Project Management Internship at Brain Station 23

by

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in partial fulfillment of the requirements for the degree of
B.Sc. in Computer Science

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Declaration

It is hereby declared that

1. The thesis submitted is my/our own original work while completing degree at Brac University.

2. The thesis does not contain material previously published or written by a third party, except where this is appropriately cited through full and accurate referencing.

3. The thesis does not contain material which has been accepted, or submitted, for any other degree or diploma at a university or other institution.

4. We have acknowledged all main sources of help.

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Abstract/Executive Summary

In this paper I have built upon the topics covered in my Pre Thesis 1 and 2 reports. I have outlined the basics of my job responsibilities at the internship and accompanied it with relevant technical information. I would request you to evaluate this paper in conjunction with the reports that I have already submitted in order to paint a holistic picture of my job experience and the lessons I learnt

Limitations

Due to the covid-19 pandemic the entirety of my internship was conducted from work from home which placed restrictions on my learning. The contents of this paper are based upon the interactions I had with the team members, my personal research and experience.

Acknowledgement

First and foremost, praise be to Almighty Allah for His guidance and allowing me to obtain an education from Brac University and aiding me in successfully completing the requirements of my degree by giving me the opportunity to conduct a Project Management Internship at reputed software firm, Brain Station 23.

I have always believed that a student's education only achieves maturation by applying the lessons in a real world working environment. I am eternally grateful to the Department of Computer Science and Engineering for providing me with the opportunity to complete an internship and thereby completing the Thesis requirement for successfully graduating with a Bachelor of Science in Computer Science.

It has been a privilege and an honour to be employed as an intern by a prestigious firm such as Brain Station 23. I am grateful to the founder and CEO of the company, Mr. Raisul Kabir who has been a beacon of light in the industry and continues to be an inspiration to all young professionals in this field.

The contribution of my Internship Co-Supervisor, Mr. Mujtahid Al Islam Akon who has also been my lecturer in the past, has been immense. I would not be able to successfully complete my internship had it not been for his guidance and support. I am incredibly thankful to him for agreeing to supervise me and ensuring that I have a well-rounded internship experience that also meets the university requirements.

Mr. Pias Golam Asad, Supervisor of my internship has provided me with an incredibly large amount of information regarding real-life working experiences.

Lastly, I will always cherish the experience of interning at Brain Station 23. I had the good fortune of working with and under the guidance of many talented and disciplined professionals. My experience at the firm has opened my eyes to the diverse opportunities that one is presented with a degree such as BSc. in Computer Science. Bangladesh as a country has been making large strides in the industry both at a local and global level and I consider it an honour to be a part of this field.

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Nomenclature

The next list describes several symbols & abbreviation that will be later used within the body of the document

AEM Adobe Experience Manager

$AR - VR$ Artificial Reality-Virtual Reality

CMS Content Management Solution

ERP Enterprise Resource Planning

RTM Requirements Traceability Matrix

SQA Software Quality Assurance

UI User Interface

Chapter 1

Company Profile

1.1 Company Background and Overview

Brain Station 23 has established itself as a pioneer of producing software services in the country. It believes in risk diversification and the greater potential to capitalise as a service provider rather than launching its own, specified product. Its CEO, Mr. Raisul Kabir mentions that there is not room in the market for more than two technology products belonging to the same category such as Pathao.

Thus, he maintains that it is much more unlikely for a service company to fail as opposed to a product company. He also believes that if a company decides to stand out in the market by developing a product of its own, it often fails in establishing the quality of services he is currently providing as there is mismanagement of priorities. If a company's present business suffers in quality, then it is difficult for it to stay in business and actually make the product they want to in the long run.

The company's revenue is divided according to one fourth of it being attributed to local business and three fourth generated from international clients.

Among the services provided by Brain Station 23 are included E-Commerce Solutions for Retail Companies like Otobi and Sailor in the form of Enterprise Resource Planning (ERP) systems, Pharmaceutical Solutions, banking services such as the City Touch for City Bank, Cloud Business, AR-VR Solutions and many more.

Brain Station 23 functions on the vision of creating employment opportunities for Bangladeshis, earning foreign currency and saving foreign currency. Keeping these broad goals in mind, the company has shaped itself up and the services it decides to provide over the last few years.

