



# North South University

Department of Electrical & Computer Engineering

## **Internship Report**

CSE498R

Summer 2021

## **MySoft Summer vInternship 2021 at eSystems Research and Development Lab, BUET**

### **Submitted To:**

Dr. Mohammad Ashrafuzzaman Khan

Assistant Professor

Department of Electrical and Computer Engineering

North South University

### **Submitted By:**

Md Sharif Hossain

ID: 1712336642

## Letter of Transmittal

30 September 2021

To

Dr. Mohammad Rezaul Bari

Associate Professor and Chairman

Department of Electrical and Computer Engineering

Through

Dr. Mohammad Ashrafuzzaman Khan

Assistant Professor

Department of Electrical and Computer Engineering

North South University

Dhaka, Bangladesh

**Subject: Submission of Internship Report on MySoft Summer vInternship 2021 at eSystems Research and Development Lab, BUET.**

Dear Sir,

Conveying the utmost complement to your position and honor that I would like to approach you with the following fact that I am very happy and grateful at this moment of submission of my Internship Report on MySoft Summer vInternship 2021 at eSystems Research and Development Lab, BUET, in partial fulfilment of the requirement for the degree program, Bachelor of Science in Computer Science and Engineering. I have used all the data and information in this report that was found most relevant and correct per best of my judgment. It will be worthwhile to mention this field work has immensely helped me to gather knowledge that might have been required long time for me to acquire. I sincerely hope this report will standard of our judgment. I will be always available for any inquiry or clarification regarding the report.

Sincerely,

Md Sharif Hossain

1712336642

North South University

## DECLARATION

I, hereby, declare that the work presented in this report is the outcome of my three months internship program performed at MySoft Summer vInternship 2021 at eSystems Research and Development Lab, BUET, under the supervision of Dr. Mohammad Ashrafuzzaman Khan, Department of Electrical and Computer Engineering, North South University, Dhaka, Bangladesh. The work was spread over a span of one of the final year courses, CSE498R, Internship, in accordance with the course curriculum of the Department for the Bachelor of Science in Computer Science and Engineering program.

Declared By:

30-09-2021

.....

Name: Md Sharif Hossain

ID: 1712336642

## **APPROVAL**

The Internship report on MySoft Summer vInternship 2021 at eSystems Research and Development Lab, BUET, has been submitted by Md Sharif Hossain (ID # 1712336642) of the Department of Electrical and Computer Engineering, North South University, Bangladesh in partial fulfilment of the requirement for the degree of Bachelor of Science in Computer Science and Engineering on September, 2021 and has been accepted as satisfactory.

**Approved By:**

**Supervisor:**

.....

Dr. Mohammad Ashrafuzzaman Khan

Assistant Professor

Department of Electrical and Computer Engineering

North South University, Dhaka, Bangladesh

**Chairman:**

.....

Dr. Mohammad Rezaul Bari

Associate Professor and Chairman

Department of Electrical and Computer Engineering

North South University, Dhaka, Bangladesh

## **EXECUTIVE SUMMARY**

eSystems Research and Development Lab is a research organization which aims to contribute in cutting edge learning design , human-centric design, cognitive Intelligence, and, more generally, system development to facilitated educational excellence.

eSystems Research and development are also focused in the intersection of Data warehousing, Data mining, Machine Learning, Learning Design, Intelligence systems, and ubiquitous applications development in the realm of big data. Many international and local university's research lab, software companies are collaborating with them for research interests. e-SRD-Lab is unique as an institution because of the work environment, the chain of command they follow, all of these created virtually, exquisite culture, excellent benefits, and cordial colleagues and of course the trust they put on us. I was lucky enough to be a part of this beautiful organization for 3 months where I could explore and extract an amazing work experience from the most talented pool researcher and software developers.

This report exhibits my work experience and learnings that I have achieved in these three months of internship as a Full-stack Developer at eSystems Research and Development Lab. Also, I have discussed the possible activity of Full Stack Development at eSRD Lab.

## **ACKNOWLEDGEMENT**

Firstly, glory and gratitude to the Almighty Allah, for His showers of blessings throughout my internship period, as whole world is fighting the COVID pandemic but I was still able to convey my internship successfully.

