

Internship on Full Stack Software Engineering

BY

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This Report Presented in Partial Fulfillment of the Requirements for the
Degree of Bachelor of Science in Computer Science and Engineering

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APPROVAL

This Project/internship titled “**Internship on Full Stack Software Engineering**”, submitted by **Rafin Biswas**, ID No: **182-15-11539** to the Department of Computer Science and Engineering, Daffodil International University has been accepted as satisfactory for the partial fulfillment of the requirements for the degree of B.Sc. in Computer Science and Engineering and approved as to its style and contents. The presentation has been held on **3th June 2021**.

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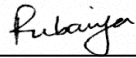
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We hereby declare that, this project has been done by us under the supervision of **Ms. Rubaiya Hafiz, Sr. Lecturer, Department of CSE** Daffodil International University. We also declare that neither this project nor any part of this project has been submitted elsewhere for award of any degree or diploma.

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ABSTRACT

In this internship period in my daily life, I have learned the concept of stack software engineering. To make a web application there are several programming languages, some of them are only used for the frontend and some are for backend. **Example:** HTML, CSS, Bootstrap (framework), JavaScript, Vue Js (framework) etc. used for web application frontend and PHP, Laravel (framework), Symphony (framework), WordPress (framework), JAVA, AEM (framework), C#, .Net (framework) etc. used for web application backend. It's very helpful information for our career. I have chosen subject of my report is **“Internship on Full Stack Software Engineering”**. Working in **“SELISE”** (Secure Link Services) added huge experiences in my upcoming career. By this great internship opportunity, I can solve real world problems. This report takes us through all the details of full stack web application development knowledge and experience achieved during this internship period.

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CHAPTER 1

1.1 Introduction

Full stack software engineering is an engineer who can handle application front-end and back-end development. As a full stack developer focusing on web applications. A web application is an application where a site can be accessed through a web server, unlike computer-based software programs that are run locally on the device. We can use this application easily. That's why currently web application demand is increasing rapidly.

1.2 Motivation

My aim in life has always been to become a successful software engineer, and Software Engineering is highly respected in the field of information technology as almost as every field is connected with computers these days. It's my passion to be full stack software engineer. I can make something for society and can learn new stuff and can take challenges to getting things done. To have the chance to work with magnificent individuals.

1.3 Internship Objectives

My main objective is identifying the real-world problem and solve them by technology and up-to-date with new technologies. Career develop with full stack software engineering. Work with new and innovative ideas. Implement different algorithms those I learnt from university courses. Improving self-worth in the company or the market.

1.4 Introduction to the Company

“SELISE” is a software firm occupied with the making of digital platforms from strategy to execution [1]. Our comprehension of data innovation and the web assists us with upgrading business execution across enterprises. It's a flat-structured, open work space with high flexibility and low surveillance. Projects are completed by cross-functional teams of dedicated employees who must be driven by self-set targets and deadlines. As

such, it is critical that everyone in the organization is aware of their roles and ready to take ownership of their duties while enjoying the perks of a friendly environment.

1.5 Report Layout

The Internship report contains five chapters.

TABLE 1.5.1: REPORT LAYOUT

Chapter Number	Description
Chapter 1	Discussion in brief about Introduction, Motivation, Internship Objective, Introduction to the Company and Report Layout.
Chapter 2	Discussion in brief about Introduction to organization, Product and Market Situation, Target Group, SWOT Analysis and Organizational Structure.
Chapter 3	Discussion in brief about Daily Tasks and Activities, Events and Activities, Project Task and Activities and Challenges.
Chapter 4	Discussion in brief about Competencies Earned, Smart Plan and Reflections.
Chapter 5	Discussion in brief about Discussion & Conclusion and Scope for Further Career.

CHAPTER 2

2.1 Introduction

“SELISE” a flat-structured, open work space with high flexibility and low surveillance. It is a digital platform making software firm. At SELISE we have a rigid process of continuous learning and coaching and holds regular workshops and training sessions. This organization is most popular in Bangladesh software firm and most skilled software firm in Bangladesh. It's a multinational software firm, have office in Thimphu Bhutan, have office in Dubai UAE, have office in Dhaka Bangladesh and also have main office in Zurich Switzerland. This organization mainly operates from Switzerland.

2.2 Product and Market Situation

“SELISE” conduct research, build proof of concepts and prototypes to ensure what we intend to build fits this goal. That's why they can give the best product to the customers. They have some own products like **E-signatures**, **Page Builder**, **SELISE ARC**, **SELISE ACP**, **SELISE Club**. We know business depends on important contracts and agreements. Effortlessly we can sign, monitor & manage documents by SELISE **E-Signature** tool. Page builder is a drag and drop page producer. We can easily make our web page by SELISE **Page Builder** without knowing any programming. SELISE Acquisition and Retention Cloud (**SELISE ARC**) is the first building of Digital Platform. **SELISE ARC** filters relevant business data form customer huge amount of data and can easily run online campaigns and saves customer time. SELISE Auditing and Certification (**SELISE ACP**) is a digital platform for inspections, audits and certifications. **SELISE Club** is a social community platform. We can manage people communication & events by this. They have a generally excellent demand in the current market and knows well about the market [1].

2.3 Target Group

Target group of markets refers a company wants to sell its products and services to a group of selected customers.

Basically, the target group of customers are big company, organization and business. They mainly work on swiss government projects.

2.4 SWOT Analysis

The following Figure 2.4.1 showing SWOT Analysis.



Figure 2.4.1: SWOT Analysis

SWOT analysis is gathering company's strengths, weaknesses, opportunities and threats [2]. SELISE's main strength is they makes customer satisfied first; another is they strictly follow rules and regulations. They give many opportunities like Good Salary Structure, Medical Insurance, Group Insurance, Food (breakfast and lunch), Annual Abroad Tour, Fun Events, SELISE School (coding best practice learns) etc. Their weakness is employee management because SELISE is a big software company and have almost 350 employees, that's why sometime it's difficult to satisfy all employee equally. After analysis, I am not seeing any threats for this company.

2.5 Organizational Structure

The following Figure 2.5.1 showing Organizational Structure of SELISE.

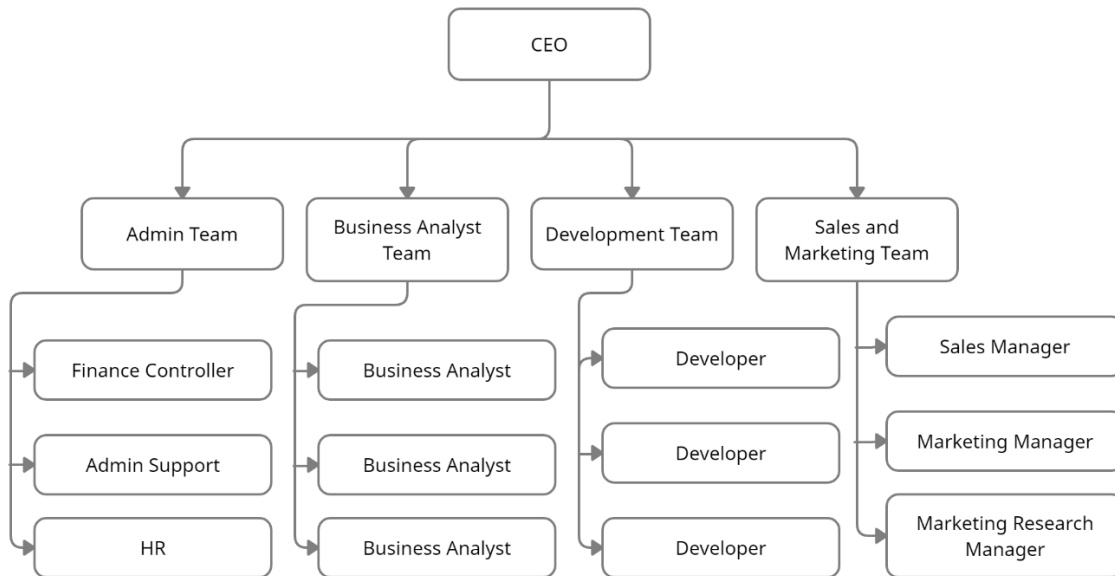


Figure 2.5.1: Organizational Structure of SELISE

Our organization works with four key viewpoints:

