

# Internship Report

## SWE 420

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Shahjalal University of Science and Technology

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Dept of Software Engineering,  
IICT,  
SUST,

*Performed at,*  
**LEADS**  
delivers excellence  
Leads Corporation  
Banglamotors, Dhaka  
Time Period: 01/09/2021-28/02/2022  
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# Letter of Transmittal

July 16, 2022

Director  
Institute of Information and Communication Technology (IICT)  
Shahjalal University of Science and Technology

Dear Sir,

It is an immense pleasure for me to submit my internship report as a part of internship program. I am so thankful to the Dept. of Software Engineering and Institute of Information and Communication Technology (IICT) for giving me the opportunity to relate my academic knowledge with recent software trends in a renowned software company. This report is based on my learning and experience during my internship time, starting from September 01, 2020 to February 28, 2022.

This report both covers the technical skills that I gained through my internship program and represents my project involvements, acquired skills and other improvements. It is believed that the report will exhibit the overall outcome of my internship course. I am looking forward to your effective feedback on my entire report.

Sincerely yours,  
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Dept. of Software Engineering,  
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Date: 14<sup>th</sup> July 2022

# Letter of Endorsement

To Whom It May Concern

Subject: Approval of the Report

This letter is to certify that, all the information mentioned in this document is true and not confidential to the company. The projects mentioned here have had successful involvement of Syeda Sania Rahman, Dept. of Software Engineering, Shahjalal University of Science and Technology.

I wish her all the best and hope that she will lead a successful career.

For Leads Corporation Ltd.




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**LEADS CORPORATION LIMITED**

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# Acknowledgement

Firstly, I am thankful to the Department of Software Engineering, SUST for arranging this wonderful internship program for me. I am also grateful to Leads for recruiting me as an intern. I take this chance to express my significant appreciation and profound respect to Md. Nur Hossain, Manager, Leads Corporation for his praiseworthy direction, observing and steady consolation during my entire internship.

I would also like to thank Prof M. Jahirul Islam, Director of Institute of Information and Communication Technology, SUST for giving me the opportunity of internship at such a renowned organization.

I am grateful to our honorable teacher Fazle Mohammed Tawsif, Assistant Professor, IICT, SUST for his tremendous contribution in the whole process of getting us admitted in different companies.

I am likewise grateful to all my team members and individuals from Leads for making my adventure smooth and noteworthy. Finally, I would like to thank and express my tremendous gratitude to my project members including Salma Hasan (Former Senior Software Architect), Shafiqur Rahman (Senior Software Engineer), Md. Alamgir Hossain (Senior Software Engineer), Najia Afrin (Software Engineer), Faisal Ahmed Anik (Software Engineer), Md. Razib Hossain (Junior Software Engineer), Mohammad Noor Uddin (Intern) and Moinul Islam Tanvir (Intern) for giving me an effective period of experience.

# Executive Summary

This document deals with the author experiences and contributions towards Leads as an intern. It also represents the achievements and challenges during the internship program. The scope of this document is to identify and describe the analysis conducted, tasks completed, experiences gained and focusing on the achievements as an intern.

The Dept. of Software Engineering of SUST offers their undergraduate students to take part in an internship during their seventh semester. The goal of offering and taking this internship is to provide students with the opportunity to get practical work experiences and applied software engineering practices in real life projects. It is an excellent opportunity for the student to learn new things and getting familiar with the industry during their student life.

Being a student of this department, I was offered to take an internship at Leads Corporation, a well-known software company in Bangladesh. I joined Leads as an intern. The Leads family cordially welcomed me. However, after getting proper training, I started working as a full-stack developer along with practicing various software engineering practices. I was treated as an employee and got all the facilities just like other employees. I have explored recent technologies and practices, got familiar with industry people, and faced new challenges. I feel fortunate to have support and mentoring from all my teammates and team leaders.

During my last six semesters, I have learned more about software engineering practices. I found a practical implementation of such as agile process of development, scrum, sprint. It really helps me to make the link between my theoretical knowledge with the practical implementations.

The experience of working in real life project helped me to both develop my critical thinking skills and practice the software engineering best practices. This internship program helped me to improve my skills, confidence and provided me an opportunity to be a professional Software Engineer.

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# 1. Introduction

## 1.1. Preface

An internship is a period of work experience, offered by an organization for a limited period. In this period students get the opportunities to exercise their knowledge in their respective field and get familiar with industry practices and cultures. It plays a significant role to build up one's career. Internship also helps to build a communication bridge between academia and industry since industry discovers the capability of potential students. Students get chance to apply their academic knowledge as well as experience how their studies are applied and implemented in the real-life projects. Being an intern at multinational company it provides greater scope to collaborate with different people around the world and gather experiences which standardize a student's quality and ability to work in different environment. As it provides real-life work experiences, it helps a candidate with other aspects such as enrich one's CV, ease one's career path, improving technical and professional skills etc.

Dept. of Software Engineering of IICT, SUST provides a wonderful opportunity to students to experience a six-month internship within their academic curriculum. It helps broaden students' mission to work in world class organization and provides a practical knowledge of software industry.