I would also like to draw immense gratitude towards Dr. Mohammad Ashrafuzzaman Khan, my Faculty Supervisor at North South University, who always inspired me and encouraged me to learn information in every possible way. I would like to take the opportunity to thank the awesome colleagues with whom I have worked so far. Special thanks to Kamruzzaman Shuvo, my Site Supervisors at eSystems Research and Development Lab, who gave me the chance to prepare this paper. I learned a lot about professional career literally from being in the field while doing this report, which would obviously benefit me in my future. I would like to express my deepest gratitude to him for supporting me when I needed it the most.

Last but not the least, thanks to my friends and family for constant supporting and helping, and for being there anytime I needed emotional support, of course. Finally, I want to thank my parents for believing in me and always loving me.

## Table of Contents

INTRODUCTION .....	10
1.1 About eSystems Research and Development Lab .....	10
1.2 Projects of eSystems Research and Development Lab .....	10
1.2.1 National Health Data Warehousing .....	10
1.2.2 About Virtual Internship System .....	11
1.2.3 Synthesis and Applications of Problem-Based e-Learning (PBL) Model .....	11
1.2.4 Database Learning and Evaluation System .....	12
1.3 Collaborators of eSystems Research and Development Lab .....	13
1.4 About Full Stack Developer .....	13
1.4.1 Full Stack Development Team .....	13
ANALYTICAL DISCUSSION ON FULL STACK DEVELOPER’S ACTIVITY .....	16
2.1 Overview .....	16
2.2 The Duties of a Full-Stack Developer .....	16
2.2.1 Full stack Developer – A Tech Wizard .....	17
MY CONTRIBUTION AND LEARNING OUTCOME .....	19
3.1 Interactive e-Learning Portal .....	19
3.2 University Management System .....	20
3.3 Learning Outcome .....	22
3.3.1 Theoretical Knowledge .....	22
3.3.2 Practical Knowledge .....	22
CONCLUSION .....	23
APPENDIX A .....	24
APPENDIX B .....	26
REFERENCES .....	28

## List of Figures

Figure no.	Figure Name
Figure 01	National Health Data Warehousing
Figure 02	Synthesis and Applications of Problem-Based e-Learning (PBL) Model
Figure 03	Database Learning and Evaluation System
Figure 04	MVC Framework working process Diagram
Figure 05	Spring-boot Angular Diagram



## List of Abbreviations

eSystems	Electric Systems
eSRD Lab	eSystems Research and Development Lab
VIS	Virtual Internship System
JS	JavaScript
API	Application Programming Interface
REST	Representational State Transfer
PBeL	Problem-Based e-Learning Model

# CHAPTER 01

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# INTRODUCTION

## 1.1 About eSystems Research and Development Lab

eSystems Research and Development Lab, Dept. of CSE, BUET, is one of most innovative and impactful research labs led by Dr. Abu Sayed Md. Latiful Hoque that contributes to Health and Education. We work in the intersection of Data warehousing, Data mining, Machine Learning, Learning Design, Intelligence systems, and ubiquitous applications development in the realm of big data. Many international and local university's research lab, software companies are collaborating with them. eSRD-Lab has been developed to focus applied research in the area of e-Health and eLearning. For applied research, industry-academia collaboration is highly needed. Currently, a research collaboration has been established among two industries: MySoft Ltd, Bangladesh and Ubitrix USA, and two academic research laboratories: Ubicomp Lab, Department of Computer Science, University of Marquette, WI, USA and eSRD-Lab, Dept. of CSE, BUET.