1. Admin team.
2. Business analyst team.
3. Development team.
4. Sells and Marketing team.

Key viewpoints of Organizational Structure:

- Organization structure helps operations proceed smoothly.
- Departmentalization is the premise by which an organization do task together.
- Centralization occurs when decision-making authority is in the upper organizational levels.
- Significant choices are made by middle-level and supervisory-level managers with decentralized authority, that's why increase adaptability.
- Length of control alludes to the quantity of subordinates an administrator has; it is used to ensuring proper coordination and a sense of responsibility among employees.

CHAPTER 3

3.1 Daily Task and Activities

As my scheduled I work five days a week from 10 AM to 7 PM & my off day is Friday and Saturday. At the primary I start with the basic of **HTML**, **CSS** and **JavaScript**. I learned HTML and CSS for two weeks to make web application frontend stature. After two weeks I started JavaScript for one week then started to learn **VueJs** (JavaScript Framework) for next one week. This session helped me to build web frontend stature by HTML and style by CSS and more user interactive by JavaScript.

Then we started **PHP** and **MySQL** from the basic. I spent one month to learn PHP and MySQL. By this session I learned how to make a web application and my final task was to make an employee attendance web application.

3.1.1 Development Tools Installation

For web application development I have used **Visual Studio Code** IDE (integrated development environment), **Laragon** for run apache server & **Composer** for dependency management in PHP.

At first, I have to download Visual Studio Code (IDE) from this link “<https://code.visualstudio.com/download>”. Visual Studio Code is an integrated development environment where I will write my codes.

The following Figure 3.1.1.1 showing Installation of Visual Studio Code.

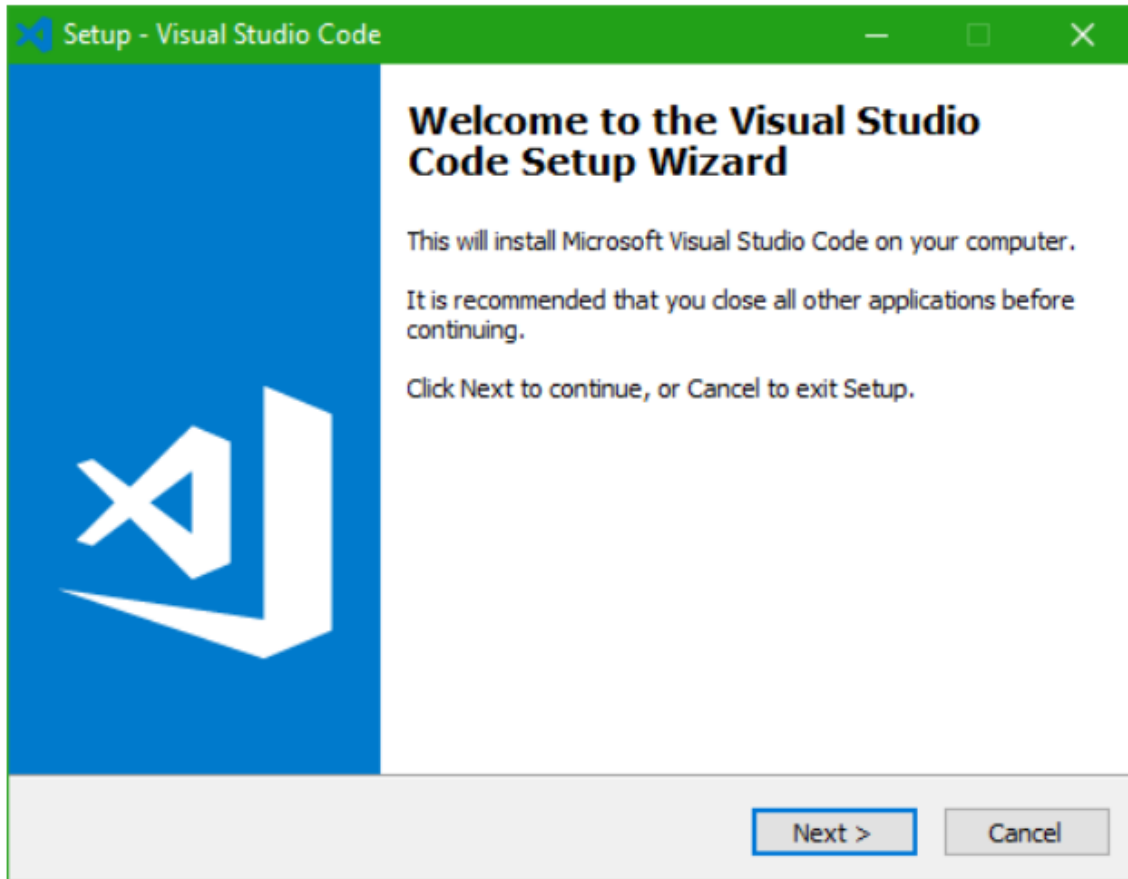


Figure 3.1.1.1: Installing Visual Studio Code

Then click on all **Next button**. After some time, Visual Studio Code installation process will be completed. Then I can open Visual Studio Code (IDE) by clicking on Visual Studio Code shortcut icon that created on my desktop.

Then, I will download Laragon from this link “<https://laragon.org/download/index.html>”. Laragon is a local apache server runner where I will run my web application.

The following Figure 3.1.1.2 showing Installation of Laragon.

