



INTERNSHIP REPORT

SWE 420

Submitted By:

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Performed at:

 CEFALO

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Time period:

15 / 09 / 2021 - 15 / 03 / 2022

Date of Submission:

16 / 07 / 2022

LETTER OF TRANSMITTAL

16 / 07 / 2022

The Director

Institute of Information and Communication Technology
Shahjalal University of Science and Technology

Subject : Submission Of Internship Report

Sir,

I would like to submit my internship report as a part of the internship program. I worked in the 7th semester as a trainee software engineer at **CEFALO Bangladesh Limited** which is part of the **SWE 420** course. I am grateful to the Department of Software Engineering, IICT, SUST for allowing me to do an internship at this reputed software company in Bangladesh. I have gained experience in software technology, corporate culture, teamwork, etc. there. This report is based on my experience and learning during the internship period from 15 September 2021 to 15 March 2022. This report covers the projects I have worked on, the technologies I have learned, the challenges I have faced, the social activities I have participated in, and more.

I believe this report will be interesting and present the overall outcome of my internship. I will be grateful if you kindly accept my report and your kind consideration will be highly appreciated.

Sincerely yours,

Jagonmoy Dey
Registration no: 2017831025
Session: 2017 - 2018
Department of Software Engineering
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LETTER OF ENDORSEMENT

To Whom It May Concern

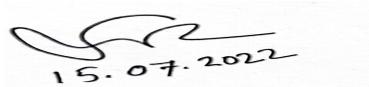
Subject: Approval of the Report

This is to certify that the report labeled **INTERNSHIP REPORT** has been delivered to me prior to the final submission.

This letter confirms that all contents of the report are true, not overstated, and do not contravene the company's policies.

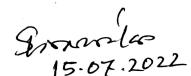
I, therefore, gladly state the validity of the report and wish Jagonmoy Dey good luck in his future endeavors.

Internship Supervisors,



15.07.2022

Shihab Rahman
Senior Software Engineer
Cefalo Bangladesh Limited



Simanta Deb Turja
15.07.2022

Simanta Deb Turja
Software Engineer
Cefalo Bangladesh Limited

ACKNOWLEDGEMENT

I express my gratitude to the Department of Software Engineering, IICT, SUST for providing me with the Internship opportunity at Cefalo Bangladesh Limited. I also express my regards to Cefalo Bangladesh Limited for selecting me as a trainee software engineer.

I want to express my sincere appreciation to **Prof M. Jahirul Islam, PhD., PEng**, Director of IICT, SUST, for running the internship program and giving me the opportunity. I also would like to thank our honorable teacher, **Mr. Fazle Mohammad Tawsif**, Assistant Professor, IICT, SUST for his contribution and hard work to get us placed in different companies.

I want to express my gratitude to **Mr. Ferdous Mahmud Shaon**, Managing Director of Cefalo Bangladesh Limited, for his support during my internship. I also would like to thank **Mr. Shihab Rahman** (Senior Software Engineer) and **Mr. Simanta Deb Turja** (Software Engineer) for guiding and training me in projects where I worked with different software technologies. I am grateful to all the seniors, intern-mates, and office staff who made me familiar with the cultures and customs of Cefalo.

I am grateful to those who are not listed for their ongoing constructive criticism, priceless recommendations, and assistance that allowed me to advance and acquire new abilities.

EXECUTIVE SUMMARY

The goal of this internship report is to document the specifics of my practical training. The purpose of the paper is to specify and provide details on the research done, the projects finished, the experience gained, and the accomplishments made while serving as an intern.

The internship is a crucial component of the Bachelor of Science in Software Engineering program of the Institute of Communication and Information Technology, Shahjalal University of Science and Technology. This work term's objective is to offer insightful perspectives on the professional and industry-focused aspects of software engineering.

I was assigned to Cefalo Bangladesh Limited for six months so that I could apply the theoretical knowledge I had learned. One of Bangladesh's top software engineering companies is Cefalo Bangladesh Limited. There, I came across a knowledge-sharing environment that aided me in developing my technical depth. My soft skills were enriched by the professional but healthy setting.

Throughout my internship, I worked on two different projects, one of which was an individual project and the other a group one. The individual project taught me how can I learn a new technology effectively and implement it. Continuous suggestions from my seniors helped me to improve my code quality. The group project which I worked on introduced me to the R&D aspects of Software Engineering. Here we had to build a product from scratch. I have improved my problem-solving abilities in the area of software engineering because of this R&D project which taught me how to work as a team.

During this time, I faced both technical and non-technical difficulties. But in the end, I realized that the learning curve has a higher slope. This internship not only helped me develop my technical skills, but also my communication skills.

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CHAPTER 1

INTRODUCTION

An internship is a professional learning experience that offers meaningful, practical work related to a student's field of study or career interest. An internship gives a student the opportunity for career exploration and development, and to learn new skills. It offers the employer the opportunity to bring new ideas and energy into the workplace, develop talent and potentially build a pipeline for future full-time employees. Usually, an Internship is offered to undergraduates or newly graduated. Internships are usually part-time if offered during a university semester and full-time if offered during the vacation periods.

The Bachelor of Science in Software Engineering program at IICT, SUST offers its students the chance to complete a six-month internship as a requirement for graduation in the 7th semester. To stay current with the most recent software trends, IICT, SUST consistently places a strong emphasis on industrial orientation in academic study. The internship adds a lot of value to individual skills and experiences. IICT, SUST expects feedback from the industry and the students. This document is an opportunity to provide feedback to IICT, SUST.

This section is divided into several categories. These categories are Objectives, scope, limitations, etc.

1.1 OBJECTIVES

There are certain goals for this report. This report aims to highlight my accomplishments, project involvements, professional development, an overview of Cefalo, and my experiences while an intern there. The upcoming batches will also be given guidance on how to get ready for the working world from this. It will also assist me in analyzing my strengths, weaknesses, opportunities, and threats.

1.2 SCOPE

This paper provides an overview of the challenges I encountered while working for Cefalo Bangladesh Limited. Without violating confidentiality, it also offers a general overview of the company and its culture. This report will provide a quick summary of my training experience with Cefalo Bangladesh Limited and the development of my technical knowledge. It will aid in the preparation of new learners for the software industry in Bangladesh and allow them to avoid misconceptions regarding the key technologies Cefalo uses.

1.3 METHODOLOGY

The report is prepared using a methodical process that begins with the very first task and ends with the writing of my final report. Finding the right information, analyzing it, determining the results, and presenting it systematically to highlight the key aspects were essential. Further explanation of the technique used in this report's overall approach is provided.

1.3.1 SELECTION OF THE TOPICS

I have divided the whole report into three main categories including the workplace details, my professional growth, and my self-assessment. Depending on these categories I have selected the topics of the report.

1.3.2 SOURCES OF THE DATA

1.3.2.1 PRIMARY DATA

Primary data came from my practical experience while I was an intern. Another significant source of primary data was the interaction with my team and other employees. Another source was participating in various internal events.

1.3.2.2 SECONDARY DATA

- Documents provided by the office
- Website of Cefalo Bangladesh Limited
- Websites of Clients
- Internet

1.4 LIMITATIONS

There are a few restrictions that have an effect on the report. Due to Cefalo's global policies, some of the information cannot be shared outside of the workplace. It is not feasible to detail every aspect of my experience there because I have only discussed what I learned from this company and what feedback I received from my team and coworkers in my report. My experiences from 15 September 2021 to 15 March 2022 are the basis of this report.

CHAPTER 2

COMPANY PROFILE

This chapter places a strong emphasis on an overview of Cefalo, what it does, its workflow, employment, training, and leisure pursuits, as well as its operations, customers, partners, and management profile.

2.1 OVERVIEW OF CEFALO

Cefalo is a software development and IT service provider company with its headquarters in Oslo, Norway, and a software development center in Dhaka, Bangladesh. As an extension to European organizations for the creation and maintenance of IT systems, it customizes scrum and supports or maintains teams. It has extensive experience in project management, offshoring, and multinational projects. BASIS Outsourcing Awards are given to the organizations considering their Growth in recent years, Export volume, Innovation & Value addition, and Future expansion plans of the company. Cefalo received this award four consecutive times in the years 2013, 2014, 2015, and 2020.

In August 2010, Cefalo Bangladesh Ltd. registered with RJSC. In January 2011, it first went into operation. Only 7 people made up the team in February 2011. In September 2014, it increased to have more than 50 members. There are now more than 170 members here in 2022, and more are being sought after. Additionally, the turnover rate is relatively low.