## 1.2 Projects of eSystems Research and Development Lab

Currently their research and innovation focuses on the following areas:

- ❖ National Health Data Warehousing:
- ❖ Virtual Internship System
- ❖ Synthesis and Applications of Problem-Based e-Learning (PBL) Model
- ❖ Database Learning and Evaluation System

### 1.2.1 National Health Data Warehousing

Researchers, analysts, professional experts working on health data have been facing serious problems because of unstructured and discrete sources of health data in Bangladesh. In this project, we have designed a ubiquitous method of data warehousing to store the health data in a structured format that can be used for knowledge discovery, data mining, decision support systems and multi purposes. Distributed File Systems, Parallel computing, Dimensional schema have been exclusively applied in the implementation to make the platform highly scalable and robust. Data privacy and security is one of the top concerns to ensure the public identities stay as safe and protected as possible. [Click here to see our all publications related to this project.](#)

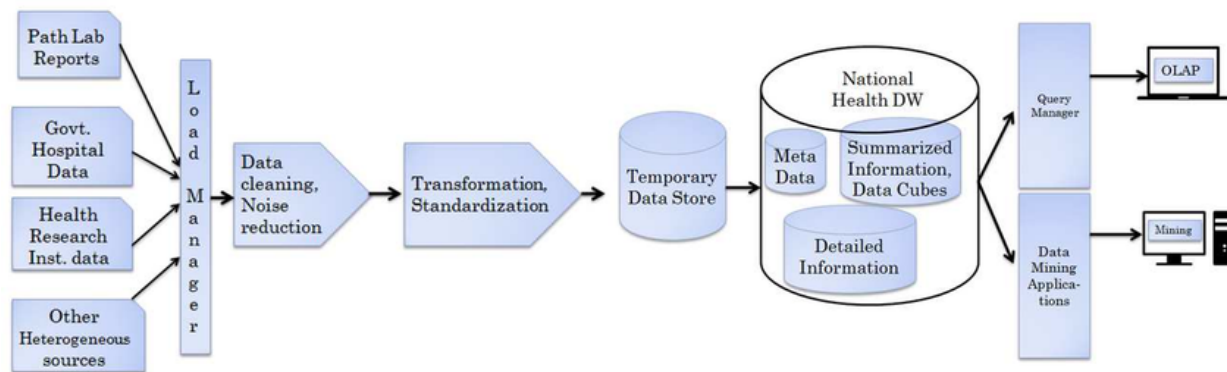


Figure 01: National Health Data Warehousing

### 1.2.2 About Virtual Internship System

In VIS, we are going to develop an interfacing platform for industry, Intern, and University to solve the following problems regarding internship: Placement problem, Real-Life Experience gain, learning management, learning outcomes. We have designed a novel method to decompose industry problems in different levels of sub problems that will be used as problem-based learning and critical business contribution. We have developed a container-based Virtual Development Environment which supported several programming languages including web technology and framework environment e.g. Python Django, Flask, Java Spring, PHP Laravel, CodeIgniter, JavaScript, Angular, HTML, CSS, etc. that will help the intern to continue work in the web portal. We will also integrate real life story-based problem statements, cognitive intelligence-based domain specific adaptive problem assignment, automatic assessment and a competitive learning environment that will stimulate Intern's performance.

Collaborating Universities: BUET, NSU

Collaborating Software Company: Mysoft Ltd, ERA InfoTech Ltd

### 1.2.3 Synthesis and Applications of Problem-Based e-Learning (PBL) Model

In Bangladesh, ICT education in Higher Secondary level is compulsory for all. We have designed and developed this web platform to sever thousands of students and connected them with teachers that enable self-learning and problem-based learning in an optimistic way. In this platform, we integrated a NCTB approved ICT book of Dr. Md. Mustafa Akbar which contents are highly aligned with problem-based learning model. There are several research findings implemented and integrated in this platform, including level-wise practice problem, question bank quality control, instant exam, real-time web compiler for HTML, C/C++, SQL, automatic error checking and

solution suggestion, testing, evaluation and ranking. Actively, there are many students and teachers using this platform in academy level and personal ICT skill improvement.

