries that Tailwind integrates well with, making it simple for developers to incorporate animations and transitions for a more seamless user experience. Because of its adaptability, modularity, and capacity to boost efficiency, Tailwind CSS is extensively used by large corporations like Shopify and Coursera.
Figure 1 – Conventional approach to styling front-end applications using HTML code and a separate CSS stylesheet. [3] [13] [8]

Figure 3.1: Without Tailwind
[13]

Figure 2 – Here's how the same styling is achieved using Tailwind CSS:

Figure 3.2: With Tailwind
[13]

3.2.2 Javascript Library (React)

JavaScript is a computer language used for many web development jobs, and React is a library for creating user interfaces. React offers an organized method for creating user interface components and is built on top of JavaScript. While each library, such as React, has its own methods and beliefs, they all strive to improve performance, encourage code reuse, and make complicated jobs easier. It is essential to the development of dynamic web applications and single-page applications. React is a strong option for contemporary web development projects since it has benefits including better code structure, increased performance with the Virtual DOM, simpler state

management, and a vibrant community. Just like any other scripting language, JS gives your website more capability. The JavaScript syntax, which combines HTML and JavaScript, now includes JSX. [3] [13] [8]

```
// Example plain JavaScript for dynamic rendering
const Greeting = ({ name }) => {
  const div = document.createElement('div');
  div.textContent = `Hello, ${name}!`;
  return div;
};
```

Figure 3.3: Plain Javascript

React gives us a markup syntax called JSX, or Javascript XML, that we can use to create React elements. Although it looks 90

```
// Example JSX code in a React component
const Greeting = ({ name }) => {
  return <div>Hello, {name}!</div>;
};
```

Figure 3.4: JSX code

3.2.3 Virsion Control: Git and GitHub

If I need to communicate with multiple developers or are working on a large project, a version control system can be helpful. Instead of having to manually undo the changes, this software lets you manage and trace changes to the source code and even roll back to a previous version. It improves development speed and experience by reducing the amount of time I spend managing the code, decreasing the likelihood of code conflicts, and assisting with code recovery in the event that I wish to go back to a previous version. One of the most well-liked and extensively used version control systems is called Git. In software development, it's critical to monitor and control changes. This is where version control systems, like Git, come into play. Git helps developers to log changes, collaborate smoothly, and roll back to prior versions if needed. In contrast, GitHub is a site that houses Git repositories, making it easier for people to collaborate, share code, and even publish applications. [3] [13] [8]

3.2.4 Package Managers

Keeping track of software libraries and dependencies can get difficult as projects expand and change. Tools like package managers are made to deal with this problem. Software libraries can be easily managed, installed, and updated by developers with the aid of well-known package managers like npm or yarn. They facilitate a more seamless development process by ensuring that projects have the appropriate versions of dependencies. Software repositories and package managers work together to download and install packages onto your system. They track the installed packages and their corresponding versions in a local package database. This database is useful

for managing software dependencies, uninstalling packages, and upgrading installed applications. [3] [13] [8]

3.2.5 Build Tool: Vite

The complexity of online applications increases the requirement for effective build tools. These technologies make sure that apps function properly by optimizing, bundling, and serving our code. One next-generation front-end tooling solution that provides faster build speeds is Vite. These tools ensure that the code is optimized for production by handling tasks. [3] [13] [8]

3.2.6 Next.js

I just became familiar with Next.js. By fusing server-side features with React's front-end capabilities, this sophisticated framework gave me the freedom to create applications that run quickly. I was also able to delve deeper into full-stack development with this framework, which smoothly integrates front-end and back-end activities. Learning Next.js really helped me learn something to work with advanced technologies.

3.3 Tutorials and Assistance

My supervisor was my primary source of assistance and education since he allowed me ample opportunity to ask questions and demonstrate how the majority of the work is done correctly. In addition, I was certain that I had an internet connection, so I looked through a number of websites and youtube channels to acquire a general notion. [3] [13] [8]

Chapter 4

MY CONTRIBUTION

4.1 Overview

Every course outline in our academic program is deliberately designed to fulfill a certain purpose, helping to shape the student into the best-prepared graduate. Additionally, there is a rationale behind the internship program. The main benefit of the internship program's advantage is that it offers practical, real-world industrial training, which a school environment can never offer. Acquiring suitable conduct for a job. The environment is the other significant benefit. Learning is included in that previous category, concerning prevailing procedures, technology, and best practices. The latter comprises among other things, qualities like responsibility, timeliness, kindness, and respect. As a front-end developer, I was in control of our website's user interface, duties included developing scalable, high-quality user interface components and transforming mock-ups and wireframes into reusable code. Furthermore, I was responsible for incorporating new functionalities into our WordPress website and overseeing the incorporation of external extensions like as WooCommerce, as well as doing routine maintenance and performance enhancements. I conducted research from day 1 at Headroom. However, as time passed, I started to face difficulties working with new features. But I continued my operation and learning at the same time. I started to build a single website with different features I will provide specifics about my work on a project and other duties throughout the report.