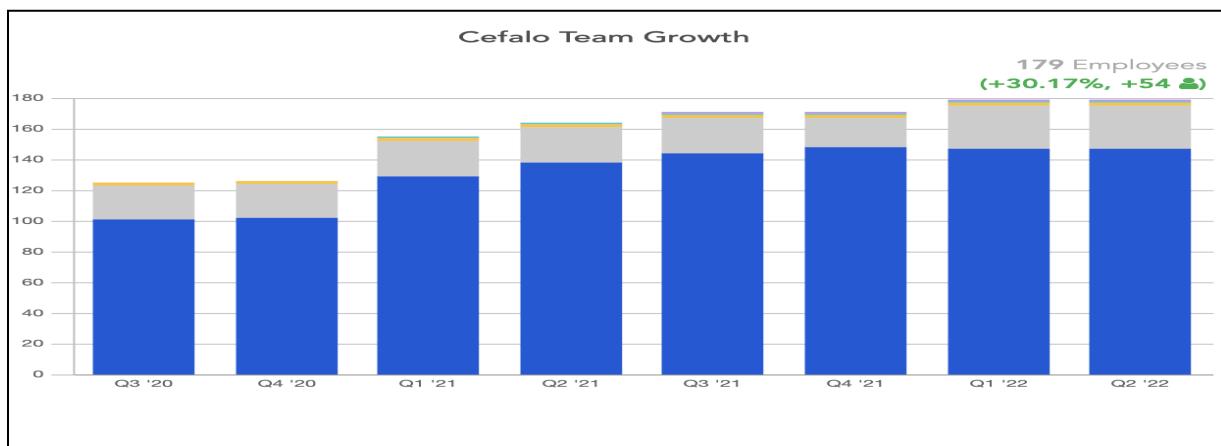


Figure 1 : Cefalo's Growth

2.2 MANAGEMENT

Cefalo's Managing board consists of six members. They are



PER EINAR MYKLEBUST

CEO & Co-founder

Oslo Office



FERDOUS MAHMUD SHAON

Managing Director

Dhaka Office



TOM HANDEGÅRD

CTO & Co-founder

Oslo Office



JENS WAHLBERG

Sales & Marketing Manager

Oslo Office



MORTEN KROGH-MOE

Board Member & Co-founder



PETTER IRGENS GUSTAFSON

COO

Oslo Office

Figure 2 : Cefalo Management

2.3 WHAT CEFALO DOES

Cefalo provides project management and technical consulting for the software, media, and financial industries. It creates and keeps up client systems. It offers a web-based CMS (Content Management Solution). Additionally, it creates unique web and mobile applications. The creation of custom web applications is based on enterprise content management systems (CMS) such as Escenic, Polopoly, WordPress, DrPublish, DrEdition, etc. For a variety of platforms, including Android, iOS, and Windows, mobile applications are created. It offers automated and manual SQA (Software Quality Assurance) system integration. Additionally, It also offers solutions related to blockchain, artificial intelligence, and big data.

2.4 TOOLS & TECHNOLOGIES

Cefalo works on various tools and technologies. They have always adapted themselves to recent software technology and have been able to teach it to their employees through knowledge sharing and in-house schooling programs. One of Bangladesh's leading Object-Oriented Language-based software companies is Cefalo. Java and C# are therefore two of Cefalo's most popular programming languages. Javascript has recently become more well-known due to its rising demand on a global scale. Nowadays, receiving training in javascript-based technology is all but required for every new hire. Following are some of their used tools :

Java	Java SE, Java EE, Spring, SpringBoot, Hibernate, Maven, Gradle
C# / ASP .NET	C#, ASP .NET MVC, Web API, Entity Framework, WCF, WPF
Javascript	JavaScript, ES6, Angular, React, Vue, Node.js, Express.js, Gulp, WebPack
Mobile	Kotlin, Swift, Objective-C, React Native, Flutter, NativeScript
Web	PHP, Laravel, WordPress, Drupal, Python, Django, Ruby on Rails
Database	PostgreSQL, MySQL, MsSQL, MongoDB, Solr, Elastic
DevOps	AWS, Azure, OpenShift, Gradle, Jenkins, Redis, Varnish, Docker, Kubernetes, Ansible, Puppet
Industry 4.0 Technologies	AI, Machine Learning, Deep Learning, Big Data, IoT

Figure 3 : Technology Stack At Cefalo

2.5 CEFALO WORKFLOW

Three main teams can be identified in Cefalo's working process. The management team, onshore in-house team, and offshore team are them. The general functioning method is provided below:

- **Management team:** The management group is in charge of keeping the entire office in an excellent state. It keeps an eye on the employees, determines what they need and gives it to them, keeps track of their attendance, and does other HR-related duties.
- **Onshore in-house team:** Actually, this group represents the client. This team is in charge of compiling the requirements and other project-related workers. The project owner, system architect, and designer typically make up an in-house

on-shore team. It occasionally also has a system developer on staff who collaborates with the offshore team.

- **Offshore team:** The primary developer team is the offshore team. The scrum master, the system developer, the architect, and the test/QA are members of this team. The offshore and onshore teams interact virtually every day during a scrum meeting. The developers had to each give an update on the work they had achieved since the last meeting. Following the status report, they will talk about the next steps in system development.

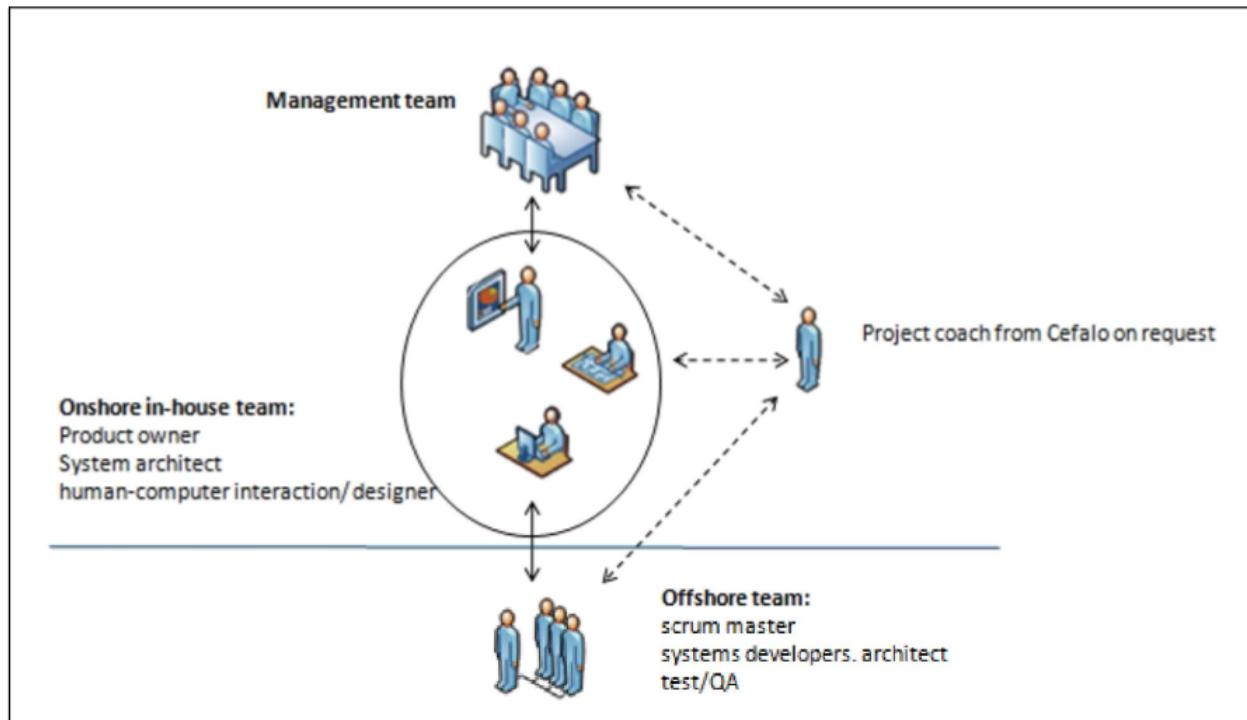


Figure 4: Cefalo's Workflow

2.6 CUSTOMERS & PARTNERS

Since Cefalo is a Norwegian business, the majority of its customers are from Europe and Norway. The names of a few of the top clients and partners are listed in the following figure:



Figure 5 : Cefalo's Partners

2.7 EMPLOYMENT FACILITIES

The workplace at Cefalo is pleasant, and there is an excellent work-life balance. A total of 8 working hours must be put in by both employees and full-time interns. Cefalo has an accommodating work schedule. Between 8:00 and 10:00 am is when you can enter. After eight hours of work, one is free to leave the office permanently. Employees are required to work 5 days a week, Monday through Friday. There are several adjustments to this basic routine throughout the month of Ramadan, though. A casual and informal dress code is also observed in Cefalo. It also keeps any holidays that the government has declared. Additionally, an employee is entitled to 2 weeks of paternity leave, 6 months of maternity leave, and 3 weeks of paid time off each year. I am given 10 days of paid leave because I am completing a 6-month internship program. Cefalo offers competitive compensation along with yearly performance evaluations.



Figure 6 : Anniversary Gifts By Cefalo

At the workplace, Cefalo offers breakfast, lunch, and snacks. Additionally, there are always-available refreshments like ice cream, coffee, tea in a variety of flavors, and cold drinks. Most critically, there is access to clean drinking water supplies here. These are all free of charge. Additionally, Cefalo offers the chance to work both onshore and remotely for European clients. Additionally, it offers in-house training, international training, traveling, and grooming.

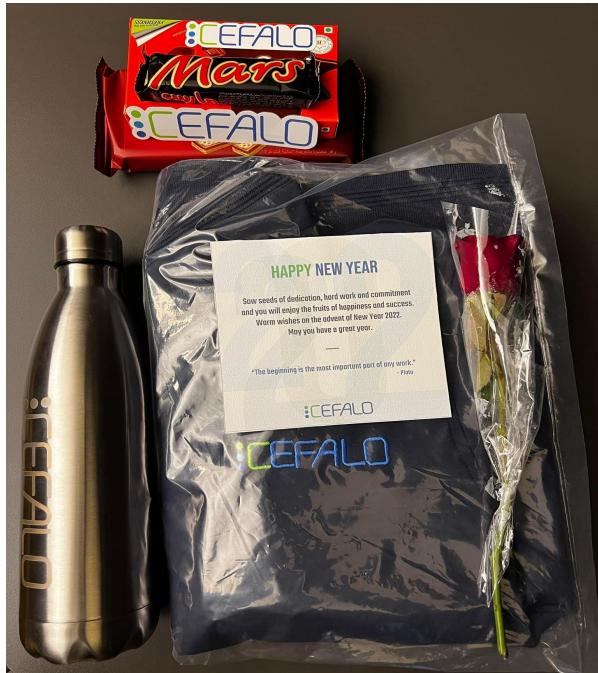


Figure 7 : New Year Gifts By Cefalo



Figure 8 : Eid Gifts By Cefalo

2.8 INHOUSE TRAINING

Cefalo offers its employees a variety of training opportunities. It offers two different types of certification programs:

1. OCJP, Microsoft Certification, and Zend.
2. Scrum Master Certification, PMP.

Additionally, it offers internal knowledge-sharing workshops and training in English communication. Additionally, technical courses are occasionally offered at a Cefalo school. Exams, assignments, and weekly classes are held after office hours. An official certificate is given once the course has been completed.