Being a student of the Dept. of Software Engineering, after completing my sixth semester successfully I got the opportunity to take the internship program at Leads Corporation.

Leads is a 30-year-old multinational company having one headquarter in Bangladesh and three branches in various parts of Bangladesh and USA. Through this internship program I got firsthand experience of working in a software company. And this attained knowledge and experience is helping me grow in professional life.

## 1.2. Origin of Report

To submit a report on internship program experience is a part of our evaluation. It represents the overview of Leads environment as well as my professional growth and project involvements as an intern. It shows the opportunity of perspective learning for the student at the professional environment. It helps to provide forthcoming batches with an entire experience and feedback to who would like to take an internship at Leads. Especially it would assist them to develop themselves according to Leads's culture and practices.

## 1.3. Objectives

### 1.3.1. Broad Objective

The main objective is to represent my learnings and growth that I have achieved through the 6 months of internship.

### 1.3.2. Specific Objectives

This report aims to,

- Point out the industrial and organizational practices I have experienced
- Describe the project I involved in
- Describe the environment of Leads
- Highlight the technologies and the software development process adopted by Leads
- Present the services provided by Leads

## 1.4. Scope

This report deals with my experiences and knowledge that I have earned through the internship program. The company profile of Leads and its culture are also briefly discussed here. How a team works and the process of working as a team along with my role, learning modern technologies, trying out new tools are also summarized in this report. How I have adapted myself with the company culture and technologies is also mentioned. Especially through this report I try to reflect on my project involvements and my experience of working in one of the main projects of Leads. The report concludes by elaborating my technical and professional growth after experiencing the internship program.

## 1.5. Limitations

As company policy is sensitive about sharing internal information outside of the company, here minimal information is provided with respect to company policies and taking permission from the authority. Since I have worked on specific technologies and a single project, it is difficult for me to give an appropriate overview of other projects development process. Provided information about other projects is based on my experience and sharing knowledge with my colleagues.

## 2. Company Profile

### 2.1. Overview

Leads Corporation Limited has been a foremost information technology service provider since 1992 when it became the exclusive distributor for Bangladesh of the global giant NCR Corporation and took over the support service of NCR's then Bangladeshi customers. Leads has come a long way since, to become the leading provider of application software for the financial sector of the country, among its myriad of various products and services.

Leads participates in designing, developing, implementing, and maintaining business application software for both domestic and overseas markets. LEADS provide Core Banking Solution (BankUltimus) for the Banking industry for both local and global market. In addition to the banking industry LEADS provides products, services and solutions for non-banking financial companies, agent banking, capital market, broker house, life insurance, enterprise resource planning (ERP).

Furthermore, LEADS provides complete life cycle of software development services including system analysis, use case development, system architecture & design, system integration, native, web API development, UI/UX design, database design and administration, functional and system testing, quality assurance and project management. Apart from the above-mentioned services LEADS also provides diversified IT solutions and services that support attainment of client's business objectives like building network infrastructure, plastic card personalization, delivery & installation of PCs, Servers, storage and backup solutions, POS, and ATMs.

Over the last couple of years, LEADS has also moved into disruptive technologies like Blockchain, Internet of Things (IoT), Artificial Intelligence (AI).

### 2.2. Location and Physical Layout

Leads has four different offices including one head office,

#### **2.2.1. Corporate Head Office**

Leads Tower, Plot#1, M-20, M-13, Main Road 1, Section 14, Mirpur, Dhaka, Bangladesh

#### **2.2.2. Dhaka Branch Office**

9<sup>th</sup> Floor, Rupayan Trade Center, Banglamotors, Dhaka, Bangladesh

#### **2.2.3. Rajshahi Branch Office**

250/10, Block B, Dhanshiri Residential Area, Sopura, Rajshahi, Bangladesh

#### **2.2.4. USA Office**

2420 Bronze CT, GA 30041, USA

## 2.3. Core Values

These are the core values Leads follows on their journey to success,

- Integrity
- Respect
- Performance
- Teamwork
- Continuous Improvement
- Customer Dedication
- Green Living

## 2.4. Management Team



**Shaikh Abdul Aziz**  
Chairman



**Shaikh Abdul Wadud**  
MD & CEO



**Anisur Rahman Khan**  
Chief Marketing Officer



**Mohammad Ashrafuzzaman**  
CTO



**Sadat Anwar**  
Head of HR



**Mohammad Akteruzzaman**  
Head of Finance

## 2.5. What Leads Does

### 2.5.1. Products

#### 2.5.1.1. Bank

##### 2.5.1.1.1. bankUltimus

Core Banking Solution (CBS) branded as “BankUltimus” provides integrated solutions for Retail, SME and Corporate banking as well as has features supporting Trade Finance, Loan management system and a lot more. It is an enterprise banking solution that enables Banks to provide full range of banking services and content to Customer Information File (CIF), Know Your Customer (KYC) & Transaction Profile (TP) according to Central Bank compliance efficiently and reliably.

##### 2.5.1.1.2. iBankUltimus

Internet banking solution.