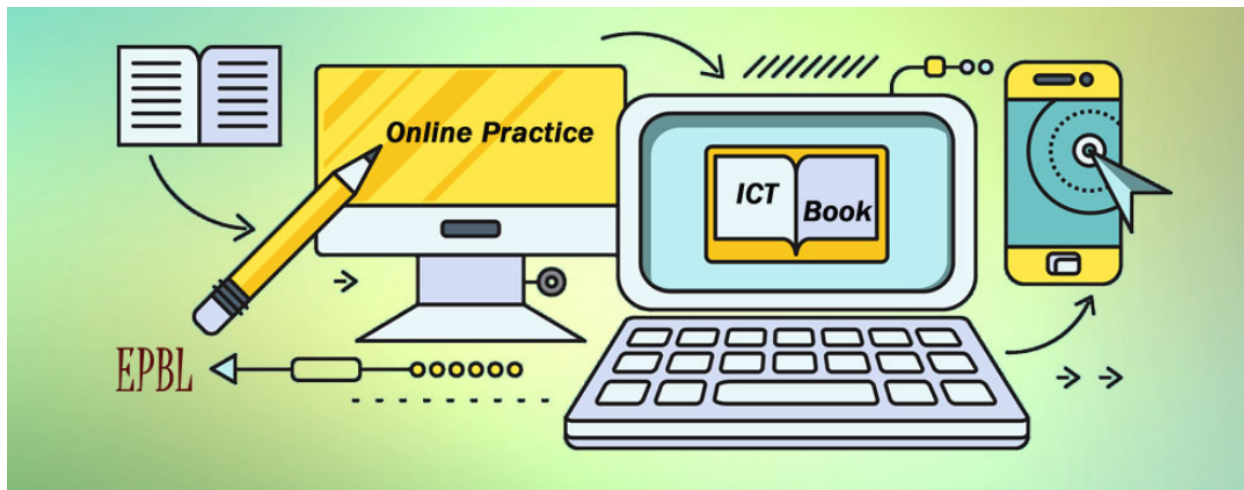


Figure 02: Synthesis and Applications of Problem-Based e-Learning (PBL) Model

#### 1.2.4 Database Learning and Evaluation System

DB-LES is a cloud-based SQL learning and evaluation platform implemented based on Problem-Based e-Learning Model (PBeL). This platform is using by university database laboratory courses like- Oracle, MySQL, and SQL-server etc. We have dynamic and rich problem bank that is used for problem setup, real-time exam undertaking module, automatic evaluation and ranking module. Currently, many universities in Bangladesh use DB-LES in their lab courses.



Figure-03: Database Learning and Evaluation System

### 1.3 Collaborators of eSystems Research and Development Lab

e-SRD-Lab is an independent research institution who are highly interested in the development of e-learning. Recently for grooming and accelerating their effort they have been funded by the Ministry of ICT Division of Bangladesh. e-SRD-Lab has collaborated with two of the renowned and recognized universities and they are, Bangladesh University of Engineering and Technology and North South University. And they are also hoping to collaborate with few other institutions who pose same arena of interests. They have also collaborated with Mysoft Ltd. known name in IT industry of Bangladesh for secure, scalable, On-Demand Application System and Data Solutions. And e-SRD has also tied successful international collaborations with Indian IT giant Infosys and Ubitrix of USA.

### 1.4 About Full Stack Developer

A full stack developer is a web developer or engineer who works with both the front and back ends of a website or application—meaning they can tackle projects that involve databases, building user-facing websites, or even work with clients during the planning phase of projects. The responsibility of a Full Stack Developer includes designing user interactions on websites, developing servers and databases for website functionality and coding for mobile platforms. Particular responsibilities often include: Developing front end website architecture.

eSRD operate their Full Stack developers' activities through following the Open Track system-

- ❖ Track-1: Java Spring (Rest API) + Angular + Bootstrap + MySQL/Oracle
- ❖ Track-2: Python Django + JavaScript + Bootstrap + MySQL/Oracle
- ❖ Track-3: Python Flask + JavaScript + Bootstrap + MySQL/Oracle
- ❖ Track-4: PHP (Any Framework) + JavaScript + Bootstrap + MySQL/Oracle (EllisLab, 2021)
- ❖ Track-5: NodeJS + Angular + Bootstrap + MySQL/Oracle

#### 1.4.1 Full Stack Development Team

In eSRD there are four members in this team under the lead of Dr. Abu Sayed Md. Latiful Hoque. They are from different companies. The members are:

Jahurul Islam  
M.Sc. in CSE, BUET  
Senior Software Engineer | MySoft Ltd.