2.9 ACTIVITIES

Cefalo engages in a range of CSR endeavors. Cefalo proudly supports and donates to the JAAGO Foundation. JAAGO is a nonprofit organization that provides more than 1600 underprivileged kids with free education. With the aid of JAAGO, the donation is used to meet the educational needs of the country of Bangladesh's less fortunate children. The 2019 SUST Tech Fest included it as a major sponsor. Cefalo recently served as the platinum sponsor for AUST IUPC 2022. Additionally, Cefalo attends several technical meetups, such as JUGBD (Java Users Group Bangladesh), PHP Experts, Code Project, Global Azure Boot Camp, etc.

2.10 RECREATION



Figure 9 : BBQ Night 2022

Cefalo plan numerous events. It competes in inter software company contests including football, cricket, badminton, and table tennis. On various occasions, it also plans a signature lunch, a company dinner, and various cultural events. On working days, there is an indoor gaming area open from 5 pm to 9 pm. Cefalo organized a cultural event and barbecue night for this year (2022). Together with other Cefalo employees, we marked this momentous event. Cefalo organizes an annual office tour as well.



Figure 10 : Intra Cefalo Cricket Tournament



Figure 11 : Intra Cefalo Football Tournament

2.11 HUMAN RESOURCE

About 180 people work for Cefalo. They intend to hire more people. Every year since its inception, Cefalo's resources and production have increased. Cefalo constantly strives to hire the best. They have a special hiring procedure that includes a super talent program. They also place a strong emphasis on training and educational resources to keep their employees current with emerging technology.

2.12 RECRUITMENT AND SELECTION

Cefalo recruits from the following sites -

1. Job Sites (BD Jobs)
2. Cefalo Website (<https://www.cefalo.com/career>)
3. Facebook Page (<https://www.facebook.com/cefalobangladesh/>)
4. LinkedIn Page (<https://www.linkedin.com/company/cefalo-as/>)
5. Directly from renowned universities.
6. References from existing employees and networks.
7. Email
 - a. For any query: mail@cefalo.com
 - b. For job query or resume: jobs@cefalo.com

Interview process at Cefalo is a little complex. It consists of -

1. CV Screening
2. Phone Interview
3. Technical Assignments (and can also include written tests)
4. Face to Face discussion (Communication in English)
5. Technical Interview
6. HR Discussion
7. Client Interview

CHAPTER 3

INTERNSHIP ACTIVITIES

The main objective of internship programs is to acquaint students with the existing software engineering industry. I've worked hard to learn from these software projects and gleaned useful insights into real-world situations. While working on these projects, I learned about several new technologies that I was previously unaware of. I had to exert myself and broaden my knowledge as a result. It enabled me to expand my boundaries.

Probably, Cefalo has the most organized training program for interns in Bangladesh's software engineering sector. My internship training program may be broken down into three main stages:

- Abstract Stage
- An Individual CRUD App Project
- A Real-World Group Project From Scratch

3.1 ABSTRACT STAGE

I had to research a variety of issues relating to HTTP and REST throughout this phase. These topics included HTTP Methods, Headers, Status Codes, Caching, Cookies, CORS, RESTFUL API, Richardson Maturity Model, etc. **Shihab Rahman** (Senior Software Engineer) and **Simanta Deb Turja** (Software Engineer) were our mentors throughout this stage. We had two meetings weekly where we discussed the topics we were given prior to the meeting and our mentors were helpful in explaining a subject to us. I am also thankful to my fellow intern-mates for helping me in understanding various topics. Topics That we covered:

3.1.1 HTTP OVERVIEW

HTTP is an asymmetric request-response client-server protocol. An HTTP client sends a request message to an HTTP server. The server, in turn, returns a response message. In other words, HTTP is a pull protocol, the client pulls information from the server (instead of the server pushing information down to the client). HTTP is a stateless protocol. In other words, the current request does not know what has been done in the previous requests. HTTP permits negotiating of data type and representation, so as to allow systems to be built independently of the data being transferred.

3.1.2 HTTP METHODS

HTTP defines a set of request methods to indicate the desired action to be performed for a given resource. Some of the common HTTP methods are :

GET: fetches entity/entities.

POST: creates entity/entities.

DELETE: deletes entity/entities

PATCH: update one or more specific attributes of entity/entities

3.1.3 HTTP HEADERS

let the client and the server pass additional information with an HTTP request or response. Some of the HTTP Headers are -

Expires: The date/time after which the response is considered stale.

Etag: A unique string identifying the version of the resource

Accept: Informs the server about the types of data that can be sent back.

Cookie: This contains stored HTTP cookies previously sent by the server with the Set-Cookie header.

3.1.4 HTTP STATUS CODE

HTTP response status codes indicate whether a specific HTTP request has been successfully completed. Some of the Common HTTP Status Codes are:

- **200 OK**
- **301 Moved Permanently**
- **404 Not found**
- **502 Bad Gateway**

3.1.5 CACHING

The HTTP cache stores a response associated with a request, and reuses the stored response for subsequent requests. There are several advantages to reusability. First, since there is no need to deliver the request to the origin server, then the closer the client and cache are, the faster the response will be. The most typical example is when the browser itself stores a cache for browser requests. Also, when a response is reusable, the origin server does not need to process the request — so it does not need to parse and route the request, restore the session based on the cookie, query the DB for results, or render the template engine. That reduces the load on the server.

3.1.6 COOKIES

An HTTP cookie (web cookie, browser cookie) is a small piece of data that a server sends to a user's web browser. The browser may store the cookie and send it back to the same server with later requests. Typically, an HTTP cookie is used to tell if two requests come from the same browser—keeping a user logged in, for example. It remembers stateful information for the stateless HTTP protocol.

3.1.7 CORS

Cross-Origin Resource Sharing (CORS) is an HTTP-header-based mechanism that allows a server to indicate any origins (domain, scheme, or port) other than its own from which a browser should permit loading resources. CORS also relies on a mechanism by which browsers make a "preflight" request to the server hosting the cross-origin resource, in order to check that the server will permit the actual request. In that preflight, the browser sends headers that indicate the HTTP method and headers that will be used in the actual request.

3.1.8 REST API

REST defines a set of architectural principles by which you can design Web services that focus on a system's resources, including how resource states are addressed and transferred over HTTP by a wide range of clients written in different languages. If measured by the number of Web services that use it, REST has emerged in the last few years alone as a predominant Web service design model. A concrete implementation of a REST Web service follows four basic design principles:

- Use HTTP methods explicitly.
- Be stateless.
- Expose directory structure-like URIs.
- Transfer XML, JavaScript Object Notation (JSON), or both.

3.1.9 RICHARDSON MATURITY MODEL

The Richardson Maturity Model is a way to grade your API according to the constraints of REST. The better your API adheres to these constraints, the higher its score is. The Richardson Maturity Model knows 4 levels (0-3), where level 3 designates a truly RESTful API.

These were some of the common topics that we covered in the abstract phase and learned about.

3.2 INDIVIDUAL CRUD APP PROJECT

Through handling Cross-Origin Resource Sharing with a frontend project to use the API, this project incorporates the idea of a backend framework and API communication. In this project I had to built a CRUD app based on Javascript based technology. **Shihab Rahman** (Senior Software Engineer) and **Simanta Deb Turja** (Software Engineer) was my mentor for this project. This project was my only individual project during my internship in Cefalo Bangladesh Limited and It was named **DSABook**.

3.2.1 TOOLS AND TECHNOLOGIES

3.2.1.1 BACKEND

- **Nodejs** : A javascript Runtime
- **Expressjs** : A Nodejs Framework
- **MongoDB Atlas** : a NoSQL Cloud Database
- **Mongoose** : mongodb object modeling for node.js
- **JEST** : javascript testing framework
- **Sinon.js** : Standalone test spies, stubs and mocks for JavaScript. Works with any unit testing framework.
- **Postman**: Postman is an API platform for building and using APIs
- **Docker**: to take away repetitive configuration task for running it in machine and others
- **Git** : Git is a free and open source distributed version control system designed to handle everything from small to very large projects with speed and efficiency.
- **Heroku** : Heroku is a platform as a service (PaaS) that enables developers to build, run, and operate applications entirely in the cloud.

3.2.1.2 FRONTEND

- **React js** : A JavaScript library for building user interfaces
- **Material-UI** : A React UI framework

3.2.2 PROJECT VISUALIZATION

3.2.2.1 GET BLOGS

- Both types of users—unauthenticated and authenticated—can view the home page and click any blog to read it.
- Pagination** is another thing I have done. A user can therefore access any page by clicking on its number, and each page can hold a maximum of 6 blogs. This is a **GET** request.