##### 2.5.1.1.3. nCore

nCore (Agent Banking solution): Agent Banking means providing banking services to the bank customers through the engaged agents under a valid agency agreement, rather than a teller/ cashier- it is the owner of an outlet who conducts banking transactions on behalf of the concerned bank.

##### 2.5.1.1.4. BUBooth

BUbooth is a Booth Banking (Subbranch Banking) Software which enables banks to offer Booth Banking services to its clients outside traditional banking units. All the Booth branches are to be considered as an extended part of the controlling branch.

##### 2.5.1.1.5. Islamic Window

Islamic Window provides functionality for banks to conduct Islamic banking activities for their clients. It includes a comprehensive reporting system with Sharia based functional modules.

##### 2.5.1.1.6. VerifID

This solution is developed with state-of-the-art technologies like image matching, optical character recognizing, live picture, AI, natural language processing etc. Customer just need his or her NID, few minutes time to complete the E-KYC. Leads E-KYC can be done both by the customer himself or assisted by organization agent or officials.

##### 2.5.1.1.7. TouchPOINT

TouchPOINT mobile application is the singular service point that can accelerate the whole financial experience for the customers within their fingertip.

##### 2.5.1.1.8. FrontMoney

FrontMoney is a comprehensive, end-to-end solution for automotive loan appraisal system, from electronic application capture through efficient credit processing, funding verification, validation and booking of new loans and leases.

### **2.5.1.1.9. X-Chequer**

The X-Chequer solution manages complex business requirements of treasury management and combines efficiency and reliability of service with sound position maintenance and liquidity management facilities.

### **2.5.1.1.10. Plug-B**

RTGS is an electronic inter-bank transactions settlement system where transfer of funds or securities take place from one bank to another on a 'real time' and on 'gross' basis.

### **2.5.1.1.11. S3**

A comprehensive set of features to get the right fit, integrating AML and Central Bank compliance seamlessly with existing business processes and systems.

## **2.5.1.2. NBFI**

### **2.5.1.2.1. finUltimus**

Core Financial Solution branded – a real-time, online NBFI business solution.

### **2.5.1.2.2. iFinUltimus**

## **2.5.1.3. Capital Market**

### **2.5.1.3.1. CAPITA**

CAPITA provides institutions operating on capital markets with modern tools allowing to meet all these requirements and effectively manage clients' assets.

## **2.5.1.4. Insurance**

### **2.5.1.4.1. InsurSoft**

InsurSoft is a complete integrated & web-enabled online life insurance solution.

### **2.5.1.4.2. i-Life**

i-Life is an internet-based life insurance system.

## **2.5.1.5. ERP**

### **2.5.1.5.1. CenterPoint**

This is a business approach that consolidates all aspects of a business.

### **2.5.1.5.2. HRMS**

Human Resource management and information system.

### **2.5.1.5.3. LeadsVAT**

Automated VAT system.

## 2.5.1.6. Digital Innovation

### 2.5.1.6.1. EduChain

With blockchain based system the authority can create and issues certificates digitally to the certificate owners with QR and unique hash code.

### 2.5.1.6.2. ParmaChain

Through PharmaChain pharmaceutical companies will be able to monitor and track their full distribution process.

### 2.5.1.6.3. Leads Track

A distributed application for supply chain to trace and authenticate asset.

### 2.5.1.6.4. AidTrust

A Blockchain based solution utilizing decentralized identities and smart contracts that increase transparency & efficiency in aid distribution among the beneficiaries.

### 2.5.1.6.5. Trusulin

A blockchain based solution to track, trace and verify the counterfeit insulin products.

### 2.5.1.6.6. RecruitGenie

RecruitGenie is an AI based virtual interviewing platform that automate the hiring process, reduce operational cost and help recruiting right fit for the organization.

## 2.5.1.7. Data Warehouse & Analytics

### 2.5.1.7.1. LIA

LIA is an Artificial Intelligence (AI) Chatbot with whom customers can interact/chat on social media platform.

### 2.5.1.7.2. Ultimus Analytics

Ultimus Analytics analyzes data, develops queries to check against the analyzed data and creates reports with analytical results including dashboards and other forms of data visualization.

## **2.5.2. Solutions**

### **2.5.2.1. Cash Management Solution**

The State-of-The-Art machines have been developed based on an in-depth analysis of banknote handling processes to lower the operator's burden and complication.

### **2.5.2.2. Card Personalization Solution**

Creates highly secure Financial Card programs and Government ID initiatives, as well as Secure ID programs for education, corporate security and many other markets tailoring solutions from Entrust Datacard solutions.