Kamruzzaman Shuvo  
B.Sc. in CSE, NSU  
Software Engineer | eSRD Lab

Mia Md. Raihan  
B.Sc. in CSE, BUET  
Software Engineer | Ubitrix Inc

Tamim Ansari  
B.Sc. in CSE, BUET  
Software Engineer | Reve Systems

Tanvir Ahamed  
M.Sc. in CSE, BUET  
Assoc. Software Engineer | eSRD Lab

Sumit Dev Nath  
M.Sc. in CSE, BUET  
Assoc. Software Engineer | QuintilesIMS

The members are dedicated to creating new challenging problems on weekly basis for the Interns. They also work on the development of the lab. They built the website of this organization. Every member has to act as a supervisor for solving the programming problem he created. There are usually two meetings in a week, the interns along with the supervisor has to attend the meeting. These meetings are not only about feedbacks and submission but also about discussing the problem and taking suggestions from one another. A supervisor helps everyone in every way possible. They are always active on Skype; anyone can get help from there.

# CHAPTER 02

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# **ANALYTICAL DISCUSSION ON FULL STACK DEVELOPER'S ACTIVITY**

## **2.1 Overview**

Full stack development is where front-end and back-end expertise come together, essentially covering the full stack of technology for a website. We as the full stack developer of eSRD Lab, we can't just to be specialized in either server-side or client-side programming, full stack developers must have experience with both, which is the requirement of our organization. In our organization, full stack developers aren't just well-versed in CSS, JavaScript, and HTML, we also know how to effectively create website foundations using back-end applications and database structures. Typically, we've worked in a variety of different roles which allowing us to develop a diverse set of skills.

## **2.2 The Duties of a Full-Stack Developer**

Since, I joined in eSRD organization as the full stack developer, my duties and responsibilities are:

- ❖ Develop visually appealing front end website architecture, including translating designer mock-ups and wireframes into front-end code
- ❖ Develop functional databases, applications, and servers to support websites on the back end
- ❖ Strategize organizational direction on emerging technology platforms and communicate the effectiveness to executive stakeholders
- ❖ Ensure that non-functional requirements such as security, performance, maintainability, scalability, usability, and reliability are being considered when architecting solutions.
- ❖ Knowledge sharing, peer-to-peer learning, problem-based learning in a specific track
- ❖ Understand the requirements of a specific projects (Evaluation problem) and implement assigned task that will be determined outcome of your internship period
- ❖ Have to strictly maintain the deadline of my assigned task.
- ❖ Timely report as per the specification
- ❖ Open discussion and inform any problem to my mentor

### **2.2.1 Full stack Developer – A Tech Wizard**

By now most of the developer community have been reskilling themselves to more than one specialized skill, and here is my take on understanding what's full stack and how can you be one importantly not to assume it's something like an advance Tech wizard and so not for you. Let's demystify and highlight some of the good design principles.

The fundamental four pillars in any architecture is Infrastructure, Database, Backend, Front end, in enterprise world its business object and application layer, in consumer application its server and client side application.

Picture above is a crude representation of an end to end cognitive business solution. With a cloud first architecture and simply to leveraging a compute power from cloud most of the cognitive capabilities are available as services. Also we are in the era of creating a "Living Lego block" like solution architecture which means any component / services should be plug n play. Let's rationalize this with some examples imagine you are introducing a simple chat (Watson conversation service) interface to your order management application, or integrating a contract intelligence (use NLPROC , NLC ) , creating a supply chain optimization with visual recognition of products from store shelf or an anomaly detection in a high volume trade. (Linked In, 2021)

# CHAPTER 03

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## **MY CONTRIBUTION AND LEARNING OUTCOME**

After completing 4 years study at North South University, eSRD gave me the opportunity to implement the academic knowledge and interpersonal skills in the professional working field. I have joined here on 1<sup>st</sup> July 2021 with a warm welcoming. On that very day, we were introduced to supervisor. I was assigned in the full stack development team as a junior developer. There were 7 more interns in the team under the same supervisor. We were trained as a full stack developer of the developer team and were assigned some small projects individually.