Chapter 2

Adobe Experience Manager

2.1 AEM as means of Software Quality Assurance

Adobe Experience Manager is one area that I had the opportunity to extensively study which I have also mentioned in my Pre-Thesis 1 Report. Adobe Experience Manager, popularly known as AEM is a content management solution (CMS) for web development in a quick and efficient manner. AEM provides access to the different stakeholders of the company to upload and frame their content as they please in a customised way. AEM is also a good tool for implementing standard Software Quality Assurance practices as it is possible to test the functionalities of the website being built.

AEM is a software that provides its user with two different environments:

1. Author Instance

2. Publish Instance

In order to work with AEM, the employee must be granted user access rights which are placed behind a company's firewall in order to provide complete protection. A channel of communication with the client or as per agreements before the start of the project, a certain number of employees working on the project were given the access rights. There are two kinds of access rights:

1. Author Access

2. Approver Access

Those with author access will have the ability to edit and upload content but he/she may face restrictions or limitations when it comes to publishing and deleting pages. In this case, only those with approver access will be able to publish or delete pages. However, the authors have the option to trigger workflows which will deliver requests

to the approver. The approver has the full freedom to accept or reject the request.
link2

The author and publish environments enable one to make content visible on their websites. The Author environment implements an easy-to-use graphical user interface (GUI) to add the content. Based on the access rights provided to a specific account of an author, the author has to login with valid credentials to use the environment.link1

Before progressing to the publishing stage, the author creates, updates and reviews the content. In the publish environment, the design of the interface is finalised and made visible to the visitors of the website.

The tasks performed as an author include the following:

- Coming up with new content or improvising existing content of a page by making edits

- Make use of preexistent templates to make new content

- Managing assets and publications including creating and editing them

- Move, copy or delete content pages, assets, etc.

- Publish and Unpublish content pages

2.2   Working with AEM Components

There are a variety of components with which one can work on AEM. After the initial familiarization period, I was able to effectively begin working with the components to create content and also ensure required functionalities. Some of these components are specifically built for respective websites so as to provide the designs as per requirements. Other components are known to have been used across different websites multiple times. These are known as the core components.

It is also important to keep in mind the testing process which will have to be implemented in a later phase. In that case, some steps should be outlined during authoring that the tester can follow and ensure full client satisfaction.

2.3 Follow the design

Using the available components, the expectation from the author is to create the design according to specifications. link1 One of the main test purposes in this aspect is to check whether the design is possible to be implemented with the available components. If not, more customization will be needed to come up with the required components

2.4 Checking the publish view

The responsibility of a good SQA Engineer is to check the functionality of the website and whether the provided UI is responsive across multiple browsers. If there is confusion between the client and production teams as to whether a page should be published or not, AEM provides an option to work around this problem by viewing the created pages in "View As Published" mode. link2

2.5 Component functionalities

In order to check whether each component is providing the desired functionality, every component must be tested separately. In the case that a component has multiple features or functionalities, a test case including a combination of different scenarios may be conducted.

2.6 Page Properties and Tags

Since separate pages which may use similar components have specific functionalities, each page includes page properties. These properties will vary with the template used to create the page. The page properties include certain options which are not readily accessed unless the properties are changed. The author is also able to lock a page which means that no other author or user can access the page to edit or create content until the page is unlocked.

Tags can be created by authors and added to the website pages. Tags are short descriptions of the content featured on respective pages. For example, since I worked on the teams of Pharmaceutical clients, I authored many pages related to medical blogs, health information etc. For these pages, tags such as the names of the diseases mentioned or "healthy lifestyle" could be used. Tags enable Search Engine Optimization and organize content which makes it easier to conduct content authoring.

2.7 Resolution

There is a quote by anonymous which I believe, "The principle objective of software testing is to give confidence in the software." Alongside making the environment enjoyable and effective to use, AEM also ensures that reliance and dependability is provided in the end product created. It fulfills the duty of good software testing which is to provide confidence in the use of the software.

2.8 Tasks Assigned and Lessons Learnt from AEM

Before I took on this internship, I harboured an interest in working with UI and expanding my working knowledge of the application and implementation of UI principles. In certain course projects, I had gotten an exposure to work on User Interface. As a result, this had opened up my eyes to the importance of good, responsive web design which amounts to a large chunk of the required functionality. The most interesting part about my internship would be that not only did I get the chance that I desired to work with UI through AEM, I also got the opportunity to widen my horizon of expected contribution in the field of software development.