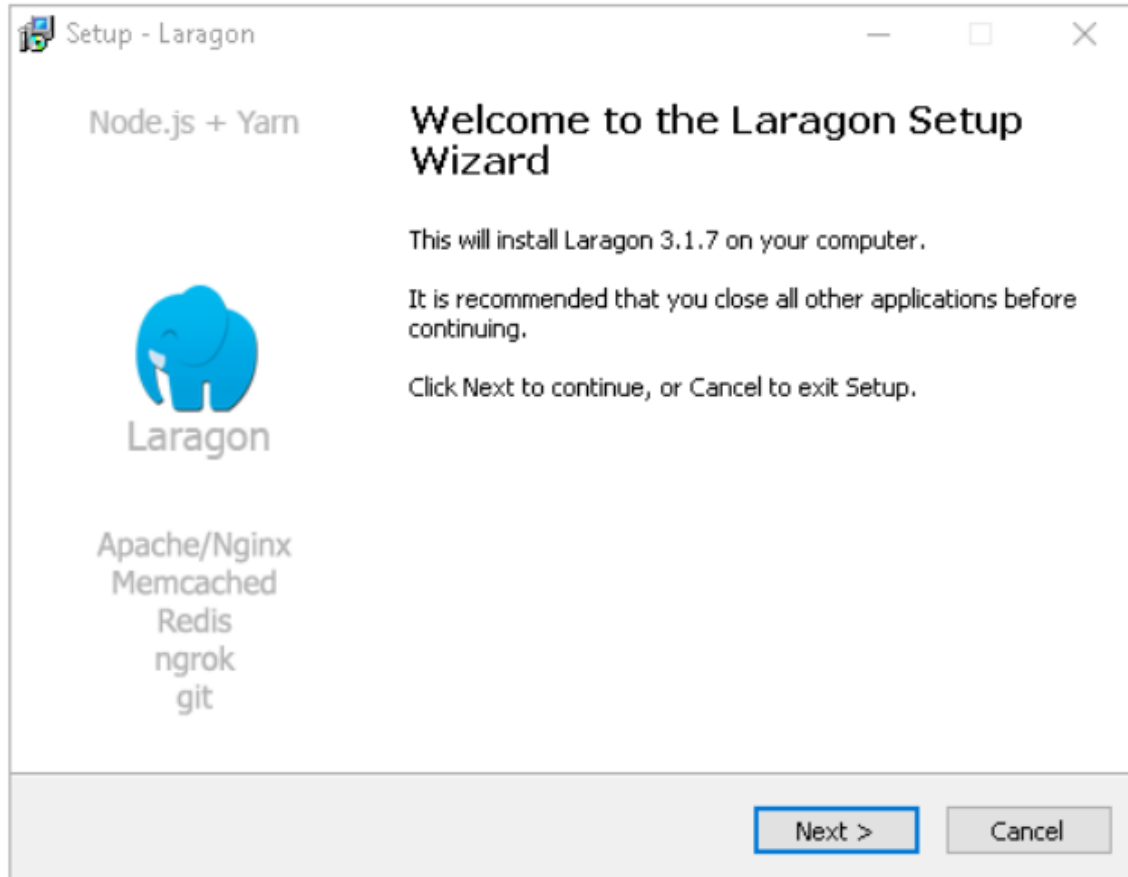


Figure 3.1.1.2: Installing Laragon

Again, click on all **Next button**. After some time, Laragon installation process will be completed. Then I can open Laragon by clicking on Laragon shortcut icon that created on my desktop.

Then we have to install Composer for dependency management in PHP. I will use a php framework to build web application. With framework automatically some dependency comes. To manage those framework dependencies, I need dependency manager as like Composer. To install Composer, I will download Composer from this link “<https://getcomposer.org/download/>”.

The following Figure 3.1.1.3 showing Installation of Composer (dependency manager).

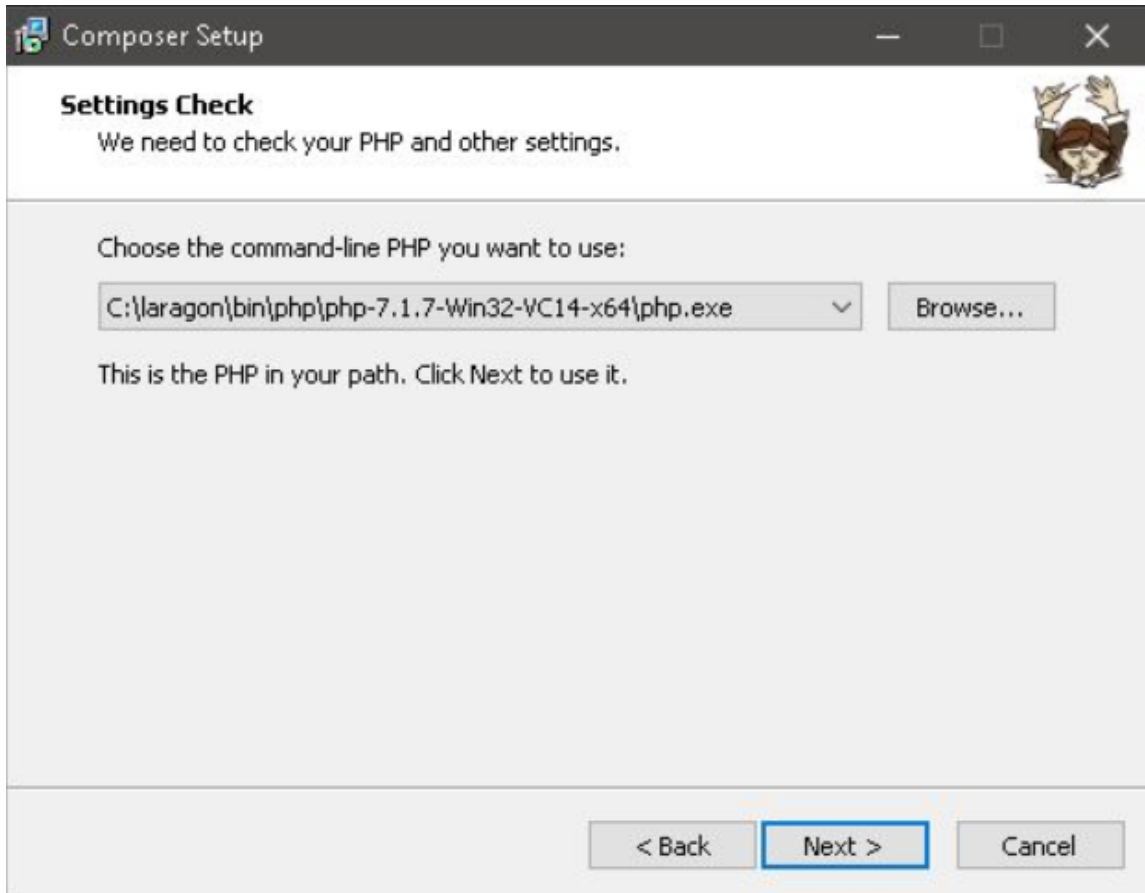


Figure 3.1.1.3: Installing Dependency Manager

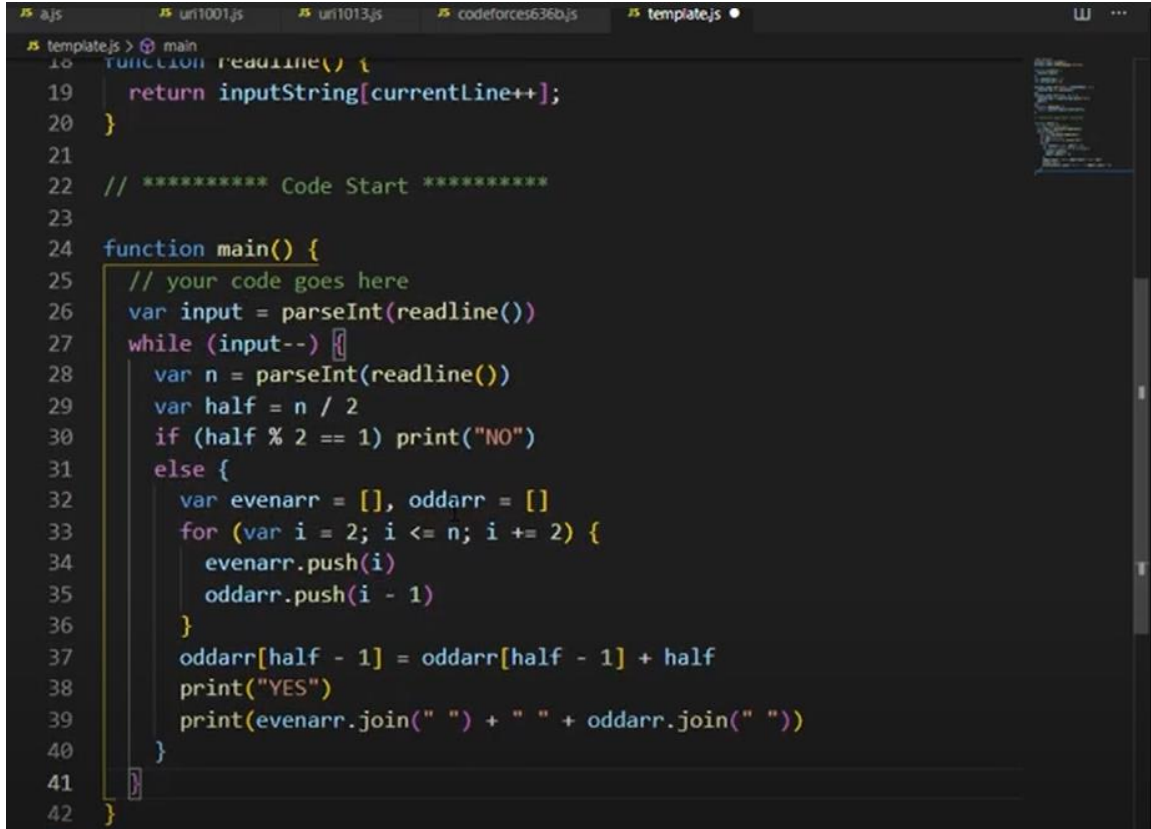
Again, click on Next buttons. At a point of installation process, will ask you for PHP path, then I will browse and select the correct php.exe file to define PHP path. Then I check composer by running command “composer -version && php --version” on command prompt.