### **2.5.2.3. Security Solution**

- SSL Certificate
- Strong Authentication
- PKI

### **2.5.2.4. Government Solutions**

- BTEB
- BMET
- DTE
- Ministry of Planning Commission
- WASA
- Central Jail

### **2.5.2.5. Unified Collaboration Solution**

### **2.5.2.6. Server, Storage & Network Solution**

## **2.5.3. Services**

### **2.5.3.1. IT Service Packs**

### **2.5.3.2. Virtual Office**



## 2.6. Workflow

### 2.6.1. Overview

- At first business analysts find out the problems that business is facing. They start working as soon as the initial scope is defined. This allows evaluating mutual velocity with clients. They start with an intensive consultancy that results in a detailed report and a management summary on viable solutions.
- Each project is assigned a product manager to capture current business context. Which market suits the business contexts, who are the competitors, what software they use or offer, what is their core competence and what core processes drive it- all these inquiries are responsibility of product manager. Once this information is collected, product manager and one of senior architects then work out an appropriate technology stack, architecture and define the business goals of the upcoming product.
- Once product development starts, a fluent agile software development process continues with continuous integration and periodic releases to production. The complete development process is conceptualized, documented, evaluated, and delivered using latest technologies. Thus, they reduce vendor dependency and enable the product to be taken over at any state.

## 2.6.2. Software Development Process

Software development process is a division of software development work into distinct phases containing activities with the intent of better planning and management. It is often considered a subset of the systems development life cycle. LEADS follows agile methodology to support proper integration of project requirements.

- First senior software engineers and architects analyze the project. Soon they produce a conclusion of which technologies to use and the architecture of the project.
- Different repositories get created for frontend and backend development in Azure DevOps server. At the beginning these repos have one master branch and one development branch. Whenever someone is implementing any feature, they need to create a sub-branch under development branch. Everyone's code first gets merged into development. Master branch gets updated after a while by a senior developer.
- Then entire solution gets sliced without multiple parts, which are named as "User Stories". User stories have two main characteristics that are "Priority", "Story Points". Priority is a subjective rating of the user story, feature, or requirement as it relates to the business and Story Points is the amount of work required to complete that story. As for a big scale project it is not always possible to set the Priority and Story Point for all of the User Stories. So, to get started only the amount of User Stories for one sprint gets assigned their Priority and Story Points. At every sprint there is time for "Backlog Grooming Session". At that session everyone of the team discusses and sets the Priority and Story Points for upcoming sprint's User Stories.
- Everyone of a team gathers to plan sprint in a meeting named "Sprint Planning". User Stories are then again gets divided into smaller tasks. Also, some common tasks are created too. Such as, Self-Study, Knowledge Sharing Session, Backlog Grooming Session, Sprint Review & Retrospective, Sprint Planning.
- After that comes planning the sprint. At every sprint, everyone gets assigned tasks that are under a story. Everyone gets chance to suggest their time estimation to complete that task and gets assigned with that time for the task. People who review PR and/or merge code gets extra time for that too which are story independent.
- The whole sprint planning gets uploaded to Azure DevOps server. Everyone keeps track of their progress from here.
- For a specific page, the backend codes need to get PR approved by assigned reviewer. After it has been approved, a senior developer then reviews it again. And if alright, then it gets merge to the development branch.
- Once the backend code is PR approved and merged to the development, the postman collection of it gets handed over to the frontend developer of that page. Frontend codes get developed by following the same practice as backend.
- After a feature is implemented, it gets to the QA team for testing. And if any issue arises then the developer who implemented it takes the responsibility to solve it using the same process again.

- Once goal for a release is met, it gets released and the development process continues as before.
- At the end of a sprint a meeting gets arranged named “Sprint Review & Retrospective”. At this meeting everyone shares what went well on that sprint and suggests what could have been improved. Then a discussion takes place on how to bring more improvement based on everyone’s suggestions. After end of these meeting “Sprint Planning” starts.
- At the next sprint the process starts all over again, but if there are any leftover task from previous sprint, it gets more prioritized.

## 2.7. Major Clients & Partners

### 2.7.1. Clients

- Citizens Bank Ltd
- Probashi Kallyan Bank
- Rajshahi Krishi Unnayan Bank
- Southeast Bank Ltd
- Shahjalal Islami Bank Ltd
- Premier Bank Ltd.
- Meghna Bank Ltd.
- Modhumoti Bank Ltd.
- NRBC Bank
- Standard Bank Ltd.
- NBP Bangladesh

### 2.7.2. Partners

- Fortinet
- Barracuda
- Cardtek
- Glory
- Entrust
- Teradata
- Microsoft
- Oracle

## 2.8. Human Resource

Leads has a family of about three hundred members already and it is growing fast. It has a very competent HR department. They are planning to recruit more. They have their unique recruitment process. As most of the projects are of big scale, Leads ensures everyone first understands their business logic well. To do so Leads provides multiple levels of training program for free. After someone completes the program successfully, they get a certificate for it also.

## 2.9. Recruitment Process

Leads has four step interview process,

**Step 1:** Aptitude Test

**Step 2:** Technical Test \ Interview

**Step 3:** Board Interview

**Step 4:** Final Interview

## 2.10. Tools & Technologies

Over the years Leads has been working with these tools and technologies,

Languages	JavaScript, PHP, Python, C#, Java, Swift
Frameworks	Angular, Vue, Django, ASP.NET MVC, ASP.NET Core, Spring Framework, Spring Boot
Libraries	jQuery, React, Redux, Vuex
ORM	Entity Framework, Dapper ORM, Hibernate
Web	HTML, CSS
Mobile	Android Studio
Database	Oracle Database
Architectures	Monolithic, Microservices
Cloud	Microsoft Azure
Tools	Git, Azure DevOps Server

## 2.11. Work Environment

LEADS has created its own culture for providing a healthy and friendly environment at workplace. Performance and success of an organization depends on the employee of the company. Here Leads does a particularly excellent job bringing out the best performance from its employees

### 2.11.1. Working Hours

In Leads Sunday to Thursday is considered as official working days. Employees are required to work at least 9 hours every workday. They must enter the office before 9 pm and at 6pm at least.