Having a sound understanding of the core features and capacities provided by AEM play a crucial role in creating the UI/UX for AEM projects. When doing so, there are a number of factors that one must be conscious of:

- Well documented and understood requirements eg., functional, user, business requirements. It is important to comprehend the overlaps between the requirements and what functionalities one wants to build by using AEM.

- Maximise productivity by ensuring that the job can be completed whilst using minimum efforts. It is imperative to outline the common areas so that the same work is not needlessly repeated.

- Cost reduction - if productivity is prioritised, the cost can be expected to fall as a result. It is important to build the project in a cost-efficient manner so as to get the maximum benefit from the resources used.

- Implement a simplified authoring experience

- Provide high quality UI of the application

A common means to simplify the process of creating good UI is to use the acronym FRAME link1. This means the content should be "Flexible, Reusable, easy to Author, Modular and Extensible".

2.9   AEM Core Components

The most straightforward approach to building the desired outcome is by making use of the provided AEM core components. There are many different pre-built core components that AEM provides making the job of designing functional and responsive web pages easy and efficient. Starting from page building components such as Text, Image, Header and Footer, Button, Download, PDF View, Progress Bar to Container components which are largely responsible for responsive UI such as containers of varying composition, tabs, accordions etc. There are also commerce components which aid in the display of relevant product information such as Product List, Navigation, Teaser, etc.

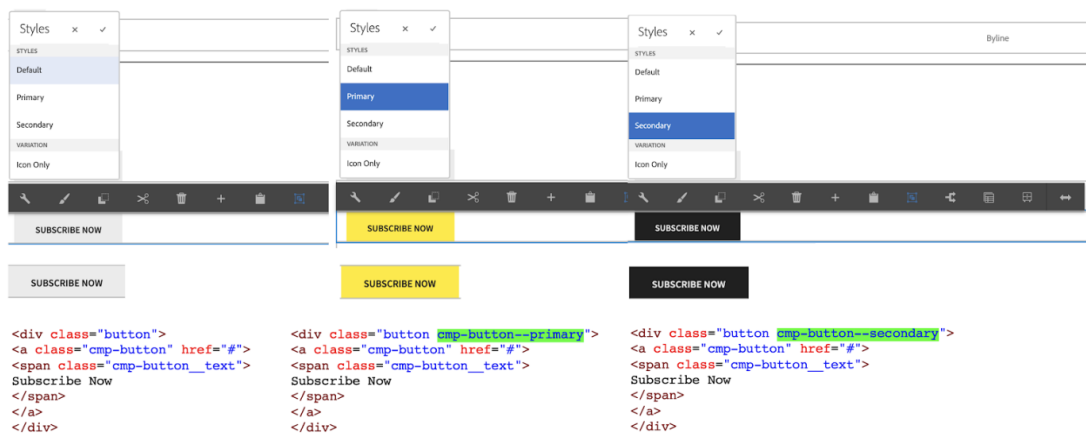## 2.10   AEM Style System Feature

Figure 2.1: aem style.png

These features enable the authors to have flexibility and choices in terms of the style variants to be used for respective components. The styles can be added, grouped or combined that allows the same components to be reused and easily modified for subsequent uses of the components. The styles are encoded in CSS behind the scnes of AEM. link1

"Each style option is mapped with a CSS class which is added to component markup at the parent level when selected. This gives control for the frontend engineers to implement CSS, targeting the parent CSS class." link1

2.11   Ability to build responsive layout

In my opinion, one of the biggest benefits provided by AEM is the ability to build responsive layouts that are functional across multiple browsers and different devices. The "Layout Container" component is the incredibly handy and efficient tool which allows this to happen. As an author, one can select the percentage of screen width to be used by the respective component. For example, it is possible to equally divide the screen into three columns for three different components or 75% and 25% between two components, etc. Within the Layout Component, it is possible to add the basic page authoring components to create text, image content, etc. The author can also choose between full-width or fixed-width containers, all of which allows the production of features which are consistent across all platforms. Responsive layout leads the way to an optimised browsing experience. It is also seen that the visitors of a website which offers poor content layout will switch to a competitor's website which offers better user experience link4. Ultimately, the objective of any business is to retain and attract more consumers and thus producing responsive web layout becomes one of the prioritized goals in building an AEM project.