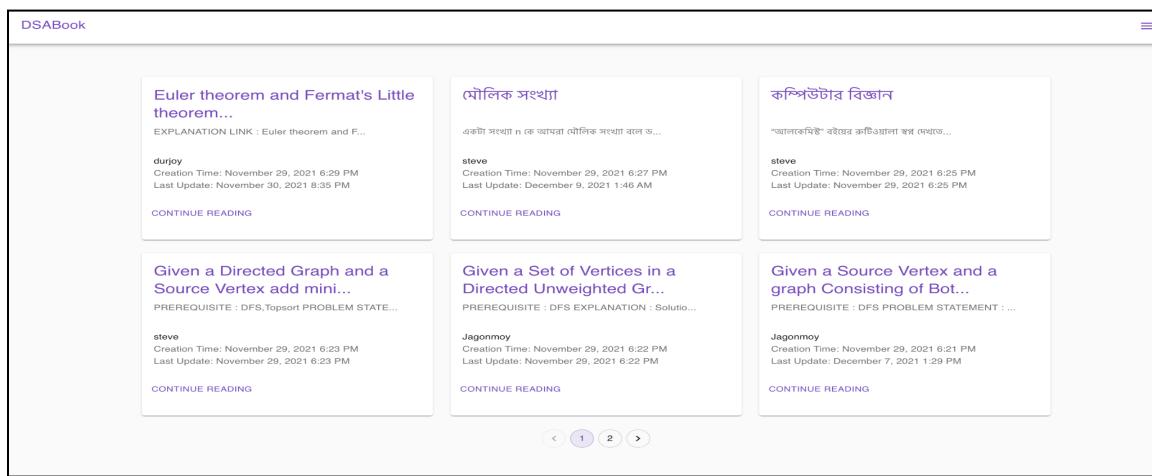


Figure 12 : Home Page Of DSABook

- An authenticated user can see his own blogs after clicking the **MY BLOGS** option from the dropdown which will appear after clicking the user's name from the top right corner.

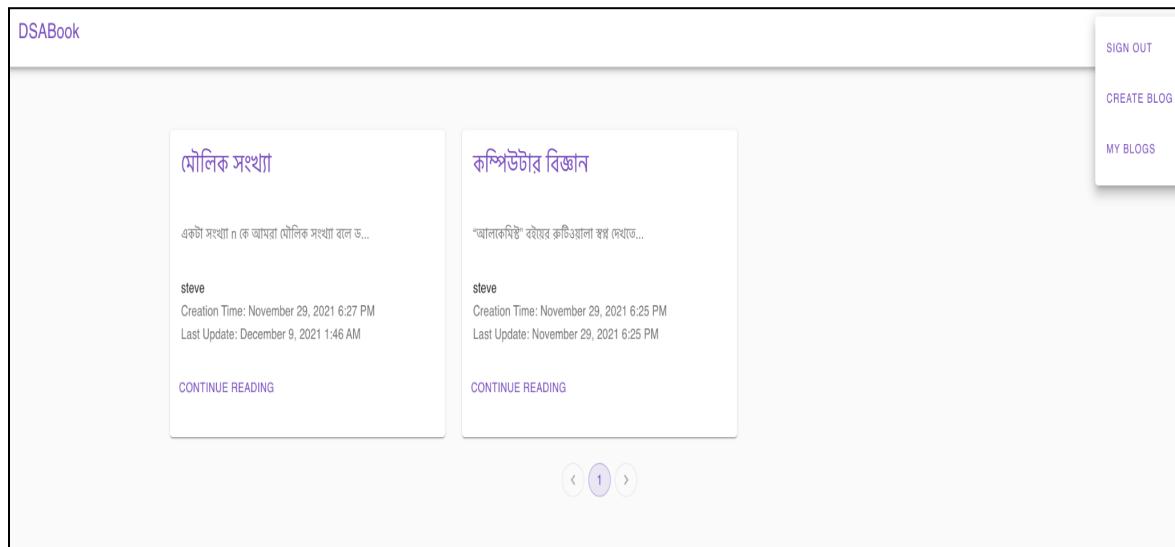


Figure 13 : Blogs Of A User In DSABook

3.2.2.2 UPDATE BLOG

- Any blog cannot be **edited** or **deleted** by a non-authenticated user. Even after being authorized, a user can only modify and delete his own blog.



Figure 14: Edit, Delete Icon Displayed For A User's Own Blog

- Upon clicking the **edit** icon , a Modal will appear.

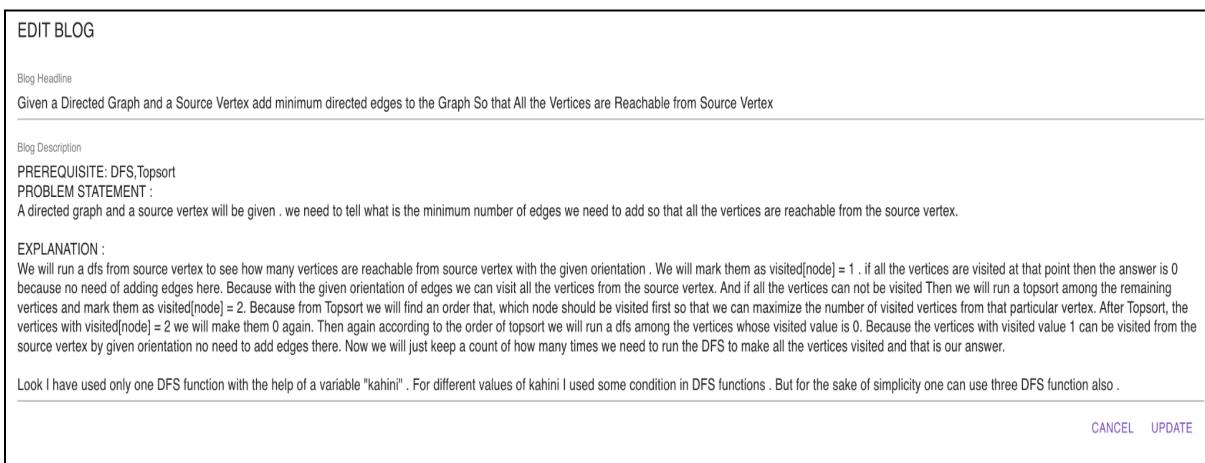


Figure 15: Edit Modal

- A popup titled **Blog Updated Successfully** appears after clicking the Update button. This is a **PATCH** request.

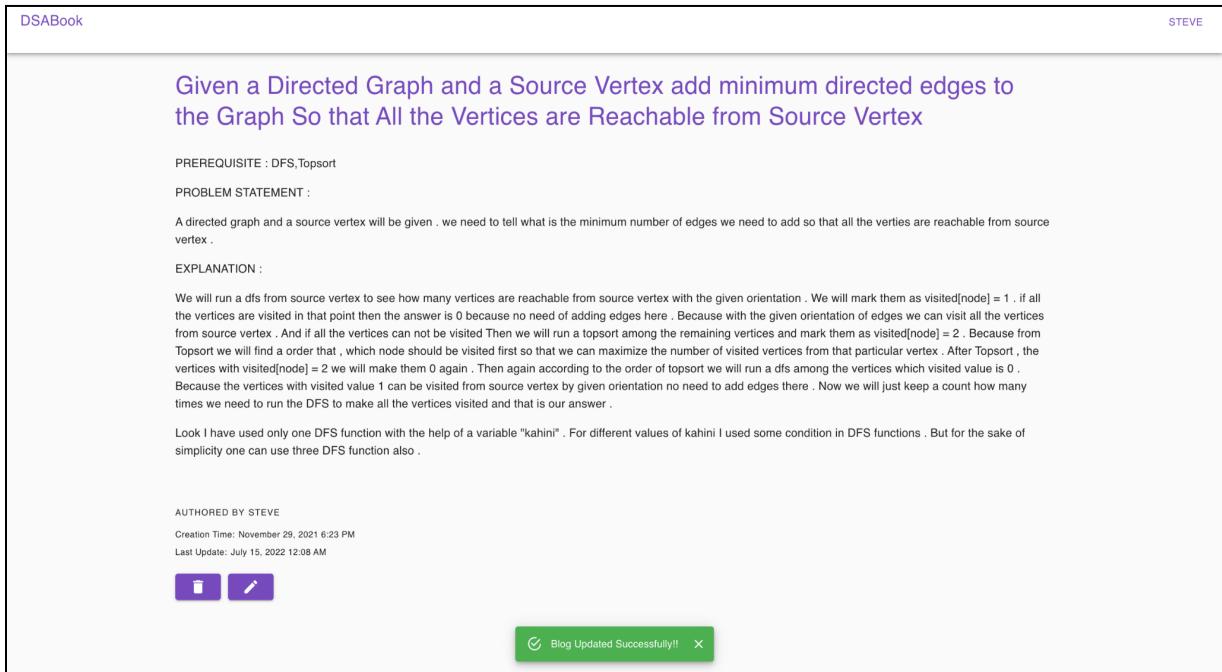


Figure 16: Pop Up After Blog Update

3.2.2.3 DELETE BLOG

- A warning modal will appear if the blog's author, an authenticated user, hits the **delete** icon.

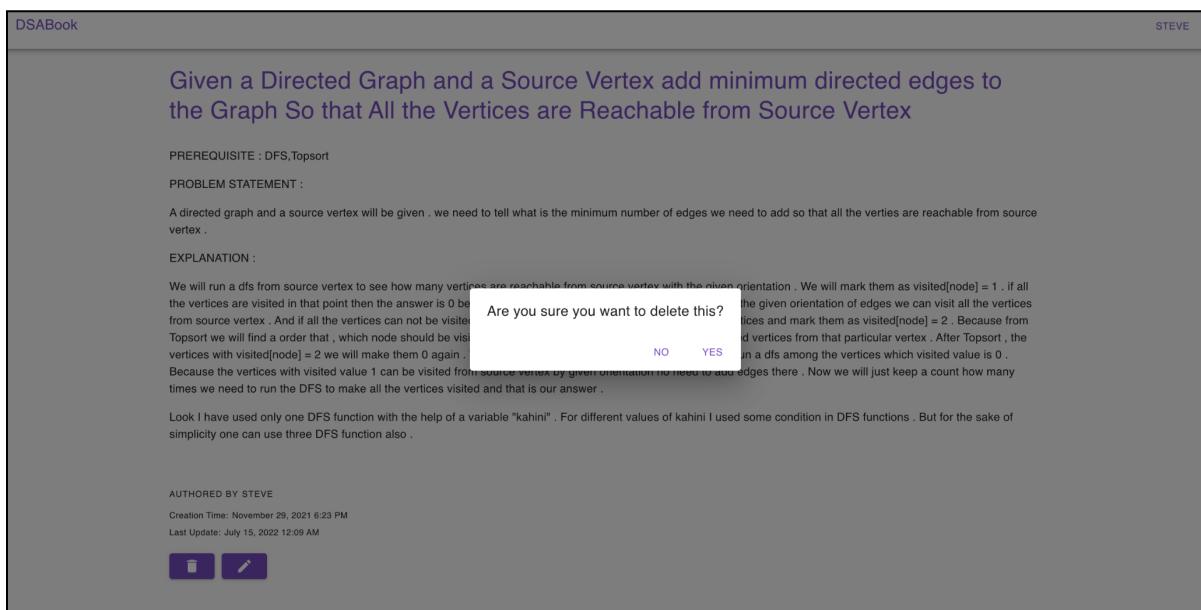


Figure 17 : Delete Warning Modal

- When the user selects **NO**, the modal window will close. However, users will be taken back to their home page and a pop-up message titled **Blog Deleted Successfully!** would show if they select **YES**. This is a **DELETE request**.