3.1.2 Basic Problem solving

Problem solving through programming is base of software engineering. Without practice problem solving no one can be good at programming. There is no alternative way. That’s why we have to practice more and more problem solving to be a software engineering.

My web application client-side language is JavaScript. So, I solved several problems in JavaScript.

The following Figure 3.1.2.1 showing Problem Solving by JavaScript.

A screenshot of a code editor with a dark theme. The editor shows a JavaScript file named 'template.js'. The code includes a 'readline()' function, a 'main()' function, and logic to process input numbers. The 'main()' function reads an integer 'n', checks if it's even or odd, and prints the result. For even numbers, it prints 'YES' and lists even and odd numbers up to 'n'. For odd numbers, it prints 'NO'.

```
10 function readline() {
19   return inputString[currentLine++];
20 }
21
22 // ***** Code Start *****
23
24 function main() {
25   // your code goes here
26   var input = parseInt(readline())
27   while (input-- > 0) {
28     var n = parseInt(readline())
29     var half = n / 2
30     if (half % 2 == 1) print("NO")
31     else {
32       var evenarr = [], oddarr = []
33       for (var i = 2; i <= n; i += 2) {
34         evenarr.push(i)
35         oddarr.push(i - 1)
36       }
37       oddarr[half - 1] = oddarr[half - 1] + half
38       print("YES")
39       print(evenarr.join(" ") + " " + oddarr.join(" "))
40     }
41   }
42 }
```

Figure 3.1.2.1: Problem Solving by JavaScript

My web application server-side language is PHP. So, I solved several problems in PHP. This makes my programming confidence stronger. This will help me to solve real application problem in future.

The following Figure 3.1.2.2 showing Problem Solving by PHP.

```
<?php
$n = fgets(STDIN);
$stringInput = trim(fgets(STDIN));
$stringArray = explode(' ', $stringInput);

function parseInt($el) {
    return (int) $el;
}

$intArray = array_map('parseInt', $stringArray);
echo count($intArray) . "\n";

for ($i = 0; $i < count($intArray); $i++) {
    $r = $intArray[$i];
    echo "Area = " . ($r * $r * M_PI);
    echo "\n";
}

6
Area = 3.1415926535898
Area = 12.566370614359
Area = 28.274333882308
Area = 50.265482457437
Area = 78.539816339745
Area = 113.09733552923
[Finished in 0.0s]
```

Figure 3.1.2.2: Problem Solving by PHP

My web application database is MySQL. This is a SQL query language. To retrieve data from database I must have good knowledge about MySQL query.

The following Figure 3.1.2.3 showing Query Problem Solving by MySQL.

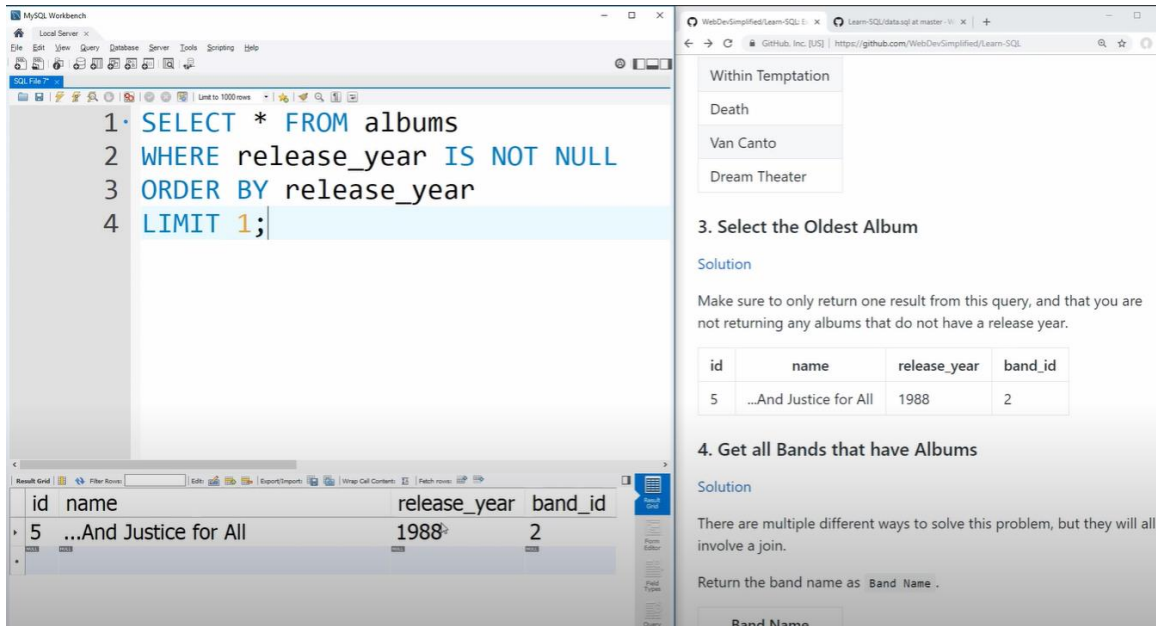


Figure 3.1.2.3: Query Problem Solving by MySQL

3.1.3 Building Application Frontend

Here I am making application frontend. I start coding with my chosen language HTML, CSS, JavaScript.

The following Figure 3.1.3.1 showing HTML, CSS, JavaScript Coding on Visual Studio Code.

