

Internship Experience Report: Advancing Quality Assurance
Skills at Planet X Inc.

by

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An internship report submitted to the Department of Computer
Science and Engineering
in partial fulfillment of the requirements for the degree of
B.Sc. in Computer Science

Department of Computer Science and Engineering
Brac University
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Declaration

It is hereby declared that

1. The thesis submitted is my own original work while completing my 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.

Student's Full Name & Signature:

A handwritten signature in dark ink, appearing to read 'Bishal', with a horizontal line extending to the right.

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Approval

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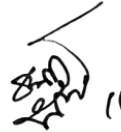
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Abstract

During my internship at Planet X Inc., On the large scale I contributed to two large projects: the Footsteps Bangladesh web application and the Scholar Jimmy Library. To check the programs and beneficiaries it included tracking, robust functionality, usability, performance, and security on the Footsteps Bangladesh application. I have implemented QA practices like functional testing using Jest, performance testing using k6, as well security testing using OWASP ZAP. My contribution in AI driven tool Scholar Jimmy Library project is back-end QA to make the user's interaction with the tool smooth and quick. This report reflects about the projects I worked in, the difficulties I've encountered and what I've gained professionally in those projects, how structured QA process helps us give out a quality product.

Dedication

This report is dedicated to my family. They have been my source of encouragement as I worked on this project. To my parents, who continue to inspire and encourage me through words of wisdom, and my friends and teachers who have inspired me all throughout the way. Shout out to my advisers who continuously remind and push me to persist and perform at my best. Its presence is an evidence of its impact to my academic and professional development.

Acknowledgment

In this regard, I would like to thank my supervisor, Mr. Md. Tawhid Anwar for his immense support and useful advice on my internship. He's wise, tolerant, and committed, and he has led me in the right direction, and the best part of the personal and career life I am in today. I am highly thankful to him for his support for me for which not only my technical abilities have improved but also I have learned much about tolerance and problem-solving skills regarding the software issues that encountered while working on the project. I shall also extend my appreciation to all the people that I worked with at Planet X Inc.; they were so kind and willing to share their time while helping me to carry out my internship. Finally, I acknowledge my family and friends for always being my source of reinforcement in what I do best as I was completing this task.

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Chapter 1

Introduction

1.1 Preamble

An internship is an important transition between the world of theoretical knowledge and the world of practical experience in the working world. It helps you to apply the learned subject in the actual world, to make yourself familiar with technical facilities, and to get a comprehensive knowledge about the organizational processes. At Planet X Inc., The two major projects that I was able to do during this time period are Scholar Jimmy Library and Footsteps Bangladesh. Scholar Jimmy Library is an AI driven learning application that is aimed at helping teachers, students and researchers by way of its intelligence educational support. However, Footsteps Bangladesh is an interactive program tracking and beneficiary management tool. The projects both helped me be part of my professional development in whatever area I am working on as a QA Engineer.

1.2 Objective

The main goal of this Internship was to develop applied experience in Quality Assurance (QA) approach with reference to testing the effectiveness and utility of the software. = This paper outlines the work done as a part of Footsteps Bangladesh and Scholar Jimmy Library project, problems occurred and professional development deserved during the period of working.

1.3 Information Sources

The knowledge in this report comes from practical work, discussion with supervisors and teammates at Planet X Inc., and technical literature in the form of project documents and testing tools such as OWASP ZAP and k6.s.

1.4 Document Overview

To make this report more structured and easier to read, this report is divided in some chapters which talk about different parts of the internship experience. In the second chapter, the company's history, the way the company is culturally and within the workplace is presented. In the chapter 3, I have provided insights to the details of the workplace at Planet X Inc. that were organizational structure, methods of communications, and the daily routines as well as that of the work life balance. In chapter 4, I talk about the presence of my internship and the role in the Footsteps Bangladesh and Scholar Jimmy Library projects. It describes the objectives of these projects, used methodology as well as challenges faced while testing and optimizing these applications. The second chapter (5), concentrates on what I had learnt throughout this internship in regards to professional growth, and it covers the technical skills as well as the interpersonal skills I attained. Furthermore, it reflects on what I have learnt and the consequences on the direction I want my future to take. Finally, Chapter 6 ends with a summary of my experiences overall, the key lessons I learned from interning at Google, as well as how this one has influenced my future career. An advantage of this approach is that it emphasizes the meaning of QA for software developing and makes clear the different phases of my internship.