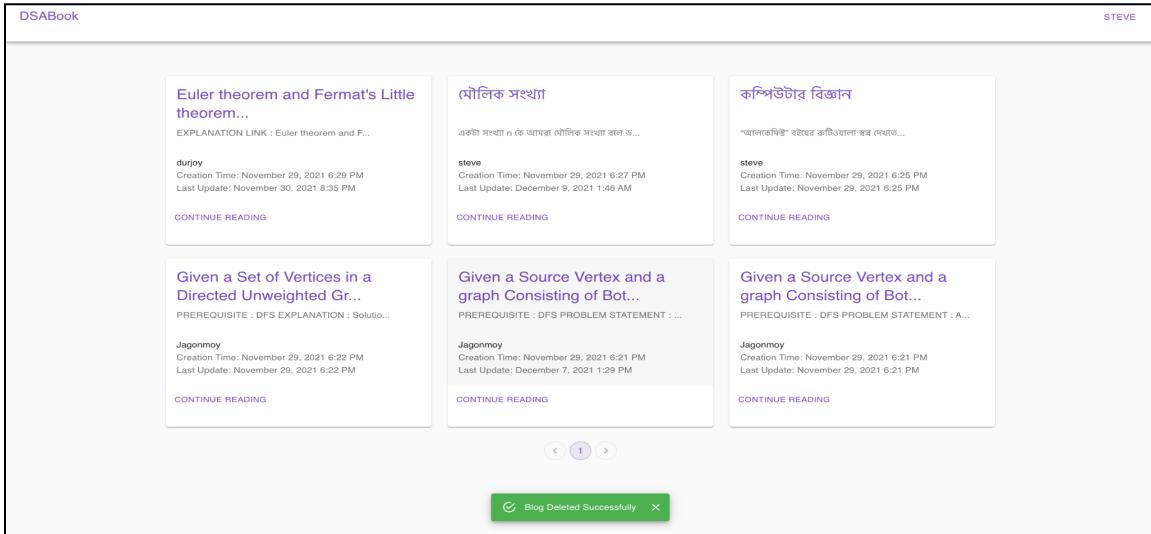


Figure 18 : Pop Up After Blog Delete

3.2.2.4 CREATE BLOG

- A blog can be created by an authenticated user. But for this, the blog title must contain at least five letters, and the blog description must contain at least ten. Unless it shows validation error. This is a **POST request**.

The screenshot shows the 'Add Blog' form. It has two main input fields: 'BIOG HEADLINE' and 'BIOG DESCRIPTION'. Below these fields is a purple 'ADD BLOG' button. A red validation message is displayed below the button: 'Blog Creation Unsuccessful!! Headline must have atleast 5 letters'. The overall design is simple and functional, focusing on user input and validation feedback.

Figure 19: Validation Error While Creating Blog

3.2.2.5 SIGN IN

- A user can log in using the correct email address and password. Except when an error message stating **Sign in Unsuccessful Wrong Email or Password!** appears.

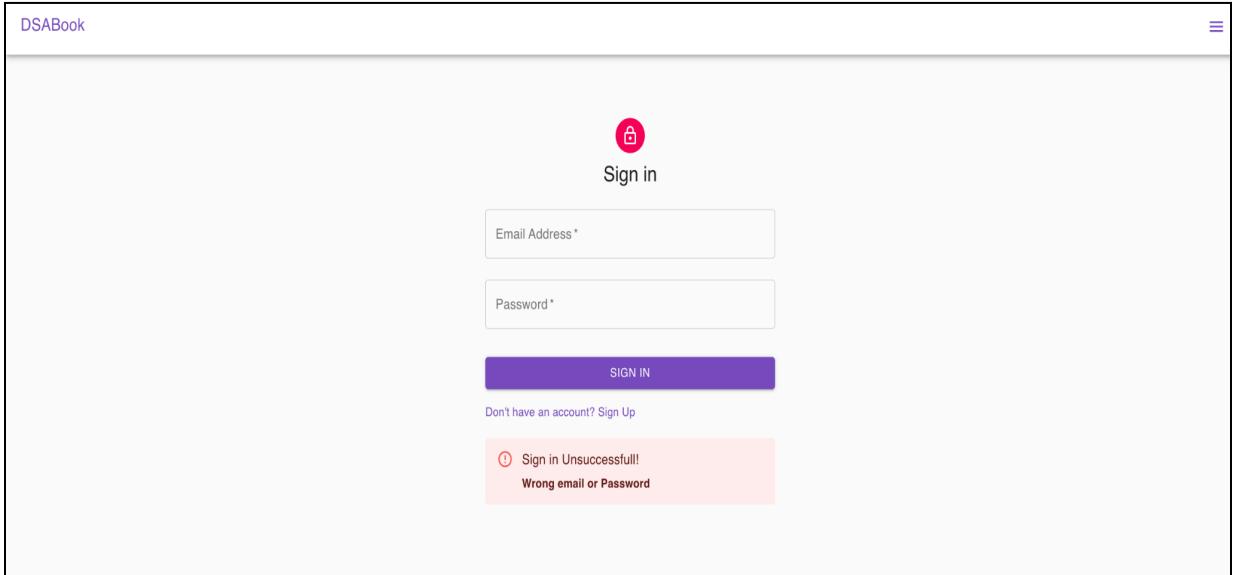


Figure 20: Validation Error While Signing In

- When signing in successfully, the user is taken to their home page and sees a pop-up message that reads **Signed in Successfully!!** This is a **POST** request

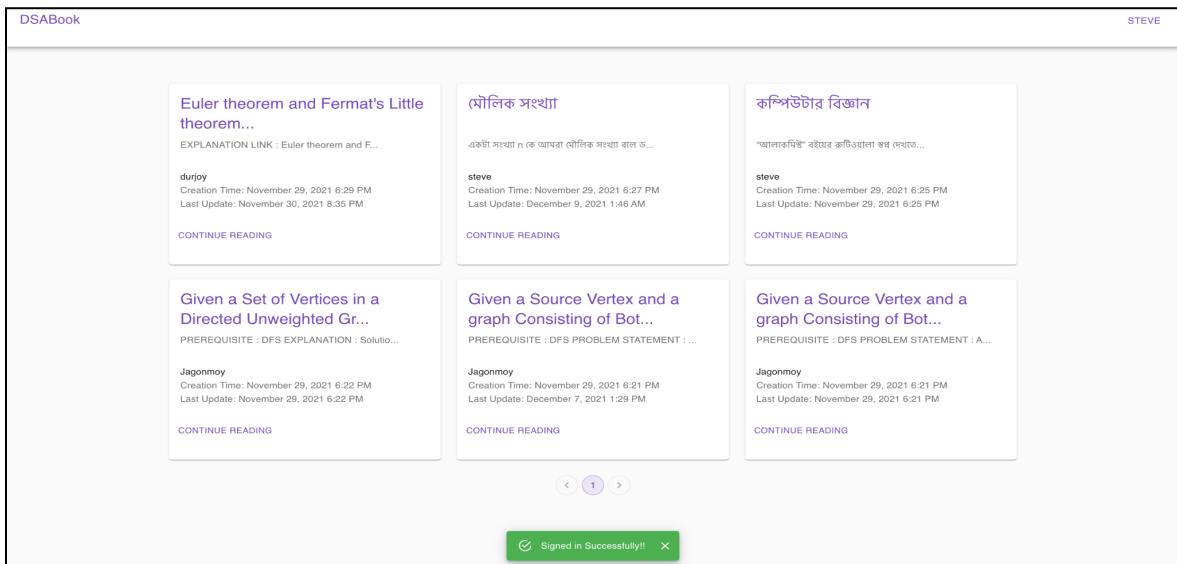


Figure 21: Pop Up After Signing In

3.2.2.6 SIGN UP

- A user must overcome all validation failures before they can sign up. Validation requirements include :
 1. Name must be between 5 to 30 letters
 2. Username must be between 5 to 15 letters
 3. Email should be a valid email
 4. Password should be atleast 8 characters long
 5. Confirm Password should match with Password

If the requirement is not met, a matching error is displayed for each field.

The screenshot shows the 'Sign up' page of the DSABook website. At the top center is a red circular icon with a padlock symbol. Below it is the word 'Sign up'. There are five input fields: 'Name *' containing 'Rahim', 'User Name *' (empty), 'Email Address *' containing 'rahim.com', 'Password *' (empty), and 'Confirm Password *' (empty). Each of the empty fields has a red error message above it: 'Username must be between 5 to 15 letters' for the User Name field, 'Email should be valid' for the Email Address field, and 'Password must be at least 8 characters' for both the Password and Confirm Password fields. At the bottom left is a purple 'SIGN UP' button, and at the bottom right is a link 'Already have an account? Sign in'.