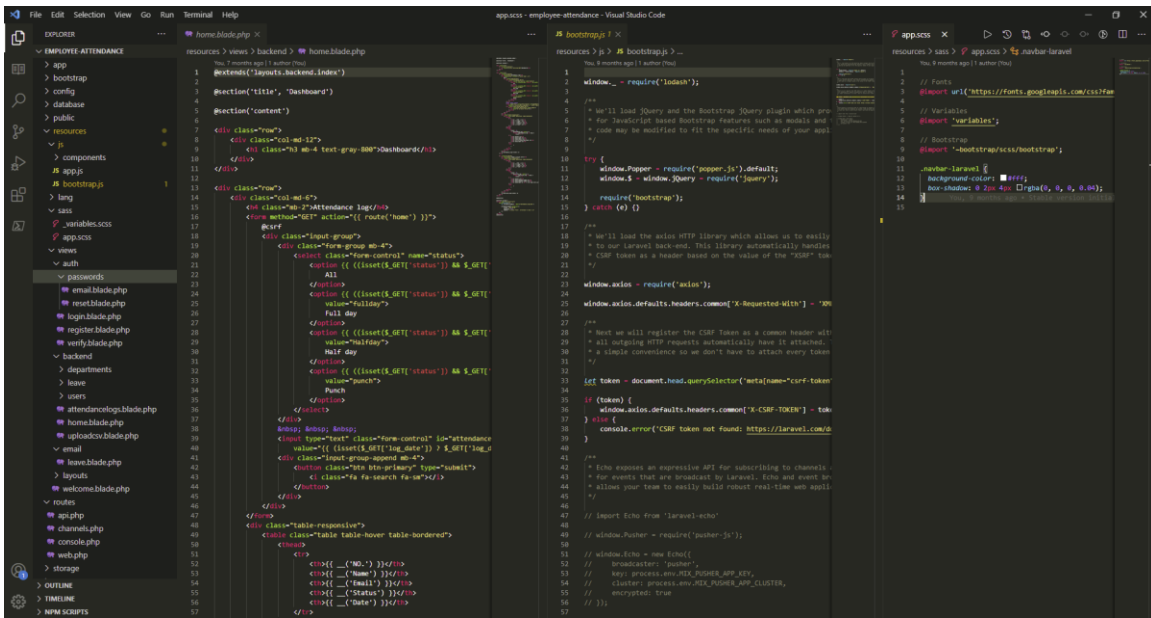


Figure 3.1.3.1: HTML, CSS, JavaScript Coding

By HTML and CSS, I am making my web application frontend and by the help of JavaScript making my web application more user interactive. I used VueJs as JavaScript framework and used Sass as CSS framework.

The following Figure 3.1.3.2 showing Application Output on Browser.

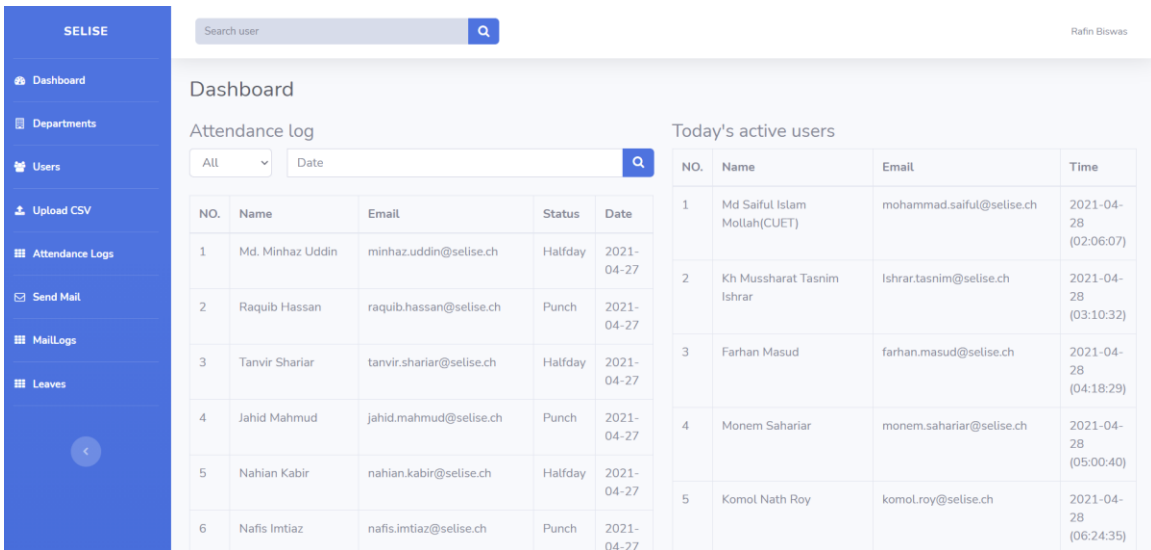


Figure 3.1.3.2: Application Showing on Browser

3.1.4 Develop Application Backend

Here I am developing application backend. I start coding with my chosen language PHP (Laravel framework) and MySQL for database.

The following Figure 3.1.4.1 showing Application PHP Codes and MySQL Queries.

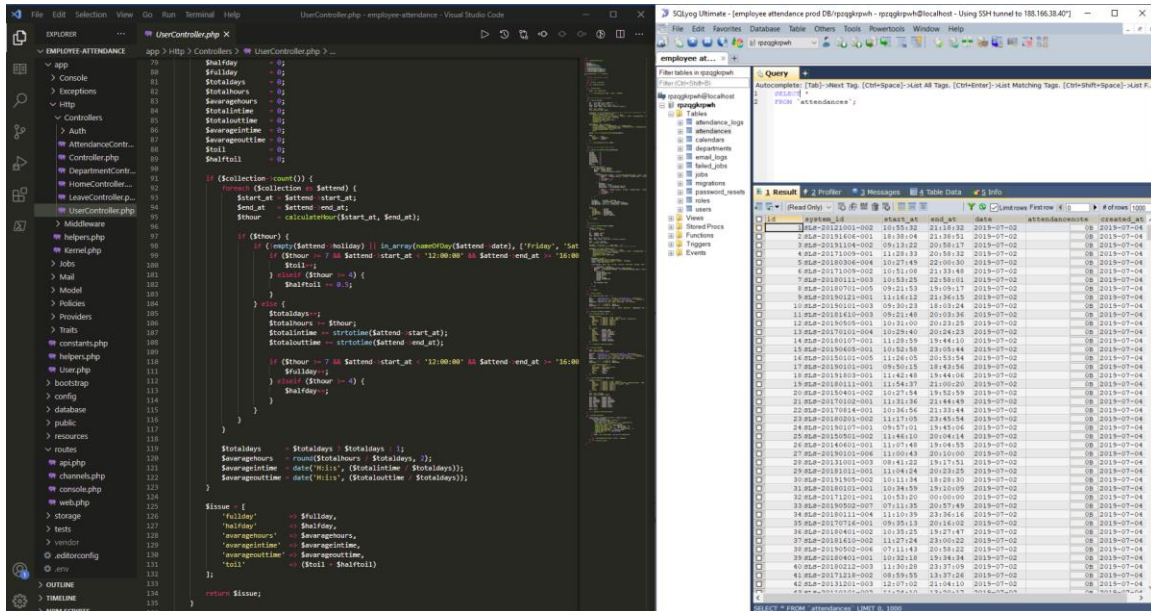


Figure 3.1.4.1: Showing PHP Codes and MySQL Queries

3.2 Events and Activities

At morning after having breakfast in office, we do a scrum meeting. In scrum meeting scrum master starts the meeting and every team member gets chance to discuss their problems or working status. After the scrum I start to do my previous task or practice previous lessons. After 3-4 hour later I do my lunch in office lounge. After having lunch again, I started to work until it's 7 o'clock and I come back at home.

3.3 Project Task and Activities

The main goal of this internship to be a Full Stack Software Engineer. So, everyday I try to finish the assign task to me. If I could not do that on time, then I try to do this task on another alternative way. Otherwise, I would take help from senior developer.