4.2 Internship Roles and Responsibilities

As a frontend development intern at Headroom Group, my primary responsibility was to assist others in designing, building, and managing the user interfaces of the platform's web applications. Also, to develop new features and functionality for websites and utilize code optimization and picture compression to enhance website performance. To create websites that are both functional and aesthetically beautiful, I went through a lot of wireframes and designs. I used 'React' to build responsive, cross-browser-compatible websites that adhere to web standards and best practices. In addition, I used popular frontend frameworks and modules like React to develop dynamic and interactive web applications. Our works were divided with the 'Trello' project management tool. I created separate project files to create the components I was assigned. I did a lot of research on component libraries, npm packages, icons, and animation libraries. Sometimes, I asked 'Chat GPT' or 'Gemini' for specific

solutions which were helpful. To check my website's responsiveness, I used an app called 'Responsively' Moreover, I worked on functionality like 'CRUD' operations and others. Whenever I was stuck with a problem that even 'ChatGPT' could not resolve, I asked my seniors for help and they were very polite. Effective communication is a crucial part for front-end developers to possess when collaborating with design and back-end teams. Furthermore, I went through some troubleshooting and resolved any issues or faults that arose with the web programs. I read a lot of documents during my internship period. It created a good habit inside me. Whenever I learn something new, I create my own documentation. Lastly, I took part in GitHub collaboration with other developers and pushed and stored my necessary code in the GitHub development branch.
In addition to these responsibilities, I also contributed to other tasks as needed by the company, including WordPress development.

4.3 Workflow

During my internship, I worked on an e-commerce web project called 'UrbanWood' which was based on RESTful API architecture. In a real-world e-commerce project, using RESTful API architecture can be crucial for building scalable and maintainable systems. In this section, I have mentioned my workflow for the development process with necessary examples and also attached a diagram.

4.3.1 Design and Prototypes

I mostly use Figma for UI design because it has developer mode and other options. If the client provides their own design, it is better to work with that and follow their theme pattern, color, and font style. But, if they don't, then it is all about brainstorming and finding the right design. Sometimes, I go visit websites like Theme Forest, and Dribble to generate ideas, prototypes, and so on

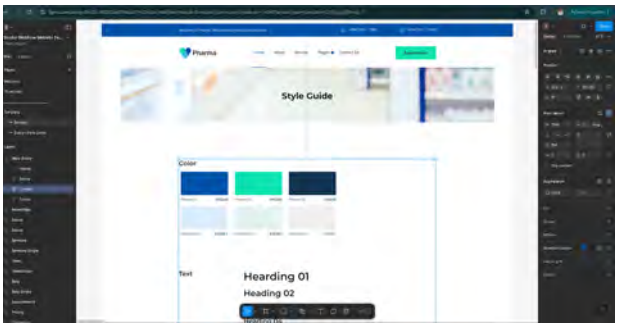

Figure 4.1: Figma for UI style guide and design

4.3.2 Implementation

The work that follows the design stage is evenly divided into numerous sections and modules. This is when the real coding process begins. I create a separate project file with the necessary dependencies and also open the main project file. I always work with two tabs simultaneously or sometimes three in the case of the backend.

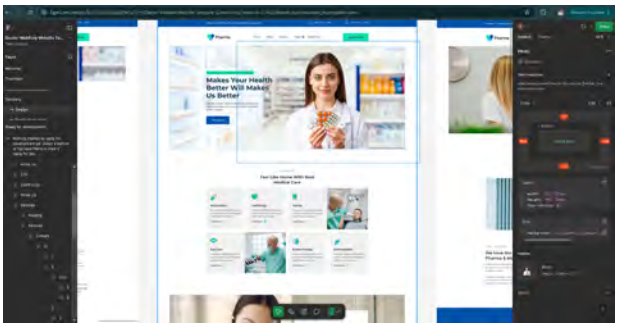

Figure 4.2: Homepage Layout

One is for testing purposes. It it goes right, I update the code with the main project file. It helps me to avoid errors.