2.12   Implement design foundation

The front-end design setup of a website is something which needs careful planning and design in order to be effective in the delivery of the product and required functionalities. Once the initial infrastructure is defined, it is important to consistently follow that plan and produce pages which are similar to the previously decided themes and patterns. This paves the way for smooth development by the front-end team as they are then able to define global styles and CSS classes which can be implemented across all pages to maintain consistency. The most commonly used AEM global components can be styled in such a way so as to be highly reusable and flexible for authors to implement and produce the desired UI for the page. link3

Chapter 3

Software Quality Assurance

3.1 Overview

In my first two Pre Thesis reports I have outlined in great detail the importance of good software quality assurance in the software development process. I have elaborated on the concepts, techniques and practices of Requirements Engineering and all the phases included in Testing Life Cycle including Requirements Elicitation, designing Test Plans and Test Execution. I have also touched upon Unit Testing in particular, its advantages, best practices for execution and some drawbacks. Furthermore, I have written about Test Use Cases and User Stories. For this purpose, I will not reiterate some of the key lessons which I have already submitted in my previous reports. In this final thesis, I will provide a breakdown of my job responsibilities in Software Quality Assurance, particularly in Traceability Matrix and some overall lessons I have learnt as well as the kinds of job roles I want to pursue in the future.

3.2 Job Responsibilities in Problem Analysis and Specification Phase

This is the earliest or first step of the Software Life Cycle (SLC). In my current role, I have been providing support to the Software Quality Assurance and Business Analyst teams. During this phase QA and Security engineers along with the analyst combine their knowledge, skills and practices in order to construct Software Requirements Specifications documents. In this respect, I am outlining the overall team responsibilities which include my contribution as well:

- Collect requirements documents from the client and prepare the respective specifications including Business Requirements, Functional Requirements, Non-Functional Requirements and User Requirements Specifications.

- Collect the documents required to form the references based on which the project will be developed.

- Find out which platform the final project will run on and the languages and language versions that will be utilized to prepare the project.

- Clearly establish the identity of users and stakeholders of the project. Based on that, it is important to determine the type of User Interface (UI) that is necessary for the program to be executed efficiently and effectively.

- When it comes to servicing high-profile clients, which have company valuations of millions and billions of dollars, as Brain Station 23 regularly does, it is of utmost priority to take in the security concerns and build a product/software that is in complete compliance to any and all legal liabilities of the client.

- Come up with a set of guidelines against which the final system can be compared to and duly evaluated.

- Gather enough data which is required throughout the entire project and its phases as well as to successfully conduct all the individual tests of the Testing Cycle at each phase.

- Ensure that the clients who are being serviced are being properly understood. Sufficient number of questions should be asked to clear any and all doubts and to develop a clear picture of what the demands are. For this, the management and stakeholders need to communicate with the users and clients properly.

- Decide which formal methodology will be used to write the specifications during the design phase such as Z, VDM, Larch, UML etc. If some other methodology is to be used then it should be clearly specified.

- The descriptions of the inputs and outputs should be clearly written and verified by the clients, users and other stakeholders by showing it to them.

- Periodically review and reassess the system specifications as a better understanding of them is developed by going through the different phases of the project.

- Following up with that, the client, the users and other stakeholders should be notified of the changes and provided with the updated specifications to see if they meet their actual needs better than previous versions of the specifications.

3.3   What is Traceability Matrix

The Traceability Matrix, which is also known as Requirement Traceability Matrix (RTM), in the simplest terms is a documentation of the interlinks between different requirements and use cases. It is a high-level document that maps the requirements to use cases defined according to client specifications in such a way that it is easy to trace the desired functionalities of the system.

Since the aim of testing is to ensure maximum test coverage, the RTM is a great way to evaluate that the things which need to be tested are indeed being tested. It is also useful to track the progress of each of the user stories or test cases in the sense that some of them may be in progress, completed, failed, blocked, etc.

3.4   Importance of Traceability Matrix

The entire project's functionality is tested through the Traceability Matrix which is another way of saying that End to End Testing of the application is attained. The RTM ensures that a high quality of the end project is being maintained as maximum test coverage is achieved. It is also a reliable method to achieve quality control as the RTM allows the tester or SQA engineer to test the system for unpredictable scenarios and document the behaviour of the system. As and when required, improvements to the system can be thus incorporated. A major part of Software Quality Assurance is the satisfaction of all the Functional and Nonfunctional Requirements as outlined in the Software Requirements Specification (SRS) and RTM enables the team to achieve that.