Figure 22: Validation Error While Signing Up

- If all the criteria are met, the user will be taken to the Sign-In page and a pop-up message titled **Account Created Successfully** will appear!

The screenshot shows the 'Sign in' page of the DSABook website. At the top center is a red circular icon with a padlock symbol. Below it is the word 'Sign in'. There are two input fields: 'Email Address *' containing 'karim' and 'Password *' containing '*****'. At the bottom left is a purple 'SIGN IN' button, and at the bottom right is a link 'Don't have an account? Sign Up'. At the very bottom of the page, there is a green rectangular notification bar with a checkmark icon and the text 'Account Created Successfully' followed by a close button 'X'.

Figure 23: Pop Up After Signing Up

3.2.2.7 PAGE NOT FOUND

- When a user accesses a route that doesn't exist, a page displaying **404 - Not Found** will appear.

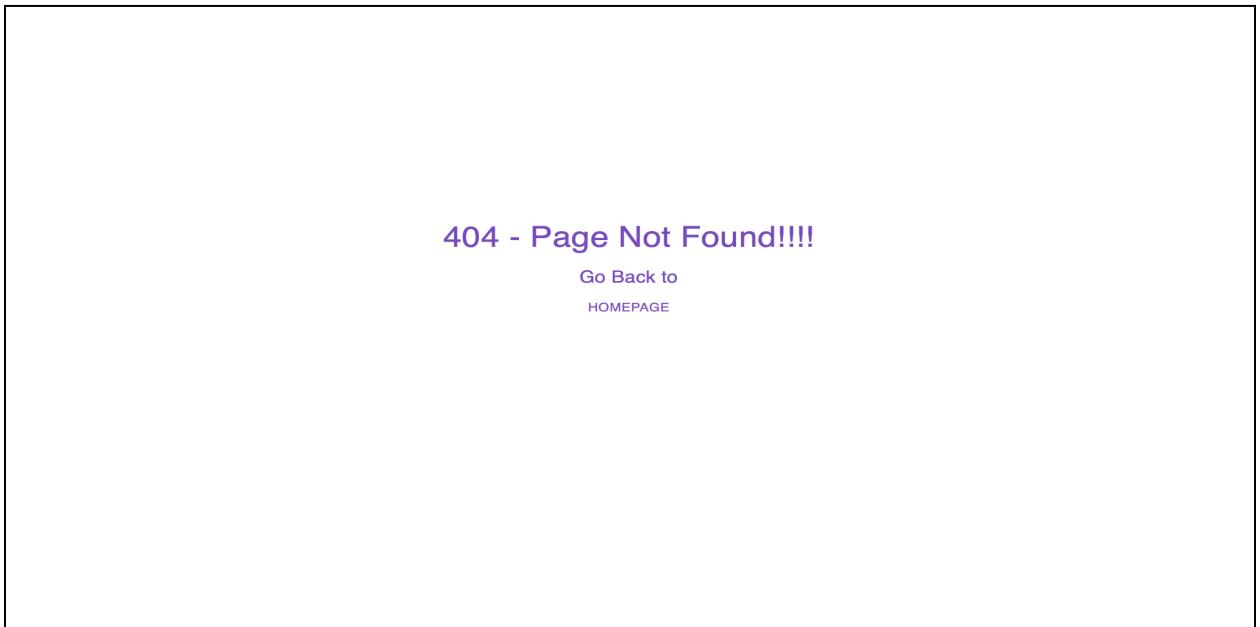


Figure 24: Page Not Found

3.2.3 BACKEND FEATURES AND PROJECT STRUCTURE

- I used JWT authentication for authentication purposes, and I supplied the JWT token for a logged-in user via a cookie.
- I've used content negotiation, so I can choose whether to receive data in XML or JSON format for each return from an API.
- For every field that may be used, I separately developed blog and user validations.
- I've put concepts like service, dao, dto, middleware, validations, etc. into practice.
- The backed project's data flow is:

server.js → app.js → routes → middleware → validation → controller ↔ service ↔ dao ↔ model ↔ dto

- What file or folder is in care of what :
- 1. server.js** : responsible for setting up database connection , port number and host .
 - 2. app.js** : responsible for segregating routes based on the API endpoint that has been accessed and linking our app to the frontend.
 - 3. routes**: Each API request is divided into subcategories and passed to the middleware separately.
 - 4. middleware**: responsible for checking the JWT token to determine whether an API call is allowed or not.
 - 5. validation** : responsible for validating blog creation,signin ,signup
 - 6. controller** : responsible for sending response to frontend . It passes the API request to service and then returns the modified data from service
 - 7. service**: a service class is a designated group of tasks with comparable performance objectives, resource needs, or business value.
 - 8. dao (data accessed object)** :This class is responsible to get data from a data source which can be database / xml or any other storage mechanism. In other words, If I want to use more than one database I can use a separate dao class for that particular database by extending the main one.
 - 9. model** : responsible for designing the schema.
 - 10. dto (data Transfer Object)** : responsible for putting responses from all databases into a standard format. Since I might be using both MySQL and MongoDB for my project, the response to this particular API request shouldn't reveal which database I am using.
 - 11. tests**: responsible for unit testing controller,service and dao class .
 - 12. utils**: responsible for producing JWT tokens and facilitates content negotiation.
 - 13. view**: responsible for viewing every single permitted API request in an HTML page.

```
✓ CEFALO-INTERNSHIP-NODEJS [GITHUB]
  > controller
  ✓ dao
    > auth
    > blog
    > user
  > dto
  > middleware
  > models
  > routes
  > service
  ✓ tests
    > controller
    > dao
    > service
  > utils
  > validation
  > views
  ➔ .dockerignore
  ➔ .gitignore
  JS app.js
  ➔ docker.md
  ➔ Dockerfile
  {} package-lock.json
  {} package.json
  ⓘ README.md
  JS server.js
```

Figure 25: Backend Project Structure

3.2.4 FRONTEND FEATURES AND PROJECT STRUCTURE

- Created two separate folder for components and pages. Suppose there is a component which I need to use for multiple pages. No need to rewrite code for every pages . I can use it whenever I need the component .
- Implemented useState and useEffect whenever it was necessary.
- used axios for connecting frontend part of my application to backend.
- used several component from material-UI .
- used react-router for routing purposes.
- Implemented validations syncing with the response from backend.



Figure 26: Frontend Project Structure

3.2.5 CREATING DOCKER IMAGE AND DEPLOYMENT IN HEROKU

I now know how to build Docker images. For the backend and the frontend, I have distinct Docker images generated. These Docker images have been uploaded to DockerHub by me. I am familiar with the process of deploying a project to Heroku, and I have done so for both my frontend and backend projects.

3.2.5.1 DOCKER IMAGE AND HEROKU DEPLOYMENT OF BACKEND

- Docker image of backend in DockerHub : [Link](#)
- Deployment of backend in Heroku: [Link](#)

3.2.5.2 DOCKER IMAGE AND HEROKU DEPLOYMENT OF FRONTEND

- Docker image of frontend in DockerHub : [Link](#)
- Deployment of frontend in Heroku: [Link](#)

3.3 A REAL-WORLD GROUP PROJECT FROM SCRATCH

After finishing my own CRUD app project, my department's other two interns and I were given a task to do together. We were being mentored for this specific project by **Ferdous Mahmud Shaon** (Managing director) and **Simanta Deb Turja** (software engineer). The aim was to create a system that would allow a fixed organizational facebook user to automatically post messages, attachments, and media to Cefalo's facebook group from any public channel at Cefalo's Workspace on Slack if it contains any unique keyword (#fb). Because it integrates the Facebook and Slack APIs, the project is called **SlackBook**.

We can divide the whole workflow of **SlackBook** into 3 subcategories :

- Research regarding Slack API and Slack App configuration.
- Research regarding Facebook API and Facebook App configuration.
- Altering and improving data on the intermediary server we developed.

3.3.1 KEY FEATURES OF SLACKBOOK

- Can post plain messages from public channel of slack to facebook group.
- Can post messages containing link from public channel of slack to facebook group.
- Can post messages containing any sorts of files (doc,pdf,zip) from public channel of slack to facebook group.
- Can post multiple files and photos from public channel of slack to facebook group.
- Can post messages written in bold,italic,bolditalic,strikethrough,blockquote,codeblock any format possible in slack from public channel of slack to facebook group.
- Can have current server configuration and change it by simple commands.
- Can have current weather update by a simple command.

3.3.2 MY ROLE IN SLACKBOOK

Every member of the team contributed to each aspect of the project. My initial responsibility was to learn about the Facebook API. How to make a Facebook app, which endpoint to use for what function, and what credentials are required.

Then, gradually, I also began working on other project components. However, my primary responsibility was to resolve all of the problems with the Facebook API that we were experiencing, and I did my best to do so.

3.3.3 TOOLS AND TECHNOLOGIES

This Project doesn't have any frontend part . It is basically a intermediary server which connects facebook API and slackbook API . JavaScript, Node.Js , Express.Js were used for bulding this project.

3.3.4 CONFIGURING FACEBOOK APP , SLACK APP AND SERVER

- Created a slack app and configure manifest.yml file according to the need.
- Installed the slack app into the workspaced and the channel
- Created a mock user who will post in the facebook group .
- Created a facebook app under this user .
- Generated a access token with all the necessary permissions and then extended it.
- Configured the .env file according to the need
- Configured the SlackBook in Linux server and took all the necessary steps to keep the server always running.