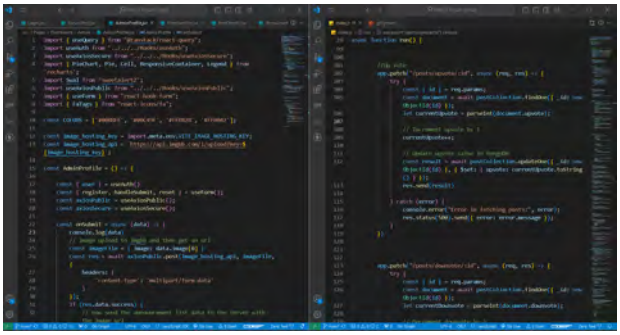

Figure 4.3: Working in VS-Code

In the home page, I developed dynamic components to display product information like name, price, and category. To make sure the interface appropriately displays the product details retrieved from the API, I tested how the data appears on the homepage in this step (Figure 4.4). Errors that occur during data retrieval are addressed politely by informing the user of the problem.

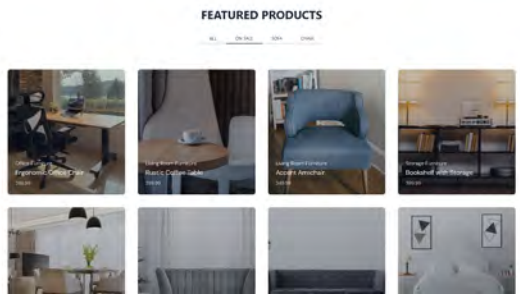

Figure 4.4: Visual Data in the Home Page

I created HTTP requests to the API using Axios in order to retrieve data. A promise-based HTTP client called Axios makes using RESTful APIs easier. In this instance, I used a GET request to get product information out of the database. After retrieving the product data from MongoDB, Axios processes the request and presents the information in JSON format.

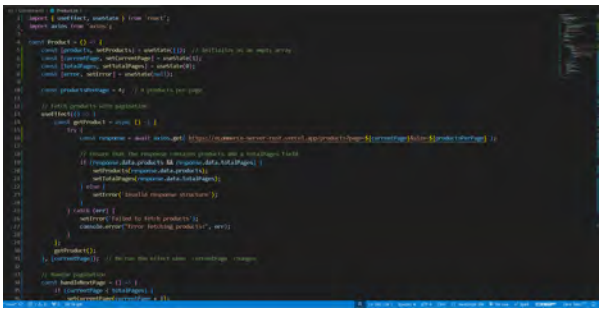

Figure 4.5: Data fetching with Axios

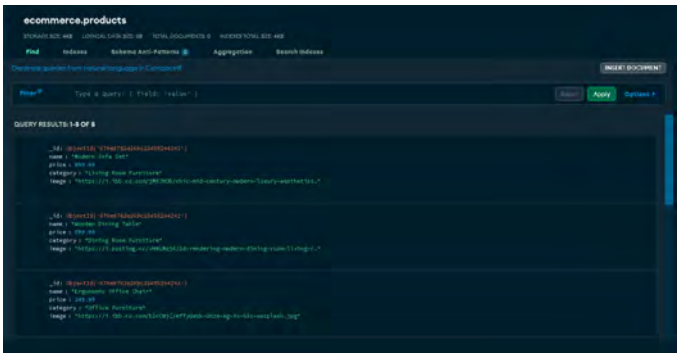

Figure 4.6: json data inside MongoDB

4.3.3 Testing

I adhered to industry best practices and standards to ensure code quality, maintainability, and compatibility across different browsers and devices. I thoroughly tested the front-end components after implementation to identify and resolve any errors or issues. This involved manual testing on a variety of devices and browsers with localhost along with automated testing with 'Jest' when needed.

4.3.4 GitHub

After each coding session, I frequently committed with clear, descriptive messages and created pull requests (PRs) for code reviews to ensure high-quality contributions. I followed a branching strategy, using feature-specific branches to isolate changes and prevent disruptions to the main codebase. Additionally, I documented new features and updates in the repository's README files, adhering to best practices such as basing and squashing commits to maintain a clean and organized history. This structured workflow significantly streamlined collaboration and project management.
Additionally, once I updated the development branch, my seniors reviewed the code, provided feedback, and made any necessary adjustments. If modifications were required, they guided me promptly, ensuring continuous improvement and adherence to project standards.
I have created a workflow diagram with the help of 'World Wide Web'.