3.3.1 Task Web Application

My task was making an employee management Web Application. I developed both side frontend and backend. To develop I used coding languages:

- HTML5 for frontend structure
- CSS for frontend structure style
- Bootstrap framework of CSS
- JavaScript for user better interaction
- VueJs framework of JavaScript
- PHP for server-side programming language
- Laravel framework of PHP
- MySQL for database

3.3.2 Application User Authentication

My first task was after user login authenticate user will be redirect to our portal dashboard. Authenticated user has different roles to manage this application and restrict application unwanted changes.

The following Figure 3.3.2.1 showing User Login page.

Selise AttendanceLogin

Login

E-Mail Address

Password

Remember Me

Login

[Forgot Your Password?](#)

Figure 3.3.2.1: User Login page

3.3.3 Application Dashboard and Menus

The following Figure 3.3.3.1 showing User Dashboard and Menus.

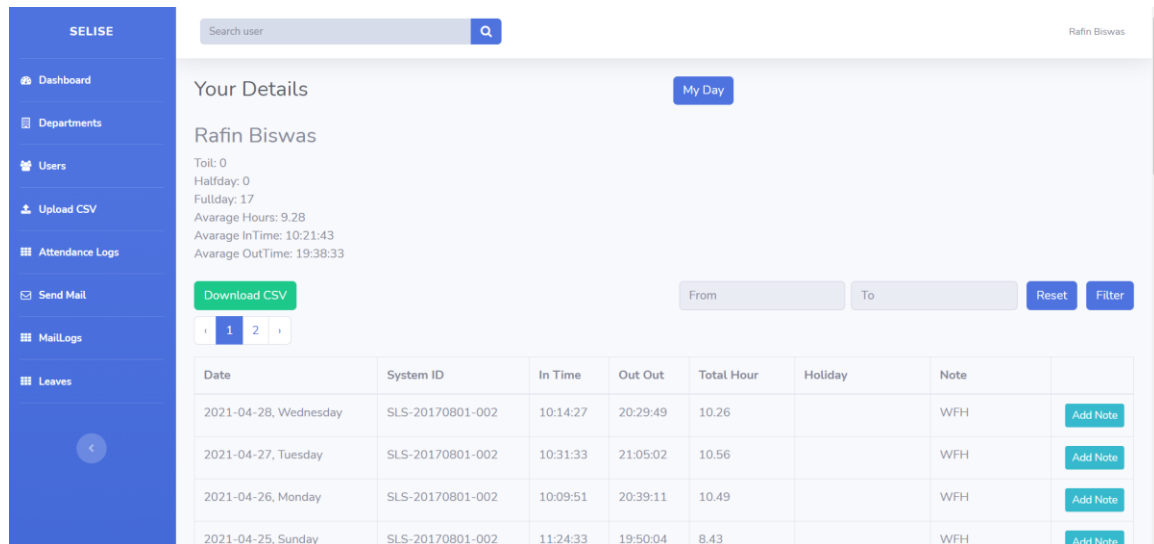


Figure 3.3.3.1: User Dashboard & Menus

From Dashboard menu can see all user activity. From Departments menu can add or update department. From Users menu can add or update user and can give attendance, see attendance and can download. From Upload CSV menu can sync attendance machine & online data. From Attendance Logs menu can see attendance mail logs. From Send Email menu can send attendance mail. From Leaves menu can add or update holiday.

3.3.4 Online Employee Attendance

Form this page company employee can give self-attendance through internet by this application.

To confirm robot not giving attendance, click on “I’m not a robot” checkbox. After google re-captcha validation user can start their day by clicking on “Start counting my Day” button. After day start, this button automatically will be invisible to user. So, that user can’t re-start their day again.

The following Figure 3.3.4.1 showing User Attendance Page (Day Start).

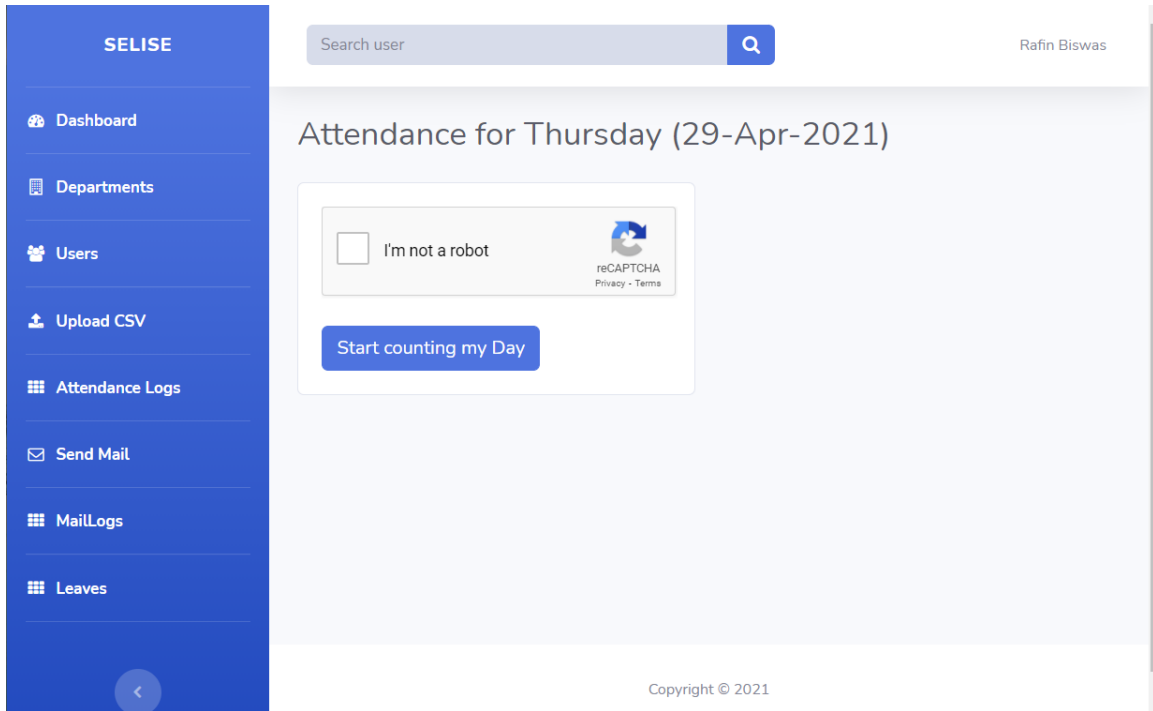


Figure 3.3.4.1: User Attendance Page (Day Start)

After day start automatically “End counting my Day” button will be visible to user. The following Figure 3.3.4.2 showing User Attendance Page (Day End).