### 2.11.2. Dress Code

Employees need to maintain formal attire at Leads. For male employees it is formal shirt, pant, shoe and/or suit. For female employees' attire should be of formal saree or three-piece.

### 2.11.3. IT Support

The IT support team is always there for solving hardware and network related issues. They will also provide engineers with the necessary software related support and take care of the software licensing issues

### 2.11.4. Rooms and Sitting Arrangements

At Leads the projects are divided into separate teams. Teams are operated as a single unit. As the team members are always close to each other, the communication gets better between them and they all bond as a team. Junior employees can be monitored and guided well by senior employees this way.

### 2.11.5. Sprint Planning

Leads follows agile methodology for developing software. In agile methodology the development of a project is divided into distinct phases. These phases are called sprints. Usually, one sprint takes 1 month to finish. Before a sprint starts a "Scrum Master" is elected from the team, who then manages the sprint for rest of the month. Then the development requirements are identified, and development process is planned in presence of all team members. After that, the features and requirements are divided into small stories which are then divided into smaller tasks. Although the team members can choose their tasks by themselves, but sometimes the team lead assigns these tasks to different developers. Each task has their own time limit. Developers must finish those tasks within that time. All the sprint details then get uploaded to the Azure DevOps Server. Team lead can monitor how much work is done from DevOps. This is how sprint planning is conducted.

### 2.11.6. SCRUM Meeting

At Leads every morning at 9:15am the team members gather on a meeting to discuss their tasks. One tells others what s/he'll be working on that day. The team lead and project manager check whether everyone is up to the pace. Team members can discuss their work's dependency with each other. This also makes it clear whether anyone in the team needs help from other

members or not. Everyone can stay updated about each other's work and get a hold of the bigger picture of the development. SCRUM meeting lasts from 5mins to 15mins max.

### **2.11.7. Work From Home**

Certain VPN connection was set up on everyone's personal computer by IT team. Employees then accessed their remote pc using the VPN connection. For communication between employees Leads used Microsoft Teams.

While working from home, everyone of a team joined morning SCRUM meeting at 9:15am and continued as usual. At the evening they again did a short day-end meeting to conclude how much they have achieved their goal for that day.

### **2.11.8. During Covid-19**

Leads shifted to home office as soon as the Covid situation worsened. It was a challenge for everyone to cope with home office. Maintaining communication was big concern. But after a few weeks everyone was coping up well with the new situation. Even at later 2021 when the office ran offline for just couple of months, Leads maintained strict safety measurement to prevent spread of Covid-19. Everyone must wear masks and they were sanitized every time they enter office.

## **2.12. Employee Facilities**

Along with the amazing work environment Leads also provides employees the following benefits,

- Medical allowance
- Provident fund
- Gratuity
- Leave Fare Assistance (LFA)
- Festival bonus
- Mobile phone ceiling
- Annual leave
- Casual leave
- Sick leave
- Maternity leave
- Training
- Mentorship

## 2.13. Recreational Facilities

### 2.13.1. Events

Team events are generally planned by the teams after a big release. That is usually going out on a lunch or dinner. Leads will also offer farewell event to say goodbye to an old employee. Also, they arrange an annual Iftar Mahfil at the month of Ramadan.

### 2.13.2. Celebrations

Leads celebrates some national and international days too. Like Pohela Boishakh, Pohela Falgun, International Women's Day, New Year's Eve etc.

## 2.14. Culture

### 2.14.1. Co-Operation

All the employees of Leads are co-operative and helpful. It is not necessarily only team members help each other. Any employee can ask for assistance from a senior or specialist from another team if they are stuck at any point. As large projects are being developed parallelly, all the team members help each other to meet their goal for the sprint.

### 2.14.2. Friendly Environment

I have spent six months as an intern in Leads. Noone differentiated us from other employees. They were very friendly. They help us to adapt with the latest changes and challenges. And this friendly environment helps us to refresh our minds while working for hours

### 2.14.3. Inspiration

The environment of Leads is inspiring. Especially my team lead inspired me after each completion of every small task. This inspiration helped to become more focused to my work. Upper management also inspires the full team after a sprint, successful releases.

### 2.14.4. Farewell

All the members take part to buy gifts and surprise cards to wish any old employee leaving the company. A farewell lunch or dinner gets arranged. Sometimes they throw parties to say goodbye.



## 2.15. Gallery



WELCOME TO THE LEADS FAMILY



## 3. My Journey at LEADS

### 3.1. Overview

Internship is a process of making newcomers familiar with his own job field and adapting him\her with the actual industry-oriented task that will help him\her in future to gain a successful career.