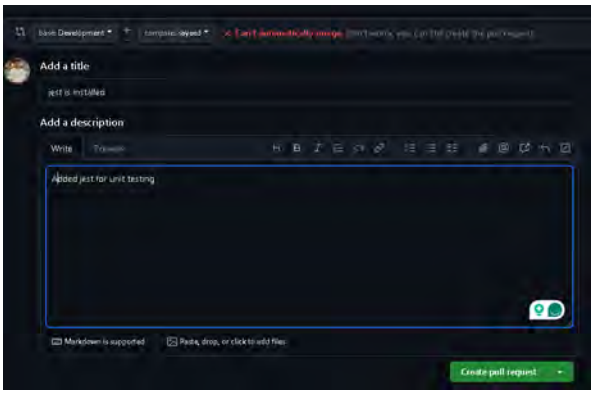

Figure 4.7: Creating a Pull Request inside Development Branch

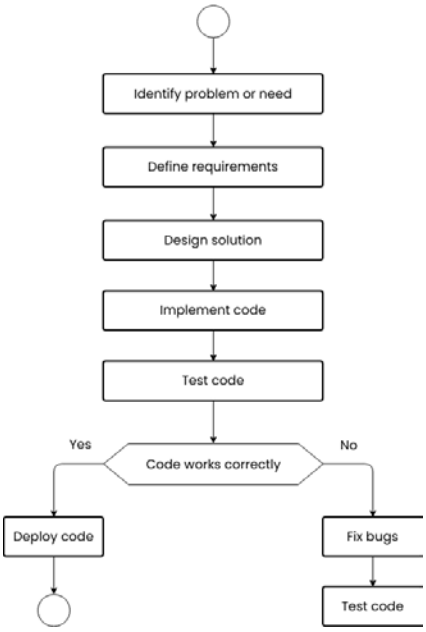

Figure 4.8: Workflow Diagram

4.4 Challenges and Solutions

I faced a range of everyday difficulties as a front-end developer, both client management- and technical-related. Managing the expectations of clients was one of the biggest issues. Front-end developers are responsible for realizing the precise vision that clients bring to life for their websites. Clients may, however, have inflated expectations since they don't always realize the technical constraints of web development. It is essential to inform clients about these restrictions, including how specific features could affect performance or the user experience as a whole. The client's vision must be balanced with a useful and accessible user experience, and front-end developers must carefully explain these technical limitations and offer substitute options.
From a technical standpoint, I faced numerous challenges, particularly when working with technologies like React, GitHub, and others. Each posed its own unique set of hurdles:

- **Web Responsiveness:** One of the key challenges I faced during my intern-

ship was ensuring web responsiveness across various devices and screen sizes. At first, several items and layouts did not show up consistently on smaller screens or in various browsers. I used CSS media queries and adaptable grid layouts to address this by putting responsive design ideas into practice. I also used the 'Responsively' app to test the webpage. I used responsive frameworks such as 'Tailwind' under the supervision of my seniors, which expedited the process of making the website more platform-neutral and adaptable. [11]

- **React Hooks:** Although React is an excellent tool for creating user interfaces, one of the main challenges was efficiently managing the state between components. Deep problem-solving and debugging abilities were needed to handle component re-renders, know when to lift state up, and leverage hooks (particularly useEffect and useState) effectively. Completing the development process became more difficult in order to optimize performance by minimizing needless re-renders and guaranteeing smooth user interaction. [11]

- **GitHub Collaboration:** Using GitHub for a group project brought up issues with version control and teamwork. Regular challenges included maintaining branch synchronization, resolving disagreements during pull requests, and guaranteeing code uniformity throughout the team. Both technical expertise and teamwork were needed to have a spotless commit history, follow team rules, and settle disputes amicably. [11]

- **MongoDB Integration:** Our back-end data management relied heavily on MongoDB, but there were challenges in properly integrating it with Node.js and the front end. Handling asynchronous database queries efficiently, guaranteeing adequate indexing for speedier read/write operations, and managing enormous volumes of data were some of the largest technological hurdles. The two main areas of study were preventing bottlenecks during peak traffic and optimizing queries. Although I don't work with the backend, but at the end of the day when you are working with functionalities inside the frontend, you have to work with the API and back end. [11]