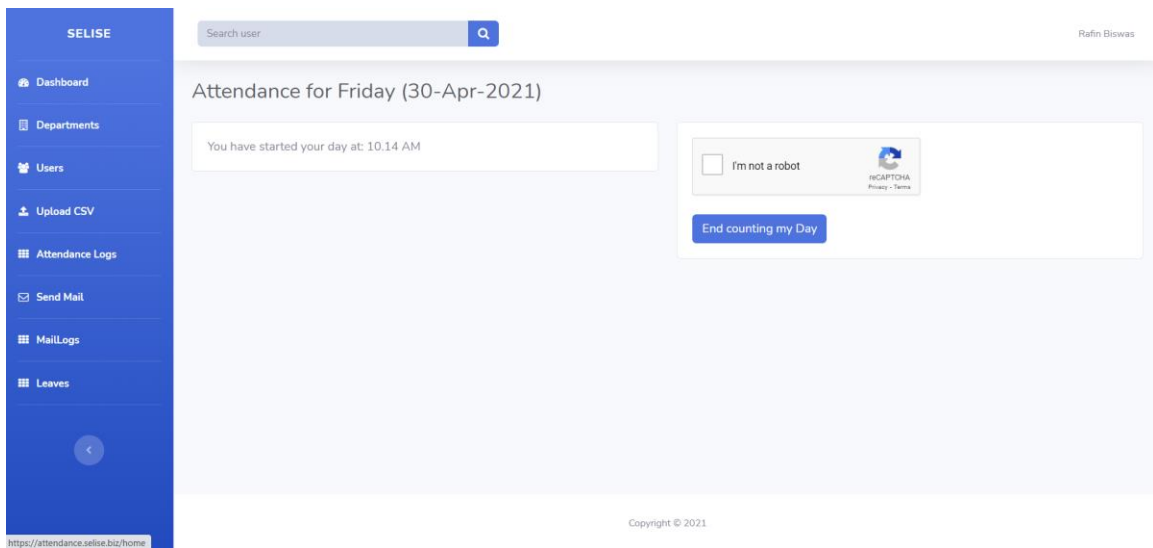


Figure 3.3.4.2: User Attendance Page (Day End)

Again, to confirm robot not giving attendance, click on “I’m not a robot” checkbox. After google re-captcha validation user can end their day by clicking on “End counting my

Day” button. After day end, this button automatically will be invisible to user. So, that user can’t re-end their day again.

One user can start day counting one time in a day but before 4 PM. If any one starts day after 12 PM this will be count as his/her half day leave. User can day end at any time but on that day. If one user doesn’t start day from portal or from office punch machine this will be count as full day leave.

Next day before 12 PM application system will send full/half day leave mail to the users.

3.3.5 Application User Import

The following Figure 3.3.5.1 showing User Data Importer.

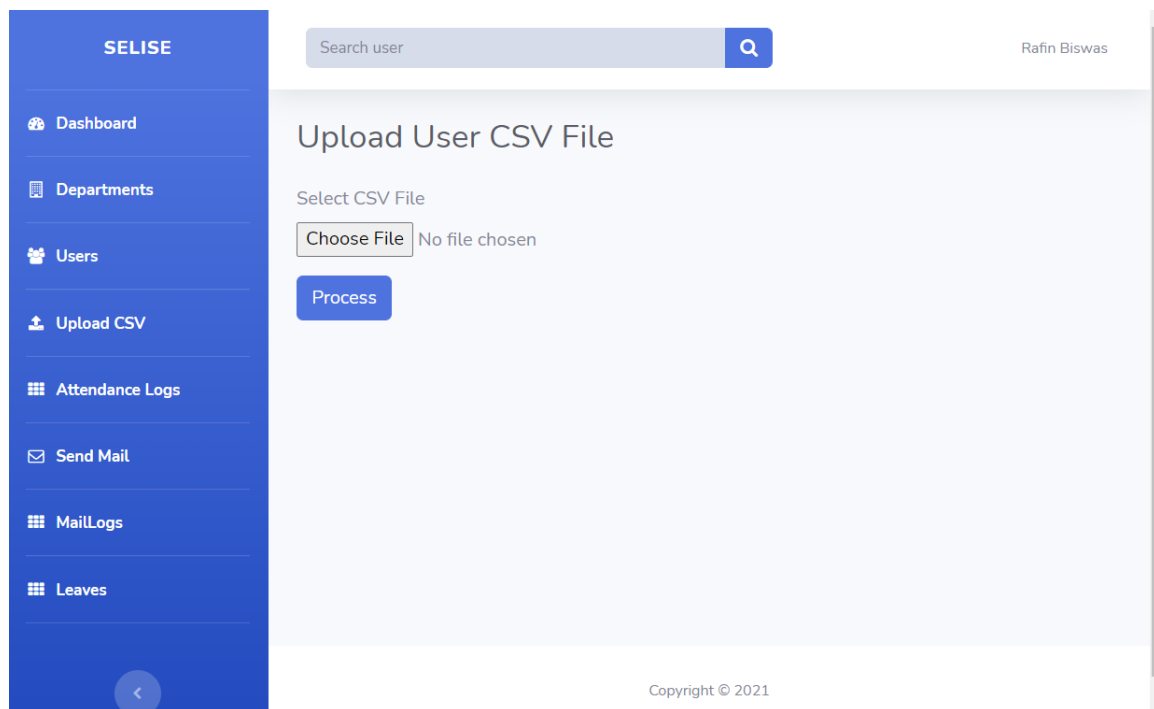


Figure 3.3.5.1: User Data Importer

From this page we can bulk import new user and update existing old user by uploading one single CSV file.

3.3.6 Attendance Machine Data Sync

The following Figure 3.3.6.1 showing User Attendance Machine Data Sync.

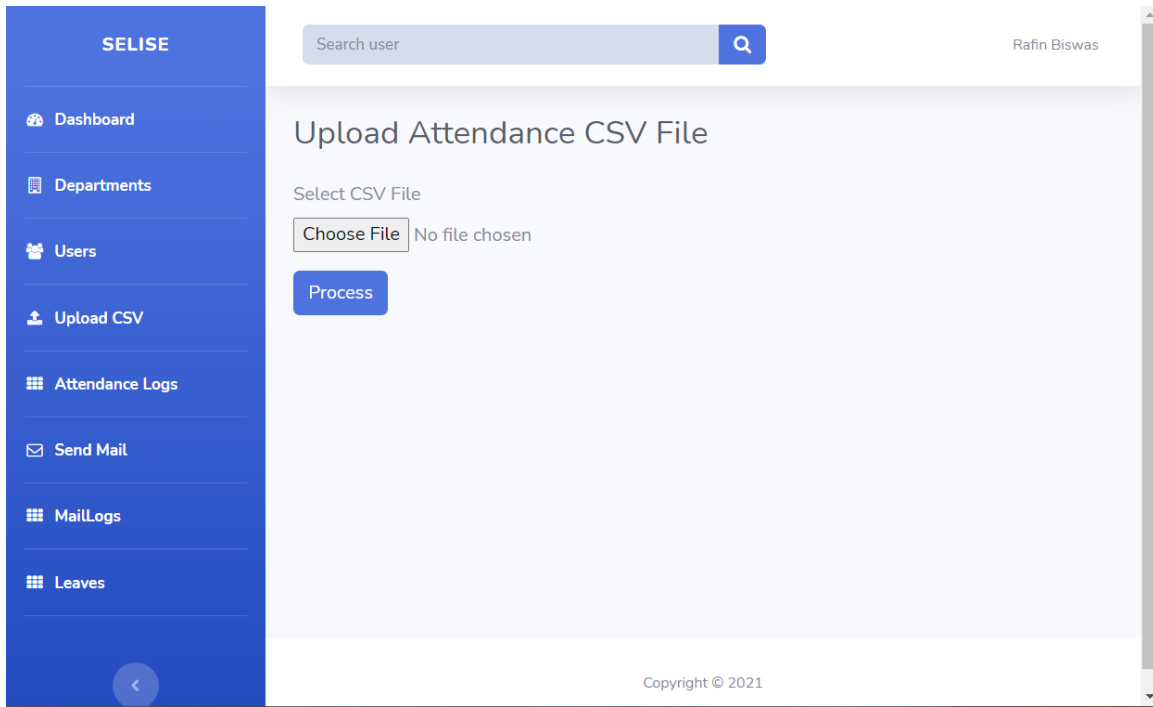


Figure 3.3.6.1: User Attendance Machine Data Sync

From this page we can sync application user online attendance data with physical punch machine data by uploading one single CSV file.