There were two projects that I worked on:

1. Interactive e-Learning Portal
2. University Management System

### **3.1 Interactive e-Learning Portal**

EPBL.org is one of the most leading educational organizations in problem-based learning. They decided to develop an interactive learning portal to help students in self-learning and to establish a communication channel between students and teachers that focus on Higher Secondary ICT education. Main features of this platform include:

- ❖ ICT book contents and section-wise programming problem sets for practice.
- ❖ Instant exam undertaking (MCQ)
- ❖ Programming practice module
- ❖ Result monitoring, evaluation and ranking
- ❖ Peer-to-peer teacher and student communication channel

Now the technical lead of this organization assigned me through my organization to develop the system step by step as the following MVC architecture.

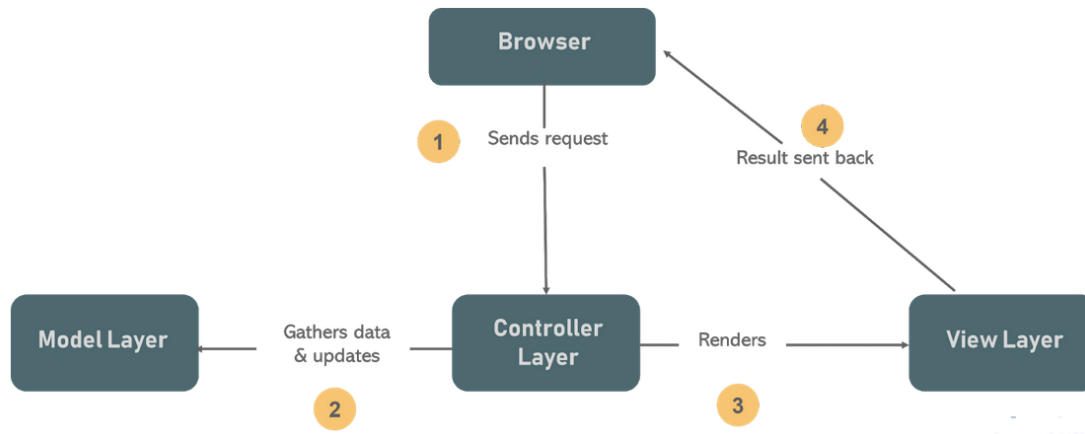


Figure 04: MVC Framework working process Diagram

Giving heed to all of these considerations, I decided to develop the system with the following technologies:

Presentation Layer: JavaScript (jQuery and Ajax), Bootstrap, HTML5, CSS (OpenJS Foundation, 2021)

Application Layer: PHP (CodeIgniter/Laravel) (EllisLab, 2021)

Data Layer: MySQL (2001-2021 The PHP Group, 2021)

Then It took me two weeks to complete the task as per as the requirements. You can see the work progress report on Appendix A with details.

## 3.2 University Management System

XYZ university is one of the leading universities in your town. Recently, the university authorities craved for a University Management System to optimize and digitize all the processes within their university, which will help to improve customer service, reduce process costs, streamline the search of student records, bills, faculties and staffs (eSRD Lab, 2021).

Fortunately, my company gets the opportunity to digitize their system. My project manager, Kamruzzaman Shuvo is assigned to develop the software for XYZ university. Luckily,

Kamruzzaman Shuvo has expertise in University Management System and I didn't have to worry about Project Management (Requirements, Functionalities, Architectures etc.).

Mr. Kamruzzaman specializes in Agile Software Development and wants to develop a highly secured, scalable, flexible, loosely coupled system with greater maintainability. After going through all the requirements, functionalities and resources currently available in the company, he decides to develop a Web-based In-house Software with Multi-tier Modular Architecture.