3.5   What is End to End Testing

This is a software testing methodology that ensures a system is functional across all the required functionalities and demanded events which occur from beginning till end of the system. link5 For example, since I worked on the teams of pharmaceutical clients, one of our responsibilities was to construct a Healthcare Professional (HCP) portal for doctors and other workers in medicine to access. In this case, End to End testing would look like being able to successfully carry out the following functions for a healthcare professional:

1. Register for an account

2. Login with existing account

3. Access discussion board separated by specific topics

4. Be able to make posts in discussion forums and engage in comments section

5. Receive promotional material on latest information about medicine

6. Receive updates on latest findings in medical research

7. Configure customized notifications for updates in desired topics

8. Logout of account

The events which are outlined above can all be broken down into various user stories which are mapped in the RTM and tested. If the written tests are passed then it can be said that end to end testing has been successfully conducted.

3.6 A breakdown of the process I used to construct the Traceability Matrix

Figure 3.1: RTM.png

On the second day of my internship, I received a call from my supervisor who asked me if I knew anything about the Traceability Matrix. I began to do my own research and later that day was included in a briefing session with a Senior SQA Engineer about Traceability Matrix. I was given the task of constructing a RTM for the pharmaceutical client that we were working for. The steps I followed to do so are as follows:

1. Review the different Requirements Specifications including Functional, Business and User Requirements Specifications

2. Review the User Stories

3. Construct a template of the RTM as follows and gain approval

4. Once I gained approval, there were many details that needed to be sorted out regarding the mapping of the different requirements, user stories and use cases. I collaborated with other members of the team such as the senior developers, SQA engineers and business analysts. I was taught how to identify the common grounds specified in the written requirements and work accordingly. I was expected to maintain the utmost professionalism in my quality of work and ensure that everything was done accurately.

5. Maintenance of the RTM is also something that I was tasked to do. As the project progressed, there were developments that had to be incorporated into the RTM. For example, the status of a test case may have to be updated. In some cases, a lot more user stories were added which would then have to be mapped to the relevant requirements, etc. I elaborate on other aspects of this maintenance duty in the project management part of my internship.

3.7 Key Takeaways

When I was doing the courses related to the kind of work I did in my internship, I was always curious about the real world implementation. The importance of certain things like documentations and SRS were not clear to me before I gained real life work experience. As I worked, I understood how crucial it is to have a sound understanding of the requirements and proper documentation of them since they pave the way for successful delivery of the system. Now, I can say that I have the experience as well as the technical knowledge to do well in Software Quality Assurance and related fields. As important as the job of the programmers is in the software development life cycle, the desired outcomes can only be achieved with the collaboration with the SQA team.

As the world evolves in the way it deals with technology, there has been an increased awareness of bridging the gap between the production teams and the users of the end product. We are now shifting from primarily focusing on technological evolutions to placing an importance on the implementation and real world implication of the product. For these purposes, Software Quality Assurance and Testing are incredibly important which is also where I see myself building a career in.

Chapter 4

Project Management Duties

When I was initially employed as an intern, one of the purposes I was tasked to serve was organization of the processes being conducted and maintaining cross-team functionalities.

4.1   Confluence

The main tool that was used to maintain updates regarding project development was Atlassian's "Confluence" which is a document management system which helps to share knowledge and information across teams and departments, particularly useful during the pandemic and work from home situation. Confluence makes the process of collaborating with clients more streamlined and effective and is overall useful to maintain an organized and efficient structure to the software development.
Job Responsibilities in regards to Confluence:

1. Attend meetings and keep meeting minutes

2. Summarise meeting minutes and update on Confluence pages

3. Maintain readability of Confluence pages by organising them into numbered sections and subsections. Ensure that all sections and pages are accurately numbered.

4. Review Confluence pages and keep track of mentioned team members. Notify team members of pending tasks, if any and ensure that all tasks (pending and completed) are appropriately indicated.

The use of Confluence majorly aids in ensuring client satisfaction by providing an easy to understand breakdown of project ongoings and required documentations. Desired content are easy to search up and due to the maintenance duties I contributed towards, any and all team members were able to use Confluence to conduct their work in an efficient and consistent manner.