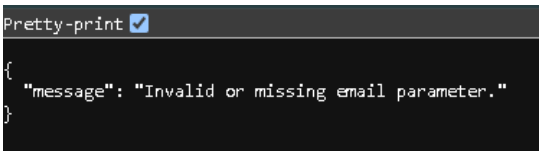

Figure 4.9: localhost showing error during data fecthing

- **Advanced Technologies:** The rapid advancement of front-end technologies also presented a unique set of difficulties. Maintaining current knowledge of emerging technologies while working on live projects necessitated striking a balance between education and real-world application. For example: modern frameworks and state management libraries like Next.js and Redux. [7]

Chapter 5

A SAMPLE PROJECT

5.1 Project Overview

EchoChamber provides a forum for people to start debates, share ideas, and have conversations on a range of interesting subjects. Through the website's dynamic and interactive user experience, visitors can communicate with other like-minded people, ask questions, and join ongoing debates in a well-organized and user-friendly setting. Establishing a community-driven forum for the exchange of ideas, insights, and experiences on a range of topics is the main objective. [6]
I created this website as a demo project during my internship and explained the technologies and frameworks I learned and used for it.

5.2 User Interface

5.2.1 Home Page

The navbar has a logo and website name, Home, Membership, Notification icon, and Join US (when not logged in) button. If the user is logged in, his/her profile picture should appear on the navbar. If the user clicks on the profile picture, a drop-down will appear with the following items: User name (not clickable), Dashboard, and Logout button. I used the 'DaisyUI' component library to design the navbar. The logo on the left is created with the help of 'Adobe Illustrator' and 'Canva'. The routes are implemented with 'React-Router-Dom'.

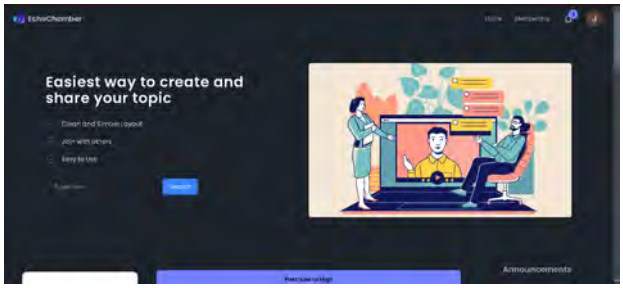

Figure 5.1: Homepage with navbar and banner section

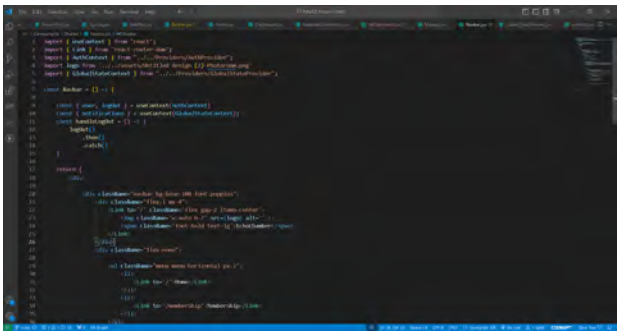

Figure 5.2: Navbar.jsx

The banner section has a search bar. Any search word is based on the tags one used in the posts. The search implementation functionality is done in the backend with node.js and express.js. A section is created that has all the tags the site offers to use in the posts. Users can use these tags to search for any post. Also, a section for the announcement to show all the announcements. If no announcement is made, the section will not be visible. If there is an announcement, the notification icon shows the announcement count.

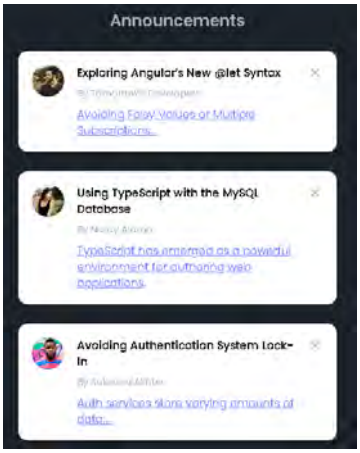

Figure 5.3: Announcement section

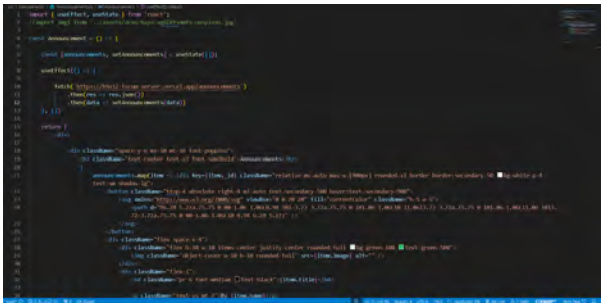

Figure 5.4: Announcement section

By default, the homepage shows all the posts from newest to oldest order. For that, I have used sort functionality where data shows based on comment count. Each post

shows the picture of the author, post title, tags, time, comments, and votes count.