Giving heed to all of this consideration, he decides to develop the system with the following technologies:

Presentation Tier: Angular (JavaScript), HTML, CSS

Application Tier: Java Sprint Boot (Apache®, 2021)

Data tier: MySQL/Oracle Lite(optional) (2001-2021 The PHP Group, 2021)

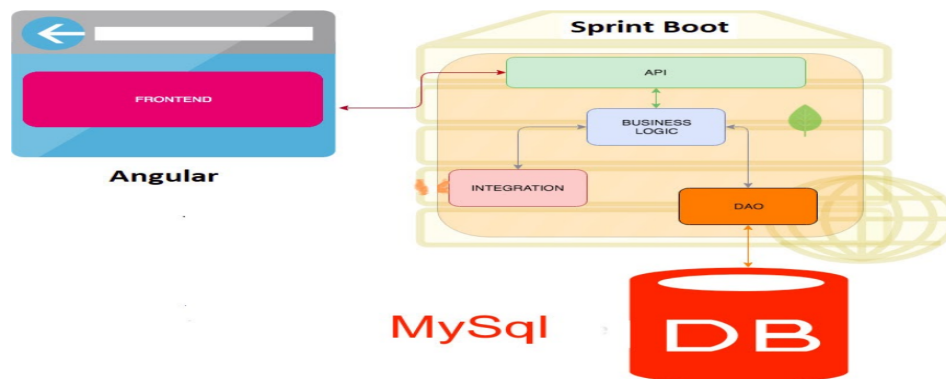


Figure 05: Spring-boot Angular Diagram

So, he appointed our team on this task and divided this project into several tasks. Then we started to develop the project and faced many difficulties due to an unknown framework. Then he gave us some documentation to read and helped us a lot to the end. After few weeks I was able to complete the task as per as requirements and submitted it. The details of my work are presented in Appendix A.

### **3.3 Learning Outcome**

Throughout this three months internship, learning outcomes can be divided into 2 categories; theoretical and practical.

#### **3.3.1 Theoretical Knowledge**

While gathering knowledge about Web Application I did learned the basics of software architecture.

#### **3.3.2 Practical Knowledge**

In my academy I came to know about only raw coding. Raw coding is easy but not effective. After joining here, I learned some framework and it made curious. I felt the corporate pressure during this season. Though it was a learning-based Internship program they treated us according to corporate rules and regulations. We had a shared drive, most of the information was there. We had continues feedback form, where the interns wrote their progress, bug, solutions and comments on the problem. We uploaded our code in the same repository on different branches, we can see each other's code. So, this environment made understand a complete working environment. Outside this we had a skype group, where we used to get help from our supervisors. I consider myself very lucky to be a part of this organization.

In appendix 'A' some of my contributions to the projects have been listed down. Maximum of the practical knowledge is reflected throughout the listed task.

Appendix B show the result of Evaluation of my performance.

Some additional skills that I gained from this internship is pair-programming, git, commenting on code, how to do code by reading documentation etc. At last, I got a clear picture of a full stack developer and an efficient way of coding.

## CONCLUSION

Development team plays the vital role of a company like eSystems Research and Development Lab. Here works frontend developer, backend developer & full stack developer. A full stack developer works both front end & back end side. They are the backbone of the team. For releasing software base any product the company must have a development team. Three months working with eSystems Research and development was a great opportunity for me. It was more like a journey to me. Opening myself to a great challenge. Working hard was my main reason for surviving this challenge.

Throughout the internship, I got the opportunity to know about a whole new methods of developing. I also switched my operating system from windows 10 to Ubuntu for more productivity. I also learn about time management. As I say earlier, this was a great experience for me.



## APPENDIX A

Problem ID	Date	Step wise progress report
<b>Week 1</b>		
P-001	07-07-2021	Install IDE and required environment
P-001	07-10-2021	Front-end of login and registration page
P-001	07-11-2021	create database as required and completion of back end
<b>Week 2</b>		
P-001	07-13-2021	Successfully completed problem 1 functionality and left some frontend tasks
P-002	07-17-2021	worked on session id, and created the required database
P-002	07-18-2021	OS, IP, browser collection using CodeIgniter and keep them in database
<b>Week 3</b>		
P-002	07-20-2021	Tracking user activities and keeping data of tracking
P-002	07-24-2021	Couldn't complete active time. Stopped working on problem 01 as shifting to problem 02
P-003	08-02-2021	Setup Environment for java and cloned given repository
<b>Week 4</b>		
P-003	08-03-2021	implemented MongoDB from GitHub repository
P-003	08-05-2021	checked database using tutorial, Mongo dB worked
P-003	08-07-2021	created student model and tried to run with postman some issues found
<b>Week 5</b>		
P-003	08-09-2021	created faculty Model and fixed student Model
P-003	08-10-2021	Grade model created
P-003	08-12-2021	Added marksheet and attendance to the Grade model
<b>Week 6</b>		
P-003	08-14-2021	All Crud API are running Shifting to AngularJS
P-004	08-18-2021	Implemented Angular JS from GitHub repository and checked tutorial model and it is working
P-004	08-20-2021	created student components and worked on it
<b>Week 7</b>		
P-004	08-22-2021	created student services and connected to CRUD API using routing
P-004	08-24-2021	created faculty component and worked on it
P-004	08-26-2021	created faculty services and connected to CRUD API using routing
<b>Week 8</b>		
P-004	08-30-2021	Checked all faculty and student component and found some error
P-004	09-02-2021	Created student find by name