4.2   Jira

Confluence is used in collaboration with another Atlassian tool called "Jira". Jira is a useful and efficient tool in order to conduct the phases of the software development cycle effectively including development and testing. Job Responsibilities in Jira:

1. Once development began, it was imperative for the team to have all the desired functionalities updated in Jira in the form of User Stories. Since I already had the experience of working with the Traceability Matrix, I was given the task to transfer the content from Confluence to Jira.

2. Using the existing knowledge I had of the requirements, user stories and the accompanying acceptance criteria, I transferred the content while ensuring complete consistency.

3. Make updates on the Jira issues (Epics are broader system areas which are divided into specified User Stories) - Epics and User Stories as and when there were any changes or developments. I also had to ensure that these changes were reflected on Confluence pages.

4. Generate reports on project progress based on the developments in Jira

5. Generate roadmaps on sub-tasks of the User Stories

6. Generate reports on the different User Stories completed in different sprints of production

Benefits of Jira:

- Better Visibility - It is a tool which can be incredibly useful in planning and visualising the project ahead of time. It helps in providing structure to the applied process and methodology and helps you to reach your targeted goal in a quicker and more efficient manner. Instead of depending on external, time-consuming and unreliable channels of communication between different teams like development and testing teams, (since communication is not every technical profession's strong suit), all concerned parties are seamlessly updated with the progresses according to the Jira issues regarding time to completion, bugs, etc.

- Useful means for prioritization - Again, Jira takes away the external need for communication and instructions in terms of getting the work done. When a software development life cycle begins, it is incredibly important to set a priority level to each task that needs to be completed. Any employee, when given access to JIra can see for themselves what the priority list is and complete

the work as and when required without relying on pushes from the project managers or team leads. This allows the process to be more organized, save time and dedicate that time to fixing any and all bugs that may arise.

- Higher Productivity - All the content on Jira is organized in lists formats. This helps the team members to get an accurate breakdown of everything that needs to be done subsequent to completing a given task. This can also help the team members to plan ahead and work efficiently.

- Jira provides the option of time tracking - this allows the project manager and team leads to accurately assess the amount of time being spent on specific components of the project. These evaluations are shared and discussed in team meetings to figure out how to solve any problems and how to better distribute time and efforts. Reports can also be easily generated through Jira tracking performance and updates.

4.3   Implemented Methodology and Brief Team Overview

Agile Software is the methodology that was utilised in the teams I worked in. Agile Methodology is a simple and effective means to convert the vision of the business into reality. Since it was already anticipated that the process to produce the end system for the pharmaceutical clients would involve constant planning, evaluation, discussion and incorporation of feedback into the team process, Agile Methodology was selected to be the most applicable one to meet client satisfaction. Additionally, Agile Methodology offers flexibility which was also an important consideration to take note of. Scrum Composed of a Scrum Master who conducts and steers the meeting, the Product Owner who maintains the Product Backlog and the rest of the team also known as the Scrum Team takes part in a Scrum Meeting at the beginning of each working day. The Scrum Master typically is responsible for maintaining a document on Confluence in which the details from each subsequent Scrum Meetings are recorded. The SDLC progresses by building on the events of the most recent Scrum Meeting. The product backlog is an account of the requirements to be fulfilled and the interrelationship with the user stories. It is also important to prioritize pending tasks, which the product owner does. He is also responsible for ensuring the existence of all required functionalities at each release. Additionally, the team members are divided as follows:

1. One Project Manager

2. Eight to ten members in the Development Team

3. Five to six members in the Quality Assurance Team

4. Three members in the Business Analyst Team

The interns including myself provided support to the QA and BA teams. It was also important that the members of each team collaborated with each other during the different phases of production. For example, towards the end of every sprint or release, it becomes more imperative for the QA team to interact with the developers. This is due to the Software Life Cycle documents which have to be written and delivered along with the release. Often, the key details to be included in these reports can only be completed with the knowledge of a developer.

Chapter 5

Conclusion

I find myself to be incredibly privileged to have had the opportunity to complete an internship as a crucial step to complete my graduation. Given the educational background that I had and the principles with which I have grown up, it was always important to me that in order to complete my solid understanding of the education I received, I must be able to apply it in a real world scenario.