After joining in Leads, I was handed over an organized sheet which has my tasks planned for each month. For the next 6months I tried my utmost best to fulfil these tasks perfectly. I started gradually by learning about their tech stack and tools. After completing a test project, I finally get to work on as a full-stack intern in one of their big scale projects that is UltimusNex. I was supervised by my team lead. Like I got help from my teammates, whenever I got the chance, I also tried to help them at solving errors and bugs.

As the name suggests, UltimusNex is the successor of BankUltimus. Core Banking Solution (CBS) branded as BankUltimus provides integrated solutions for Retail, SME and Corporate banking as well as has features supporting Trade Finance, Loan management system and many more. It is an enterprise banking solution that enables banks to provide full range of banking services and content to Customer Information File (CIF), Know Your Customer (KYC) & Transaction Profile (TP) according to Central Bank compliance efficiently and reliably.

BankUltimus was constructed with ASP.NET MVC using the MVC architecture. At UltimusNex, our target was to migrate BankUltimus to REST architecture. UltimusNex had a microservice architecture that included five other services. It uses Oracle Database, backend was constructed using ASP.NET Core and frontend was in Vue.js To do so, we had to understand the codebase of BankUltimus first, then write appropriate frontend code in Vue.js and backend code in ASP.NET Core. After a certain time, my tasks also include reviewing PRs.

Software development progress was same as described before that is, first endpoints are created then after these codes get approved by a senior software engineer, UI creation starts and goes through the review process before getting merged. At the beginning of a sprint, we had our tasks planned and assigned at Azure DevOps. We worked according to that. We also occasionally had Knowledge Sharing sessions to discuss about self-studies and new learnings. Overall, for me it was a slow start, steady progress, and a good ending.

From the beginning to two months, we were working directly at office. But after that, we went for remote office because LEADS was shifting their office from Banglamotor to their Head Office at Mirpur.

*Disclaimer: Because of confidentiality I was not able to attach pictures of any of the projects and the development process.*

## 3.2. Month 1: Learning Period

Leads gave me a full month to study their stack which included many new tools and technologies with which I was not familiar. Goal for my first month was learning different programming language and technologies like HTML, CSS, jQuery, JavaScript, Vue.JS, Vuex, Vuetify, ASP.Net Core 3.1, Entity Framework, Dapper, LINQ, Oracle SQL. For the coding environment I need to get familiar with PL\SQL, Visual Studio 19, VS Code and GitHub. As it was a migration project, I needed to study both of their architectures too like MVC architecture, REST architecture and concept of Web APIs. Every day at SCRUM I gave an update about my study.

## 3.3. Month 2: Getting Hands Dirty

After getting familiar with their tools and technologies I was assigned the following tasks for the second month,

- UltimusNex is a web application, although I was already familiar with web development LEADS gave me time to study further about web application software development concept and practices.
- At the time I joined LEADS, UltimusNex was already under development. So, to get myself prepared I needed to understand its solution architecture for UI, API, and DB level development as well as the coding conventions they were following.
- When I got a grasp of their solution architecture for entire UltimusNex, I was assigned by my team lead to complete a “Test Project”. Tasks for this project was to create clone three selected pages from UltimusNex with its entire functionality which included setting the project environment, writing Stored Procedures (SP), creating endpoints, designing, and integrating UI.
- My progress was monitored by my team lead, got helps from teammates too. Occasionally, I had to give declarative speech of how the code is working and was asked questions about the code I had written.
- A lot of things get clear and new questions arise when someone gets a firsthand experience. This Test Project made it easier for me to understand UltimusNex codebase better.

## 3.4. Month 3: First Steps

Later passing the Test Project successfully, my team lead was satisfied enough to let me work on UltimusNex directly. I proceed as following,

- I started slowly by building pages that are of type Parameter. Parameter pages takes general information inputs from System Admin such as, Country, States in a Country etc. These data are then shown to User.
- As UltimusNex is a code migration project from BankUltimus, I also had to study BankUltimus solution architecture and coding conventions. As BankUltimus codebase was in .NET MVC, it was a completely new to me and a bit challenging to get used to at first. But I eventually coped up with it.

- For completing the pages that I was assigned for the sprint, I progressed by reading code of a page from BankUltimus and then writing appropriate code for that page in Vue JS.
- Although I was working only at frontend for the month, but parallelly I was studying ASP.Net Web Forms, ASP.Net MVC, xUnit.net, WCF Service, Oracle PL/SQL as well so that I can work on backend from next sprint.

## 3.5. Month 4: Working Full-Stack

As I got more familiar with UltimusNex, for this sprint I got the chance to work on backend as well.

- I was assigned parameter pages this sprint as well. It was not necessary that I build both the backend and frontend of page. Sometimes I was building the endpoints and someone else from the team is building the UI and vice versa. So, I decided to build the endpoints first to resolve other's dependency on me. I progressed as usual reading codes from BankUltimus then writing appropriate codes for UltimusNex.
- Another part of building APIs was writing unit tests for all the functions of an endpoint to ensure expected result. To pass review successfully all of these test cases needed to pass too.
- At this sprint, I was also assigned to review PRs of frontend. To review PRs, I had to check if there were any bugs, if the coding convention is maintained strictly or not, if the code has any unnecessary functions or variables declared. I reviewed them, wrote comments if there was any issue and after all the comments were resolved I approved those.