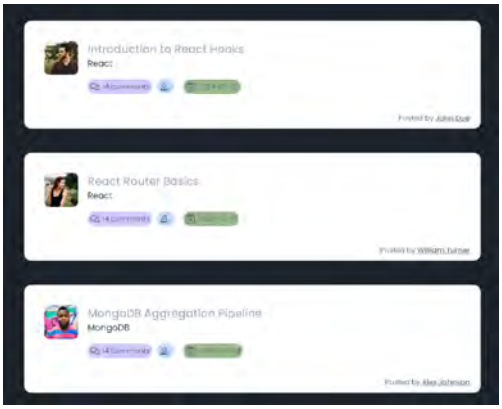

Figure 5.5: Forum Posts

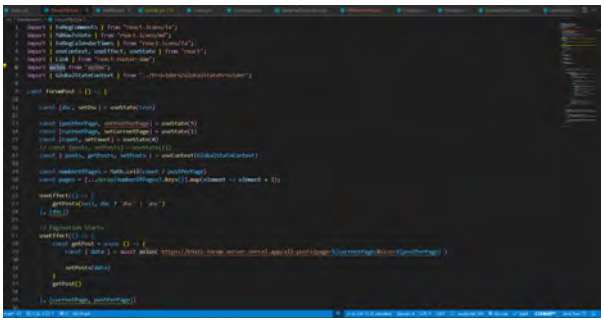

Figure 5.6: ForumPost.jsx

Clicking on a post/search result, the user is redirected to the dynamic route with postId, where it shows the post details. A user needs to log in to make a comment, give a vote (upvote or downvote), and share a post. For that, I have created a private route and implemented authentication with an 'Auth Provider' using 'Firebase'.

Figure 5.7: Post Details Section

5.2.2 Membership Page

I have added a separate membership page for the payment gateway. On this page, the user has to pay N taka/dollar to become a member of this site. If a user becomes a member, he will receive the gold badge and can do more than 5 posts.

Figure 5.8: Membership with payment gateway

5.2.3 Dashboard

The dashboard route is fully conditional based on user and admin.

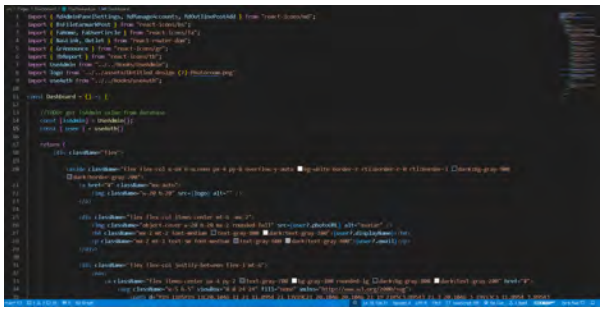

Figure 5.9: Dashboard.jsx

User Dashboard

When a user clicks on the Dashboard, he/she will be redirected to a page where there will be the following routes: A. My Profile B. Add Post C. My Posts

Figure 5.10: User Profile

This page will have the user's name, image, email, badges, and my 3 recent posts. There is be two badges and these badges will be visible only on the My Profile page when the conditions are fulfilled: 1. Bronze Badge: If a user registers on the site, he/ she will receive the Bronze badge. Or, 2. Gold Badge: If a user becomes a member, he/ she will be rewarded the Gold badge.
If a user visits this page, he/she will be able to see all the posts he/she posted. It shows them in tabular form. Each row has a 'Post Title', 'Number of votes', 'Comment Button', and 'Delete Button'. On clicking the Comment button, the user will be redirected to a page where he/she can see all the comments on that post (/comments/postId). The user can Report a comment on the Comment page. The

comments are in tabular form where each row will have the email of the commenter, the comment text, feedback, and a Report button. By default, the Report button will be disabled. The Feedback column has a dropdown with 3 feedbacks. If a user selects a feedback reason, the Report button will become active. Once the Report button is clicked, it will be disabled.

Admin Dashboard

When an admin clicks on the Dashboard, he/she will be redirected to a page where there will be the following routes: A. Admin Profile, B. Manage Users, C. Reported Comments/Activities and D. Make Announcement.