3.3.5 DATA FLOW

- Events :

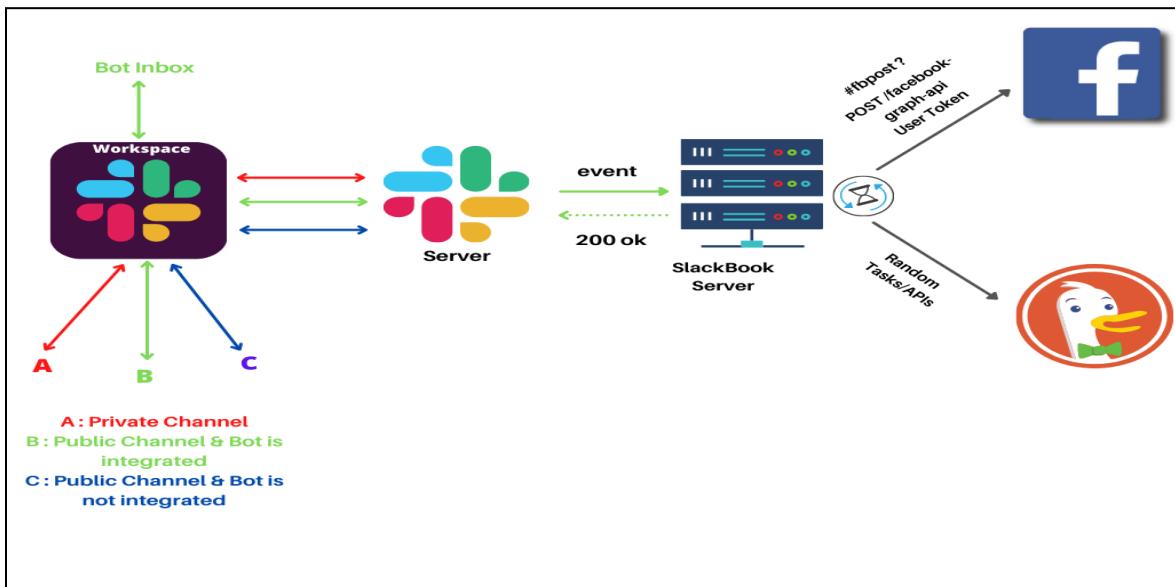


Figure 27: Event's Data Flow

Our Slack bot will be subscribed to bot inbox and public channel message events based on setup. The slack server will pass each communication to our SlackBook server. After some processing, our SlackBook server will post to the Facebook group.

- **Commands:**

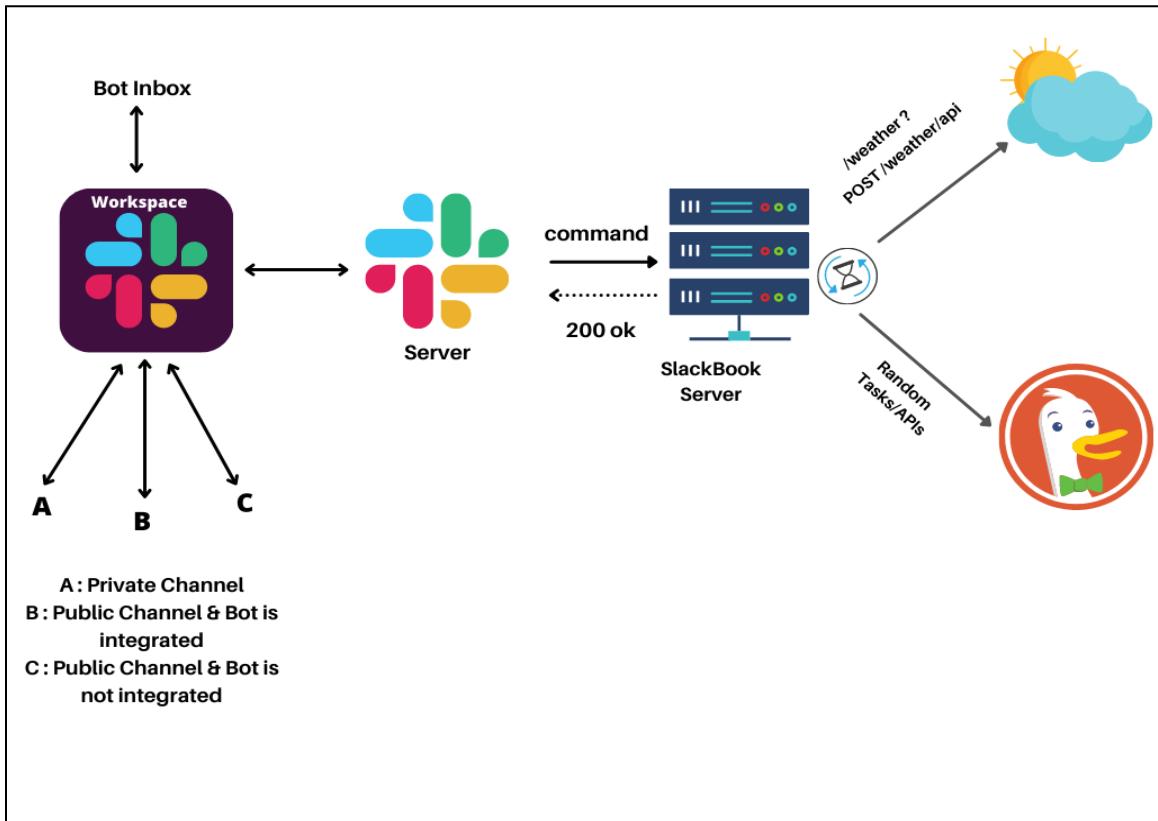


Figure 28: Command's Data Flow

If someone wishes to use certain API calls or take some other activity without sending a message in a public channel. Slack command subscription will assist you in this situation in order to create custom commands and carry out your desired tasks. In our situation, the /weather command is in charge of the current weather conditions in the vicinity of Cefalo. We also have commands that are exclusively accessible to admins, such as /getConfig and /setConfig. By using these instructions, they can modify the configuration and examine what it is currently.

3.3.6 DATA PROCESSING

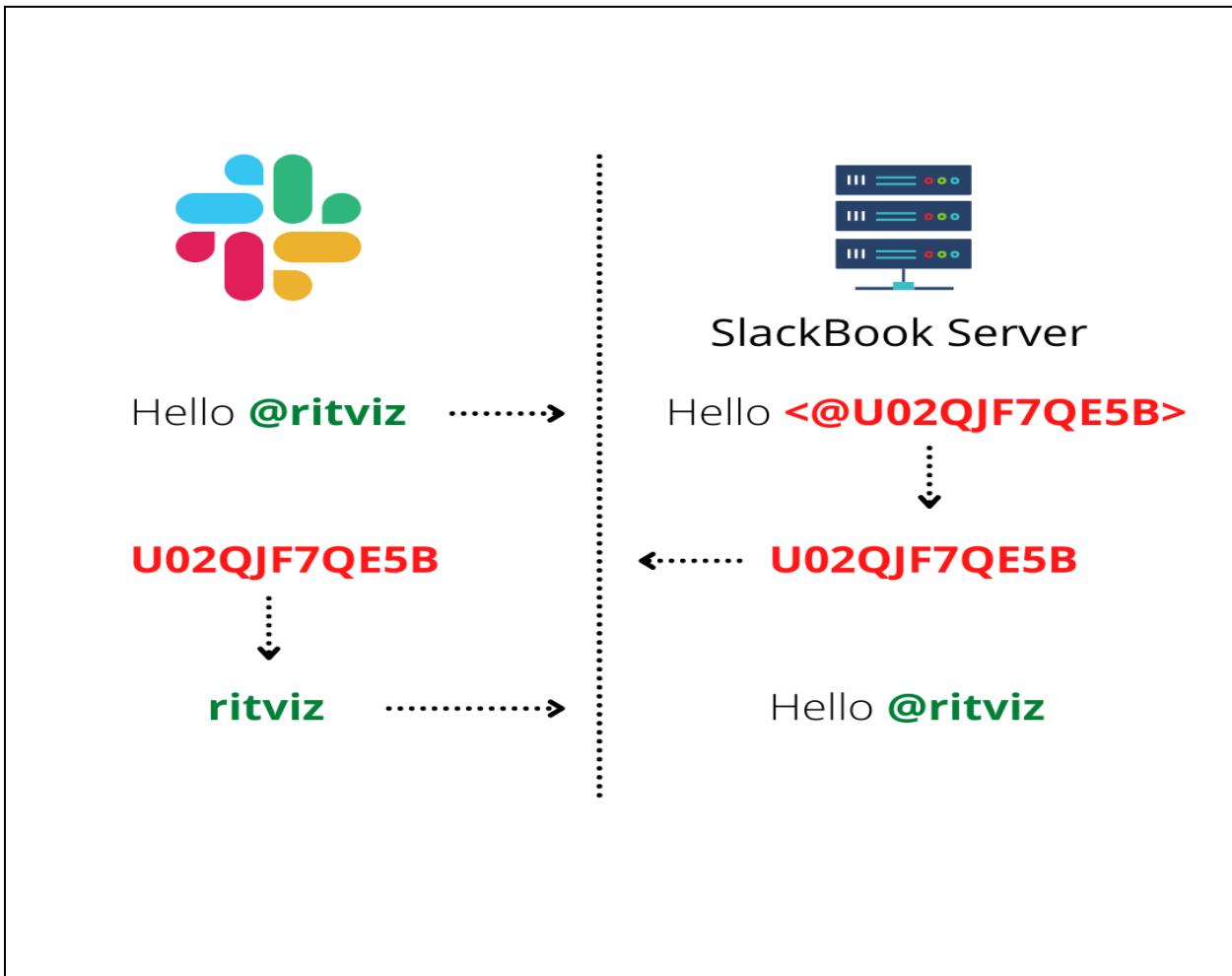


Figure 29: Extracting Username

To prepare the messages for use as credentials when contacting the Facebook API, we had to develop regex to extract links, mentions, bold, italic, strikethrough, codeblocks, and blockquotes from the messages that were obtained from Slack. We also had to concat user name so that people in facebook group can understand who is sending this messages from slack as there is only a fixed user who will post this messages to group.