Chapter 2

Company Profile

2.1 Company Overview

Planet X Inc. was founded in 2018, is become a software development and IT solution provider company. The objective of the company is to supply scalable and efficient software applications for startups and largeventions alike. Planet X Inc has more than twenty talented engineers working for it and is capable of creating new applications, improve and develop the software and create maintainable systems that meet industry practice. The company has established its image as one that provides quality innovative digital solutions to its local and international clients. Organizational culture at Planet X Inc. particularly focuses on collaboration, continuous learning and client satisfaction, to ensure high quality and efficiency in every project on board. By using the latest, and most progressive technology and agile methodologies, the company aids businesses solve their tough challenges and keep creating and growing sustainably.

2.2 First Day at Planet X Inc.

My first day, in general, was filled with enthusiasm, and a combination of new lessons to be learned at Planet X Inc. I was greeted nicely by the team and I got to sit down with the CEO, Ali Hafiz and the Managing Director in which I explained to them more about the company, environment and requirements. Through the composition I realised that the team was friendly and supportive making it easy for its members to blend into the organisation.

2.3 Products and Services

Planet X Inc. offers two primary services:

- **Application Development:** Creating scalable, resilient and performing applications for both startup and large companies.
- **Application Optimisation::** Improving the efficiency and size of current software applications in use.

Altogether, Planet X Inc. has become a technology supplier that many both domestic and global corporations prefer to work with. Thus, having a passionate team and a clear client orientation perspective, the company is to expand its operations in the sphere of IT.

Chapter 3

Workplace Details

3.1 Organization Structure

Organisation structure of Planet X Inc is relatively flat and encourages free sharing of information among the employees of the company.

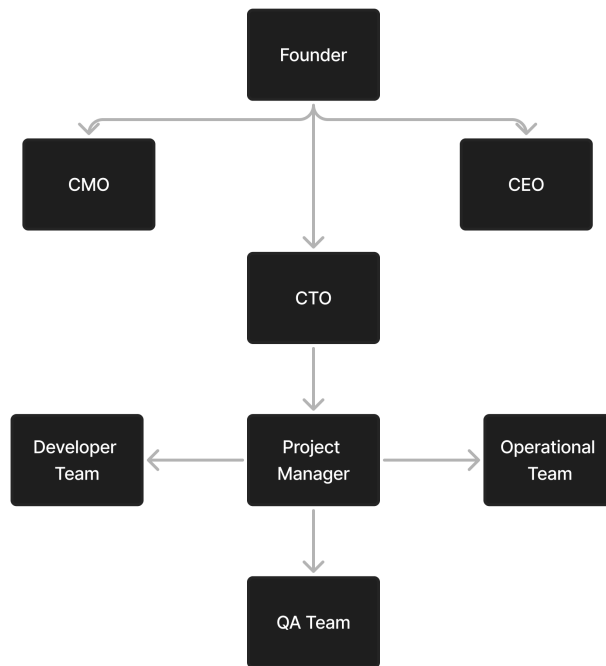


Figure 3.1: Organization Structure of Planet X Inc.

3.2 Communication

One major part of my internship at Planet X Inc was the effective communication. Discord was largely used by the company to discuss with the teams and communicating with them in voice, as a platform for an efficient and organized collaboration. Every day stand up meetings, team discussions and quick resolution of issues were conducted on discord. In addition, there were no other tools we used outside of ClickUp for task tracking, bugs, and project progress. By using ClickUp, we were able to define tasks, assign them, and observe the ones that had passed the testing phase as well as the status of these tasks.

Apart from those tools, I checked in with supervisors and team members regularly to clarify requirements and make sure our test goals were aligned. The project progress was reviewed weekly, any roadblocks were discussed and improvements were outlined in weekly review meetings. Much like email and instant messaging, formal communications and reporting critical updates were done through email and instant messaging. Planet X Inc. possessed an open communication culture that caused an environment of high collaboration, which meant that issues were dealt with quickly and testing goals were achieved effectively.