Figure 5.11: Admin Panel

This admin profile page will have the admin's name, image, email, number of posts, comments, and users. Also, a pie chart to show the total number of posts, comments, and users of the entire site. Below the profile section, there is a form where the admin can add tags. The admin can make a user admin by clicking on the Make Admin button. Implement a server-side search functionality to find a specific user. Also, the admin can announcements. What announcement the admin makes will make is entirely up to you but make sure to keep it relevant. Again, there is a reported activities section. An admin will see all the reports made by the users. It shows necessary information about the report/feedback to the admin where I have Implemented necessary admin functions that I want an admin to take against these reports. I made the actions relevant and I think about a Facebook group admin.

5.2.4 Login/Register Page

After clicking the 'join us' button, it will redirect an user to the login or registration page. This is the page to implement authentication. Users will see a login form. There is also a social login in both the Join Us and Register pages. There is a link to toggle between the Register and Join Us page.

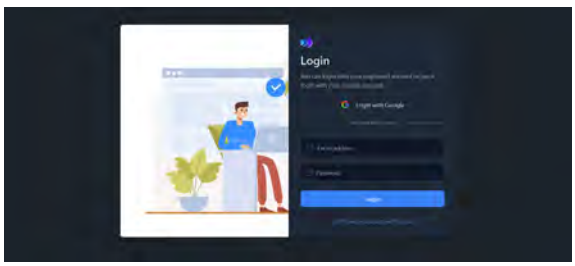

Figure 5.12: Login Page

A whole range of backend services and technologies from Google Firebase facilitate app development and boost efficiency. It offers cloud storage, analytics, authentication, real-time database functions, and all of these combined into one platform. Firebase is the best option for both startups and large companies because of its scalability and user-friendliness, which lower development costs and time while improving app quality and user experience. Its strong architecture guarantees consistent performance, and its wealth of documentation and community assistance helps speed up development and troubleshooting even more.

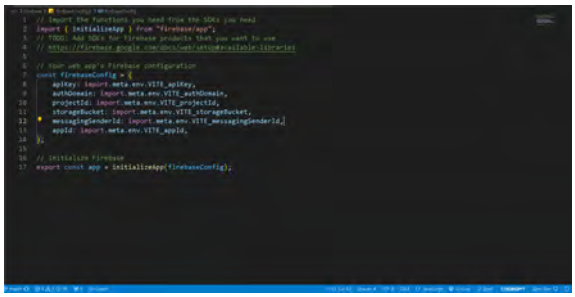

Figure 5.13: firebase.config.js

5.3 Technology Stack

- **Front-End:** React js, Tailwind CSS,
- **Back-end:** Node.js, Express.js,
- **Database:** MongoDB
- **Authentication:** Firebase Authentication, JWT
- **Deployment:** Firebase(Client), Vercel(Backend)
- **Client:** https://github.com/sayeedHossain191/echoChamber-client.git
- **Server:** https://github.com/sayeedHossain191/echoChamber-server.git
- **Live:** https://b9a12-forum-client.web.app/

5.4 Challenges

During this demo project, I faced some challenges on implementing functionality and back-end integration. Moreover, I used Firebase and JWt for authentication for this project which was also quite hard to work with. Lastly, the continuous need to learn and implement new technologies in real-time added complexity to the development process.

5.5 Limitations

There were many restrictions on the project. Advanced features like real-time data updates and speed enhancements were not fully implemented due to time restrictions. Limitations in terms of technology included restrictions on the use of specific contemporary development tools, as well as a lack of support for huge datasets and high-traffic performance optimization. Additionally, this project might make advantage of contemporary front-end technologies like Redux, Next.js, or even typescript. I'm learning these technologies right now.

Chapter 6

PERSONAL GROWTH

6.1 Professional Growth

6.1.1 Communication and Team Work

I've learned the importance of office team work as a means of fostering internal cooperation, communication, and decision-making throughout my internship. I was able to increase interest and talk to people outside of my field by holding regular meetings. Any new topics may be discussed here, and everyone is asked what their daily responsibilities are. I was able to gain some understanding of how the other teams worked as well, if only momentarily.

6.2 Work Environment

For me, working at Headroom Group has been a really intriguing and educational experience. I met a few new folks, with whom I have gotten close in a short period of time. Nobody contributes any ideas, and everyone is incredibly helpful. When I started, I was treated like a full-time employee rather than an intern. That facilitated my quick transition into their workplace culture.