Conducting this internship at a prestigious firm such as Brain Station 23 has equipped me with many invaluable lessons that I will surely carry forward with me no matter where I go. Furthermore, it has given me a direction to follow in my career, build on the skills I already possess and hone my craft to achieve perfection. The internship experience was beneficial to me to instil my self-belief that I can function as a motivated and driven professional. Some of these are:

1. I have learnt to set incredibly high standards for myself and the quality of work I produce.

2. It is crucial to take ownership of any task that you are given, whether it is seemingly big or small. This is a direct lesson that I have learnt from the CEO of BS23, who has succeeded in incorporating high values and principles in his company's work culture. Taking ownership means that one ensures a task is completed in the best possible manner from start to finish.

3. There is no need to shy away from challenges. In fact, facing challenges is an incredible opportunity for growth on both a personal and professional level. Before starting the internship, I would never have known that Iam capable of making valuable contribution in a high pressure professional environment. Now, I have the confidence I needed to be determined to make a mark in the professional field with my education.

I would like to elaborate on the importance of quality assurance in the software engineering field. The situation is such that, especially in Bangladesh, the importance is heavily given to the technical side and the programming. In those departments, Bangladesh's workforce has made significant strides both in the local and global tech economies. There is much talent to be found in developers and engineers in our youth base. However, understanding the importance of Software Quality Assurance is an area which is slowly coming to the awareness of Project Managers and other tech leaders, especially in Bangladesh. The reason for this is, given that one of our main sources of foreign currency revenue is the software industry, it is incredibly important to maintain proper communication channels with foreign clients. Clearly written requirements and strong communication relationship with clients can be the difference between a highly successful project that leads to many other opportunities for the software business or a system that fails to meet the client's expectations and tarnishes the reputation of the software company.

For too long, the science and technology industry has only placed a concentrated focus and emphasis on the technical aspects. But with such a large and overall effective industry, impacts other than the technical sides are huge. One example is data analysis concerning the sociological impacts. Something even more specific to software production is Requirements Engineering. It is a crucial job in the efficient deployment of the products and client satisfaction. In the real world, the skills a programmer possesses to build complex and extensive software is not sufficient to work on actual products and services that are in demand. A concise breakdown of requirements and ability to understand the client's problems are imperative to come up with effective strategies and nuanced solutions.

From my brief understanding of working in Quality Assurance and providing Business Analyst support, some people may be quick to falsely assume that such activities and documentation are unnecessarily bureaucratic. Before and after every deployment, a large number of documents need to be prepared, signed off by the respective authority, sent back and forth between client, Quality Assurance team and Developer teams. This is a time-consuming process. However, in order to present your client with the exact product or service that is demanded should be the top priority of any software firm and in order to accomplish this, the time investment is a reasonable and worthy one.

Alongside having sound technical knowledge of a Computer Science education, I have had the good fortune to contribute the extracurricular and additional skills and traits which I have acquired throughout my high school and university education. Given the fact that I have maintained a freelance writer career for more than seven years, I have the strengths of having professional analytical skills. Due to my interest in

speaking, communication and interacting with people from all backgrounds - I have also developed an extensive set of interpersonal and communication skills as well. These qualities have all proved to be beneficial for the analyst role. Since, to be a good analyst you need to have:

- analytical skills

- technical skills

- managerial skills

- interpersonal and communications skills

As I mentioned above, this internship has been a truly eye-opening experience into the professional world for me. For many reasons, a student's university career may not be as successful as anticipated. Due to the fact that the best performing candidates from their respective schools are competing in university level, it is easy for even the student with the highest grades to get demotivated. However, for such students the option for internship can be an extremely beneficial and educational one. I strongly believe that in order to complete the well-rounded development that a university experience promises, a student should gather work experience. Moreover, from a personal perspective, I am once again motivated to pursue my career and chase my dreams. This continued experience of my internship has re-instilled the confidence in myself and has narrowed down the skills in which I can be proficient. From my current position, I hope to continue in Quality Assurance and focus towards Requirements Engineering by presenting a comprehensive output of the diverse skill-set that I possess.

Through my internship, I have realised the value of Requirements Engineering and the importance in bridging the gap between clients and production teams. I am now equipped with more practical knowledge of what makes a good Software Engineer than I would have if I just relied on textbook knowledge. Globally, there is an increasing awareness of the crucial roles that must be fulfilled Software Engineers adjacent to the roles of Programming and Development. As a result, I am inclined to carve out a career for myself in which I am able to do just that.