<b>P-004</b>	09-04-2021	Created faculty find by student name
<b>Week 9</b>		
<b>P-004</b>	09-06-2021	Course Module Add
<b>P-004</b>	09-07-2021	Course Module List
<b>P-004</b>	09-09-2021	Course List and Search
<b>Week 10</b>		
<b>P-004</b>	09-10-2021	Course Advance Search
<b>P-004</b>	09-12-2021	Course Search by student id
<b>P-004</b>	09-13-2021	Course Module Details
<b>Week 11</b>		
<b>P-004</b>	09-16-2021	Grade Details by faculty and student id
<b>P-004</b>	09-18-2021	Grade Details by faculty and student id
<b>P-004</b>	09-20-2021	Grade Module update
<b>Week 12</b>		
<b>P-004</b>	09-21-2021	Design grade submission Layout
<b>P-004</b>	09-23-2021	Generate pdf versions of marksheet
<b>P-004</b>	09-25-2021	Create results and other database and retrieve it from database and done all works

## APPENDIX B

Form ID:INT.EVAL.001



### CSE498R/EEE498R/ETE 498R

#### Intern Evaluation Form

Department of Electrical and Computer Engineering  
School of Engineering and Physical Sciences (SEPS)  
North South University, Bashundhara, Dhaka-1229, Bangladesh

#### Student's Information

Student's Name	Md Sharif Hossain
Student ID	1712336642
Contact Number	+8801703596806

#### Evaluator's Information

Name	Kamruzzaman Shuvo
Company/Organization	eSystem Research and Development Lab, BUET
Office address	ECE Building, BUET, Dhaka-1000
Contact Number	+8801718347937
Email address	kazishuvomain@gmail.com

#### Internship Details

Number of Weeks Worked	12 weeks
Number of Hours Worked	324 hours (27 hours/week)

#### Evaluation Criterion:

The following skill sets and performance indicators will be rated by the industry evaluator.

Scale: 5=Excellent, 4=Above Average, 3=Average, 2=Below Average, 1=Poor, NA=Not Applicable

Criteria	Scale					
	5	4	3	2	1	NA
1. Quality of assigned work received	✓					
2. Quality of written communication skills	✓					
3. Quality of oral communication skills		✓				
4. Quality of computer/technical skills		✓				
5. Ability to work with others	✓					
6. Attendance & punctuality		✓				
7. Professional demeanor						✓
8. Professional appearance		✓				
9. Quality of computer/technical skills		✓				
10. Use of time management skills	✓					
11. Judgment/decision making skills	✓					
12. Adaptability& Flexibility		✓				
Total Score:		49 (Excellent)				

What are the intern's greatest strengths?

Analytical skill, solution designing, dedication and quick learning capabilities. Sharif is good at backend programming as well as full-stack development.

In what areas does the intern need to improve?

He needs to concern about some technical issues and practise coding regularly for efficiency.

Would you consider this intern for a permanent position?

Not decided yet, but we will recommend him to other companies.

Would you be willing to supervise additional NSU Engineering Interns?

Yes. We have developed a virtual internship platform to interface interns, industries and universities that have opened a new era towards "Go-Virtual". We will eagerly invite NSU Engineering interns.



\_\_\_\_\_  
Evaluator's Signature & Date

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