6.2.1 Time Management

Time management is the most challenging thing I have ever had to deal with, and I still do. The problem was not the distance between my house and office; rather, it was the traffic. Being in Dhaka, I've learned to deal with traffic and the challenge of arriving to work on time. I can now, however, state with confidence that I have resisted this for the duration of my career and have always been able to manage my time.

6.3 Technical Growth

I learned about different tools and technologies during my internship.

6.3.1 GitHub

Collaboration on GitHub really improved my capacity to operate in a group setting. I improved my ability to handle pull requests, peer reviews, and settle merge disputes. These procedures contributed to the project's overall code quality and consistency. In order to coordinate duties and prevent overlap, collaborative procedures like feature branching and issue tracking were essential. Because I often worked with team members on code discussions and project documentation on GitHub's platform, this experience also helped me become a better communicator. [12]

6.3.2 React

In order to improve my ability to create dynamic, component-based user interfaces, I mostly worked with React. Building scalable and interactive applications was made easier for me by React's declarative methodology and virtual DOM. I grew skilled at building reusable components to speed up development and leveraging React Hooks for state management and lifecycle techniques. My ability to write modular, maintainable code has greatly increased as a result of this training, which has also helped me better comprehend contemporary front-end development techniques. [12]

6.3.3 Next.js

I learned about Next.js throughout my internship. I learned a lot about Next.js's suitability for frontend development even if I wasn't using it at the time. My knowledge of server-side rendering (SSR), static site generation (SSG), and how these technologies improve the development of quick, search engine optimization-friendly web apps with integrated routing and API support has grown as a result. [12]

6.3.4 Axios

I became proficient in handling HTTP requests in my web apps using Axios during the assignment. Axios made it easier to post data to the server and retrieve data from APIs, which improved my ability to create responsive and dynamic user interfaces. Its promise-based architecture greatly enhanced the application's overall data-fetching procedure by facilitating effective error management and seamless React integration. [12]

6.3.5 Npm Tools/Packages

I made heavy use of Npm tools and packages to improve functionality and manage dependencies across the project. The development process was optimized by utilizing well-known tools like Tailwind CSS for styling, React Icons for UI elements, and Axios for API calls. I now have a better understanding of version control, package management, and how to effectively incorporate third-party libraries to increase an application's functionality. [12]

Chapter 7

CONCLUSION

7.1 Conclusion

I have learned so much about the foundational elements of website building in my six months as an intern front-end developer. This experience has made it clear how important it is to carefully plan before doing anything and how important it is to record every phase of the process step by step. I've discovered that thinking through a single idea from multiple perspectives helps me solve problems more creatively by allowing me to view problems from other sides. One of the most significant things I've learned is the importance of resilience and patience, particularly when handling challenging coding problems. Even minor errors have the potential to ruin a project, yet overcoming these obstacles requires composure and attention. Through this process, my understanding of debugging and the nuances of well-written, effective code has grown. This internship has also highlighted how quickly technology is developing, especially in light of our increasing reliance on Internet resources. The way people interact with these platforms is greatly influenced by front-end development, and I now see how important it is to design interfaces that are easy to use, accessible, and visually appealing. The core of the user experience is the marriage of interactivity and responsiveness, made possible by widely used frameworks and technologies. But I've also come to understand that there isn't a one-size-fits-all solution, and keeping up with new developments in technology is crucial to adjusting to the various demands of projects. In the long run, this internship has greatly impacted my professional goals. It has strengthened my love for front-end development and stoked my curiosity about cutting-edge frameworks and technologies. I have no doubt that the abilities and information I've gained thus far in my academic career at BRAC University will be the cornerstone of my future aspirations as well as my long-term profession as a developer. I am immensely grateful to my institution for giving me the tools and guidance I need to be successful in this field, and I look forward to the opportunities and challenges that lie ahead. [10]

7.2 Future Goal

As of now, I am trying my best to master modern front-end frameworks like Next.js. Currently, I'm working on a team-based project called 'Auraloom' which is a podcast website. I am also taking part in unit testing for our project. Apart from that, my future goal is to learn more about backend technologies, including Node.js, Express.js, or server-side frameworks so that I can completely shift to Full-Stack Development. Also, I will expand my collaboration and version control skills along with improving testing and debugging skills. Lastly, I aim to take on more responsibility by mentoring junior developers or becoming a lead front-end developer.

This final report covers the six months of my internship, and I am thankful to BRAC University, my educational institution, for giving me a top-notch education and knowledge over the years. Many thanks.

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