TABLE 3.3.6.1: USER ATTENDANCE LOGIC MAPPING

No.	Cases	Start Time	End Time
1	User start & end day only by punch machine.	Accept machine data	Accept machine data
2	User start & end day only by application portal.	Accept application data	Accept application data
3	User start & end day by both punch machine and application portal.	Accept application data	Accept application data
4	User only day start by punch machine.	Accept machine data	N/A
5	User only day start by application portal.	Accept application data	N/A
6	User only start day by both punch machine and application portal.	Accept machine data	N/A
7	Forget to give attendance	Accept machine data	Accept machine data

3.3.7 Application Core Features

This is an employee management web application. So, we have many user managements feature. Some of the core features are in bellow:

TABLE 3.3.7.1: APPLICATION FEATURE MAPPING

Feature No.	Feature	User Role		
		Employee	Department Head	Admin
1	User can login	yes	yes	yes
2	Can update own profile	yes	yes	yes
3	Can update others profile	no	no	yes
4	Can give self-attendance	yes	yes	yes
5	Can see self-attendance and download	yes	yes	yes
6	Can see others attendance and download	no	no	yes
7	Can see others attendance and download (same department)	no	yes	yes
8	Can create user	no	no	yes
9	Can create and update departments	no	no	yes
10	Can create and update holidays	no	no	yes
11	Sync user attendance machine & online data	no	no	yes
12	Can send attendance email	no	no	yes
13	Can see other users	no	no	yes
14	Can see other users (same department)	no	yes	yes
15	Can see user activity from dashboard	no	no	yes

3.3.8 Application Security

I used Laravel (php framework) to build my web application backend. Laravel have strong security features [3]. Some of them are given bellow:

- Prevents from SQL injection
- Have protection from cross-site request
- Have protection from XSS scripting
- Laravel encourages to use HTTPS instead of HTTP
- Laravel encourages to use purifier
- Laravel can filter and validate from data
- Strong hashing for password

- Laravel have built-in encryption
- Can destroy sessions when it's required

3.4 Challenges

From scratch develop a web application is not much easy tasks. When I was developing web application, I faced many difficulties in frontend and backend part. There are some tasks are easy to complete and some are very difficult to solve. Being a full stack web developer, I have to solve both frontend and backend problems and then have to implement those in my web application. That's why if we want to be Full Stack Software Engineer then we have to gather strong knowledge about both frontend and backend and have to practice problem solving by programming as much as possible.

In this internship period I faced many challenges, from them I want to mansion one or two challenging task.

My web application was about company employee management. In previous there was no app for company employee management that's why they stored employee data on XL sheet and managed employee by XL sheet. So, my first challenge was importing all user data from XL sheet.

Another challenge was, every day we punch card to give attendance. But in this current pandemic situation some people work form home and some work physically in office. Who are working from home; they give their attendance on online and who are working from office, they give their attendance by card punching on machine. So, my challenge was sync online attendance data and machine attendance data.

CHAPTER 4

4.1 Competencies Earned

Today's competitive online market established with great quality work and time. So, to survive in this competition, I have to be more focused and earned my place with your own hard work. I also face lots of difficulties in my life and proudly overcome those difficulties and gain courage to face future problems. During this internship timeline I am also found many problems and overcome those problems. In future I will be more confident to establish myself in the field of Full Stack Software Engineer and ready for taking new challenges and solve them [4].

I worked on employee management web application on SELISE. By working on this project, I achieved so many competencies:

- Now I have much better problem solving and coding skill
- I have implemented the object-oriented programming concept on this real-world project what I learned on my text book
- I have learned many problem-solving technique and logical thinking
- I have learned how write test code and pass unit testing and debugging codes
- I know how to team work and work done with the team

4.2 Smart Plan

To develop a web application, pre-plan we must do, to choose the right step in time. The web application has two main part frontend and backend. To develop the frontend, we have to choose right tools like better design, framework and reliable source code. Today's most popular markup language is HTML5, cascading style sheets CSS3 and scripting language is JavaScript. So, I choose HTML5, Sass (CSS3 framework), VueJs (JavaScript framework) for my application to develop the frontend.

On the other hand, to develop the backend choose server-side programming as PHP and MySQL for the database. Today's one of the most popular framework is Laravel. So, I used Laravel (PHP framework) for backend development. To be a full stack web software engineer, we have to know in which type application which programming or framework

is suitable. We use agile methodology to achieve better software quality, reliability, better working process, team work, boost up work, low cost and transparency.

4.3 Reflections

As my goal, I always wanted to be a Full Stack Software Engineer. I work very hard with highly experienced team members; that's great experience for me. By this internship my creativity thinking has increased and know more about technology, this will reflect on my future job place. I also learned about the software architecture and coding pattern. I have level upped my coding skill by working on enterprise software solution. I worked with micro service software architecture, and this knowledge will help me to get a good job in future [5].

CHAPTER 5

5.1 Discussion and Conclusion

The internship gives me to acquire many experiences that will allow me to play a role in my full stack web application development carrier. I can do several web development projects and could work on several projects, which helped me to become autonomous. This internship plays an important role in making my career in the software industry. That I have learned in SELISE.

So, many things in this internship. How to maintain a project and manage the timeline were the most important issue. Learning about various Web Application technology like Laravel, Symphony, WordPress etc.

5.2 Scope for Further Career

Arranging a good job is a big challenge for freshers. If I do not have practical experience. But a successful internship will benefit me to build a better career. Which is a great chance to prove my potentials and gain confidence? I hope that this internship will benefit me in the future to build a robust carrier. PHP and JavaScript are also a base-cost web development tool and settlement companies prefer it more. PHP and JavaScript in any event, for a fresher, are a good tool to begin with. If you want to continue your career as a Full Stack Web Application developer then JavaScript and PHP or any other language for that matter is just technology, so focus more on logic.

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APPENDICES

Appendix A: Internship Reflection



Selise/letter/CC/21078
Dated: 26 Apr 2021

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www.selise.ch
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TO WHOM IT MAY CONCERN

This is to certify that Rafin Biswas NID No. 5556577244, a student of Daffodil Int. University continued an internship program at Secure Link Services Bangladesh Limited from 05th Jan 2021 till 25th Apr 2021. During his stay till now, we have found him to be a professionally skillful person.

This Internship Certificate is issued as per the request of the Intern and in case of any query feel free to contact us.

Best Regards,

A handwritten signature in black ink, appearing to read "Kazi Adnan Raihan", is written over a horizontal line.

Kazi Adnan Raihan
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Appendix A: Company Detail

“SELISE” a flat-structured, open work space with high flexibility and low surveillance. Occupied with the making of digital platforms from strategy to execution. We give enterprises solution to upgrade customer business. Projects are completed by cross-functional teams of dedicated employees who must be driven by self-set targets and deadlines. we have a rigid process of continuous learning, coaching and holds regular workshops & training sessions. We have office in Thimphu Bhutan, in Dubai UAE, in Dhaka Bangladesh and also have main office in Zurich Switzerland.

“SELISE” have some own products like E-signatures, Page Builder, ARC, ACP, Club. We know business depends on important contracts and agreements. Effortlessly we can sign, monitor & manage documents by E-Signature tool. Page builder is a drag and drop page producer. Acquisition and Retention Cloud (ARC) filters relevant business data form customer huge amount of data and can easily run online campaigns and saves customer time. Auditing and Certification (ACP) is a digital platform for inspections, audits and certifications. Club is a social community platform. We can manage people communication & events by this. The best part about us makes customer satisfied first.

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