## 3.6. Month 5: Upgrade

At this point, my team lead decided to level up my tasks a bit. So, my sprint went as following,

- For parameter pages I worked on both front and back end like before.
- Some new types of pages were introduced to me at this sprint, those were Deposit & General Ledger (GL). Purpose Deposit types of pages are to handle any bank account related operations and activities including type of account, account opening\closing. And for GL pages, it handles transaction related activities. Such as, account debit, credit, and many other operations.
- As Deposit & GL pages has particularly complex business logic under the hood, I worked at UI level of these pages for this sprint. Even at UI, it was complex. Like, having nested and\or conditional tables in both pages and modals.
- Reviewed PRs at this sprint as usual. But from this sprint I reviewed backend PRs as well. Had to maintain the same strategy as before for reviewing backend PRs too.

## 3.7. Month 6: Complex Tasks

As for my last month and sprint, I faced the most challenging period. Though it was tough, but I enjoyed every bit of it.

- At this point of time, there were not anymore parameter pages left to migrate. I was assigned to develop both frontend and backend for Deposit and GL pages.
- As these pages had complex business logic, I had to dive deep into banking system to implement these well. Got helps from my teammates also.
- Procedure was same, reading code from BankUltimus then building endpoints, write unit tests, after endpoint codes get PR approved then implement and integrate the UI.
- Continued to review PRs of both frontend and backend as usual.



## 4. Acquired Skills

### 4.1. Technical Competence

#### 4.1.1. Practices

##### 4.1.1.1. Microservices

Microservices - also known as the microservice architecture - is an architectural style that structures an application as a collection of services that are. A microservices architecture consists of a collection of small, autonomous services. Each service is self-contained and should implement a single business capability within a bounded context. A bounded context is a natural division within a business and provides an explicit boundary within which a domain model exists.

##### 4.1.1.2. MVC

The Model-View-Controller (MVC) is an architectural pattern that separates an application into three main logical components: the model, the view, and the controller.

➤ **Model**

The Model component corresponds to all the data-related logic that the user works with.

➤ **View**

The View component is used for all the UI logic of the application.

➤ **Controller**

Controllers act as an interface between Model and View components to process all the business logic and incoming requests, manipulate data using the Model component and interact with the Views to render the final output.

##### 4.1.1.3. Web API

A web API is an application programming interface for either a web server or a web browser. It is a web development concept, usually limited to a web application's client-side (including any web frameworks being used), and thus usually does not include web server or browser implementation details such as SAPIs or APIs unless publicly accessible by a remote web application.

##### 4.1.1.4. REST

REST, or REpresentational State Transfer, is an architectural style for providing standards between computer systems on the web, making it easier for systems to communicate with each other. REST-compliant systems, often called RESTful systems, are characterized by how they are stateless and separate the concerns of client and server.

## 4.1.2. Technologies

### 4.1.2.1. JavaScript

JavaScript (JS) is a lightweight, interpreted, or just-in-time compiled programming language with first-class functions. While it is most well-known as the scripting language for Web pages, many non-browser environments also use it, such as Node.js, Apache CouchDB and Adobe Acrobat. JavaScript is a prototype-based, multi-paradigm, single-threaded, dynamic language, supporting object-oriented, imperative, and declarative (e.g., functional programming) styles.

### 4.1.2.2. Vue.js

Vue.js (commonly referred to as Vue; pronounced "view") is an open-source model–view–viewmodel front end JavaScript framework for building user interfaces and single-page applications.

### 4.1.2.3. Vuex

Vuex is a state management pattern + library for Vue.js applications. It serves as a centralized store for all the components in an application, with rules ensuring that the state can only be mutated in a predictable fashion.

### 4.1.2.4. Vuetify

Vuetify is a complete UI framework built on top of Vue.js. The goal of the project is to provide developers with the tools they need to build rich and engaging user experiences.

### 4.1.2.5. VeeValidate

VeeValidate is a form validation framework built specifically for Vue.

### 4.1.2.6. C#

C# is a programming language developed by Microsoft that runs on the .NET Framework. C# is used to develop web apps, desktop apps, mobile apps, games and much more.

### 4.1.2.7. ASP.NET MVC

ASP.NET MVC is an open-source web application framework developed by Microsoft that implements the model–view–controller pattern. It is no longer in active development.

### 4.1.2.8. ASP.NET Core

ASP.NET Core is a free and open-source web framework and successor to ASP.NET, developed by Microsoft. It is a modular framework that runs on both the full .NET Framework, on Windows, and the cross-platform .

### 4.1.2.9. xUnit.NET

xUnit.net is a free and open-source unit testing tool for the .NET Framework. The software can also be used with .NET Core and Mono.

#### 4.1.2.10. Dapper ORM

Dapper is an object–relational mapping product for the Microsoft .NET platform: it provides a framework for mapping an object-oriented domain model to a traditional relational database. Its purpose is to relieve the developer from a significant portion of relational data persistence-related programming tasks.