3.3.7 POSTING DATA FROM SERVER TO FACEBOOK

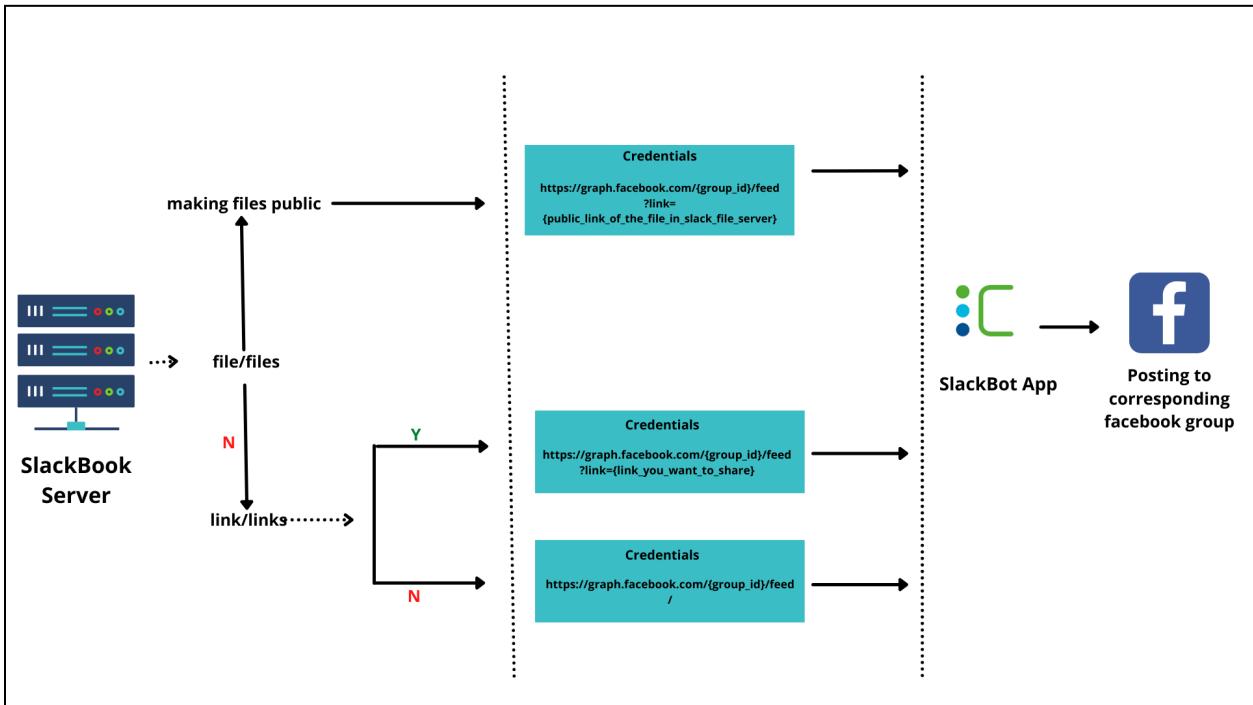


Figure 30: Data Flow From Slackbook Server To Facebook

- Using a specific Slack API, all files contained in the message are made public if any are present. If it contains many files, all of them—aside from the first—are attached to the message with links to their respective Slack servers because Facebook only permits sharing one file in preview mode. When the system has all the required credentials, it will access the corresponding Facebook API.
- If it is found to be empty of all files, a link check is performed. When there are several links, all but the first link are attached to the message. because only one link may be shared in preview mode on Facebook. The system will then access the appropriate Facebook API after receiving all the required credentials. If it doesn't contain any links, the required credentials will be used to access the relevant Facebook API.

CHAPTER 4

SELF ASSESSMENT

I will discuss all of the technologies and ideas that I discovered while completing each stage of my internship program in this part. How I overcame the challenges and how the trying circumstances enhanced both my technical and non-technical skills.

4.1 TECHNICAL LEARNING DURING THE ABSTRACT STAGE

- **Concepts:** HTTP and REST concepts and best practices which includes http methods, headers, status codes, Caching, Cookies, CORS, REST principle, Richardson Maturity Model etc.
- **Tools:** Chrome Dev Tools

4.2 TECHNICAL LEARNING DURING THE DSABOOK APP STAGE

- **Language :** JavaScript
- **Backend :** NodeJs ,ExpressJs
- **API Testing Tool:** Postman
- **Unit Test:** Jest,Sinon.Js
- **DevOps:** Docker, Heroku
- **Version Control:** Git
- **Frontend:** ReactJs, MaterialUI
- **Database:** MongoDB and Mongoose .
- **Operating System:** Linux

4.3 TECHNICAL LEARNING DURING THE SLACKBOOK APP STAGE

- Facebook API and How to integrate a Facebook App to a system.
- Slack API and How to Integrate a Slack App to a system
- Establishing an intermediate server to read Slack messages and send messages to Facebook
- Regex

4.4 NON-TECHNICAL LEARNING

- **Problem Solving Mindset:** Since I have engaged in competitive programming throughout my academic career, I believed that this is the only method to improve problem-solving abilities. However, encountering an issue during the software development process and then finding a solution changed my way of thinking. Whether it is successful or not, I believe that trying to add a new feature to a project has improved my problem-solving skills.
- **R&D Mindset:** While doing the group project R&D mindset has developed to a great extent. There were also instances where we had to test every combination from a range of sources in order to get an effective answer. During this internship, I came to the realization that Googling is an excellent skill to have as a software developer.
- **Learning a new Technology:** I believe I was able to figure out the ideal strategy for me to learn a new technology throughout my internship period. I would check to see if I need to master any prerequisites before I could start learning this specific technology. Choose a basic or major resource that I can use in conjunction with other resources. I was always seeking assistance from my mentors and my fellow interns anytime I ran across an issue. I would rather put what I had learned into practice. Instead of learning all the topics at once and wasting time, I will learn a topic while working on a project if I run into any issues connected to it.
- **Team-Work :** As I worked on a group project, Cefalo helped me cultivate a mindset for functioning in a team. It aided me in taking my part in the project seriously and learning how to support others in finding a solution.
- **Professionalism:** Everybody in Cefalo is in charge of their own jobs. Everyone is well aware of their objectives and is acting accordingly. This mentality has aided me in treating my assignment seriously and completing it by the deadline.
- **Knowledge Sharing:** We could seek for advice from our mentor in Cefalo, and they were eager to give us better direction and help. We could also ask other Cefalo members for assistance, and they were really helpful. Everyone at Cefalo was very eager to assist us.
- **Punctuality:** One of the key qualities needed to be a competent professional is punctuality. All of the members in Cefalo are very informed of the dates and times

of their meetings and other events. One of the main factors contributing to the development of this trait throughout the cefalo may be the adoption of Norwegian culture.

- **Communication:** Probably the most crucial trait for surviving in the corporate world is this one. It is practically difficult to advance as a software developer without good communication. My six-month offline internship helped me improve this trait. I was always eager to participate in any sporting or cultural events and could ask anyone from Cefalo for assistance with anything. We received a lot of appreciation for this characteristic during our departure. Since we were constantly eager to meet new people, almost all of the Cefalo employees knew us.
- **Self Reliance :** My personal project gave me the opportunity to improve my self-assurance. All intern had to report their progress at the status meeting. Because of this, I've been motivated to work more and take responsibility for my own actions.
- **Code Quality and Structure:** Because Cefalo adheres to a high level for software engineering, our code has periodically been evaluated, which has substantially improved the quality of our code and the structure of our project.

CHAPTER 5

CONCLUSION

5.1 CONCLUSION

Overall, my internship lasted six months. The internship program was one of the best experiences of my life. Cefalo follows Norwegian culture, which can contribute to the great workplace atmosphere there. Employees at Cefalo are frequently held accountable to no manager because the company practices macro management. It was fun to be honest and responsible with myself. My mentors were all incredibly helpful to me. I was able to enhance both my technical and soft skills during my stay at Cefalo.

Despite being an intern, I took part in a variety of rituals and events. I thought that when I first started working here, I would be treated differently from other employees, but I was shown to be mistaken. All employees receive equal treatment and accommodations. Breakfast, lunch, snacks, coffee, ice cream, and other nice amenities were offered to each of us. We were encouraged to take part in events like the BBQ party, intra-Cefalo futsal tournament, intra-Cefalo cricket tournament, intra-software badminton tournament, etc. just like other full-time employees.

The conversations I had with seniors and intern mates in the dining hall and on the balcony are what I miss the most about Cefalo. They have given me advice on my career, projects, and soft skills development. Their friendliness made it easy for me to become accustomed to the habits and cultures, and my hesitation vanished. Every day in the gaming area. Playing some games of table tennis and carrom would relieve all the stress after a long day of work. Through those games, I got to know many more Cefalo people, and we developed close relationships. The rooftop also has a place that is open. When we wanted some fresh air, we would go there.

Cefalo has a solid grasp of what corporate life is like on a worldwide scale. It is aware of worker satisfaction. They have always made an effort to maintain the global software engineering industry's standards. Most of its customers come from other countries. So it's a wonderful chance to get to know them. Additionally, it makes an effort to schedule training and knowledge-sharing sessions for its staff whenever necessary. It is, in my opinion, one of the greatest places in Bangladesh to launch a career as a software engineer, if not the best. In addition, since this was my first job, it will always hold a particular place in my heart and I will always think back on the memories I made while working here.

5.2 REFERENCES

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- Frontend of Individual Project :
<https://github.com/jagonmoy/Cefalo-Internship-ReactJs>
- Backend of Individual Project:
<https://github.com/jagonmoy/Cefalo-Internship-Nodejs>
- Live Frontend of Individual Project: <https://dsa-book-frontend.herokuapp.com/>
- Live Backend of Individual Project: <https://dsa-book-backend.herokuapp.com/>
- SlackBook Project: <https://github.com/RakibulRanak/SlackBook>