#### 4.1.2.11. Oracle Database

Oracle Autonomous Database is an all-in-one cloud database solution for data marts, data lakes, operational reporting, and batch data processing.

### 4.1.3. Tools

#### 4.1.3.1. Postman

Postman is an API platform for developers to design, build, test and iterate their APIs.

#### 4.1.3.2. PL/SQL

PL/SQL is a procedural language designed specifically to embrace SQL statements within its syntax. PL/SQL program units are compiled by the Oracle Database server and stored inside the database. And at run-time, both PL/SQL and SQL run within the same server process, bringing optimal efficiency. PL/SQL automatically inherits the robustness, security, and portability of the Oracle Database.

#### 4.1.3.3. 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.

#### 4.1.3.4. Azure DevOps Server

Azure DevOps Server is a Microsoft product that provides version control, reporting, requirements management, project management, automated builds, testing, and release management capabilities. It covers the entire application lifecycle and enables DevOps capabilities.



## 4.2. Professional Growth

Professional growth refers to gaining new skills and work experience that can help one reach a goal in their career. This internship program at LEADS gave me the opportunity to get a real-life work experience and develop myself as a professional.

### 4.2.1. Communication

As an introverted shy person my communication skill was not that good. But when working at a team and trying to make a good progress, I had to present what problems I was facing, had to ask for help when needed, had to have discussions for own and other's needs, need to ask questions to understand the tasks properly, shared day's plan and day's progress every day at scrum, discussed about learnings. Not only that, but I also got to meet new people. All of these made me speak up more, to communicate more. Overall, my communication skill got a lot better after the end of six months.

### 4.2.2. Teamwork

Before internship, I only had a little bit of experience at working in a team, also none of the previous experiences was in professional environment. But here, I got an opportunity to work with a professional team of nine amazing people. Learned to adapt and collaborate with different people and environment. This also showed me how everyone can work together even if with distinct perspectives sometimes, how my team lead manages a team.

### 4.2.3. Co-operation

A team cannot succeed on a task if cooperation does not exist. Each of my team members had amazing cooperation skill. They were always helpful and thankful to each other. Even to grow together we had knowledge sharing sessions occasionally every month. These helped me to grow my cooperation skills as well.

### 4.2.4. Work From Home

The newest and most unusual thing for me was to work from home. It was a tricky skill to build because at home the environment is different from an office. But staying consistent to my work I was successful to not only pull this off but also have a good grasp in it.

## 4.3. Self-Development

### 4.3.1. Time Management

Our tasks got planned and assign at the beginning of a sprint. All the tasks had time limits and most of the time I got chance to decide the amount of time I needed. As it was in my hand, I had to get very calculated of it. I made sure it was as efficient as possible. Also, I had to complete the task in that specific time. So, all of these made we aware and skillful of my use of time.

### 4.3.2. Critical Thinking

At past, if I faced any error I would get panicked and immediately look for the solution rather than thinking about what is causing the error. But now I can say that my thinking process has been changed. Now I look for the reason of an error when it occurs, if I find it then I'll try to understand it and eventually solve the error.

### 4.3.3. Empathy

Being part of a team, one needs to feel the empathy for his/her team members or working colleagues. I saw my teammates being empathetic to each other. Even my team lead did not behave roughly, even if someone was not able to complete their tasks at time. He always asked the reason of being late to complete, if that person is facing any problems. Even at someone's problems, others came to help happily. These practices helped me to become a kinder person than before.

### 4.3.4. Dedication

Dedication of my teammates was to look for. Everyone was trying their utmost best to complete their tasks perfectly at time. Also, as everything was planned from before, I tried to stay consistent with my work as well. Gradually it made me more dedicated to my work.

### 4.3.5. Attitude

I am fortunate that I my team was built of some extraordinary, enthusiastic people. They were always sincere with their work. They make me feel positive towards every kind of work in a professional environment. We worked together with patience and dedication to make this project a success. This experience made me more patient and positive minded person.

### 4.3.6. Punctuality

LEADS has strict working hours and dress code. Everyone working there were maintaining these rules well. I tried my best to stay consistent as well and was never late to anything. These trained me to be more punctual and organized as a person.

## 5. Conclusion

The internship program enabled me to learn vital information about the software industry, its culture, workplace, and everything related to software development. It has helped me become acquainted to the business's formal culture and the main technology they use. By using the actual technologies there, I was able to complete the best academic year of my life. The tasks I worked on will motivate me to work even harder and be more responsible and self-assured.

The internship program enhanced my teamwork ability. It is important to function as a unit and respect others to make a project successful at the company. The team discussions helped me identify and solve a lot of complex problems which would have been impossible to solve without everyone's teamwork.

I would like to express my gratitude to the Department of Software Engineering at SUST for giving me the chance to learn more about the challenging work world. My coding and design skills for software development have improved. I am now eager to take on the forthcoming problems that the world will present.

In a nutshell, my internship was a tremendous experience. And I'm hoping that this experience will inspire me and teach me how to construct a better future for myself.

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