3.3 Daily Routine

The structure of my daily routine at Planet X Inc. was to guarantee productivity and the efficient management of tasks. The stand-up meeting began the day, where team members would share their goals for the day, whatever challenges they're facing, and what they had made progress on for their assigned tasks. This meeting gave a complete direction for the day and standardized team efforts to the project's goals.

After the stand-up, I used my time to execute test plans, do functional testing and document the defects that were found in the process. I worked together with developers throughout the day, we discussed the problems that we found and that fixes were done practically. Test strategies were refined and there was an increased coverage for overall test, which can all be attributed to regular interactions with the QA team.

Socializing with colleagues during lunch breaks was a good opportunity because it created a friendly and collaborative work atmosphere. Since lunch finished, I continued to test only to see if the things that I did were usable and fast, while logging all of the observations into ClickUp for optimal tracking. In the afternoon, a new review meeting schedule would be attended, and we would spend time discussing the testing progress, upcoming challenges, and any modifications in our test approach which we deem to focus on. I ended the day with a final review of the test cases run, documented open issues and made reports for the interesting findings. The structuredness of my daily routine provided a systematic way to test, so there was no missing anything important and no compromising quality of software.

3.4 Work-Life Balance

Planet X Inc. places a great importance on having a positive work life balance. Employees are allowed to work remotely under certain circumstances, and following the standard office schedule. Apart from 10 casual leave days, 10 annual leave days and 14 sick leave days annually, the company also gives 10 days' casual leave. Though board and team meetings are set to happen on Saturdays every week discussing strategies and pending projects as a team, every Friday is an off day. The work pressure gets tight especially on Thursdays where extra work is given to cleanse out the workload and make sure the clients are being serviced by Fridays, the company does pay care to its employees. Designed to promote a sustainable work life balance are the liberal policies and the team structure, along with work from own facilities added which increases the flexibility and well being of employees.

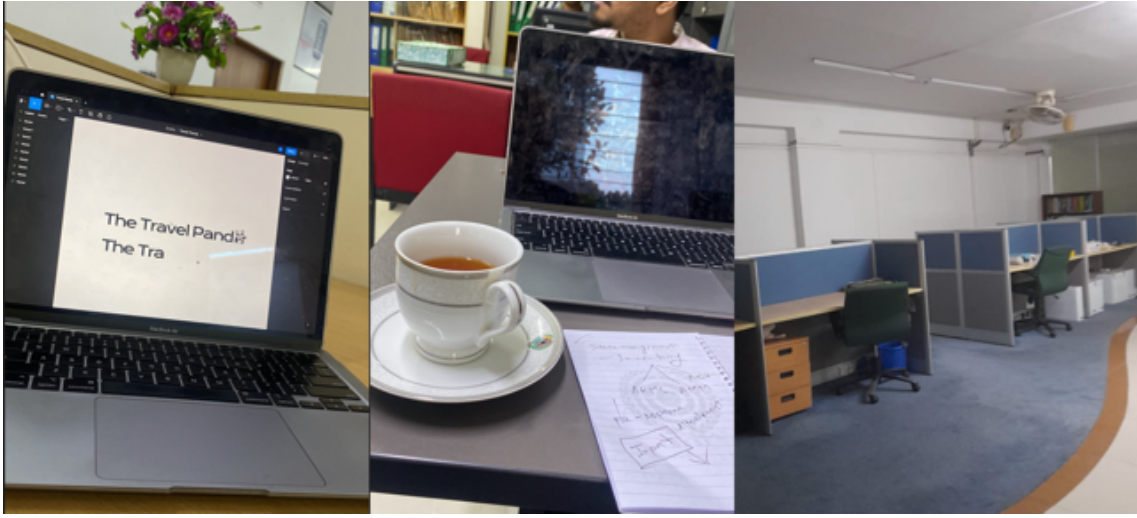


Figure 3.2: Indoor and sitting area of Planet X Inc.

Chapter 4

My Contributions

4.1 Project Overview

Footsteps Bangladesh

The Footsteps Bangladesh project was an interactive website based program tracking tool that aimed to facilitate beneficiary management. My role involved:

- Testing Functionality: Making sure application when launched had all its fundamental components in working order.
- Performance Testing: Performance testing using k6 to determine the behaviour of the system under heavy hit rates.
- Security Testing: Selecting ZAP to detect possible weaknesses and learning how to work with data safely.

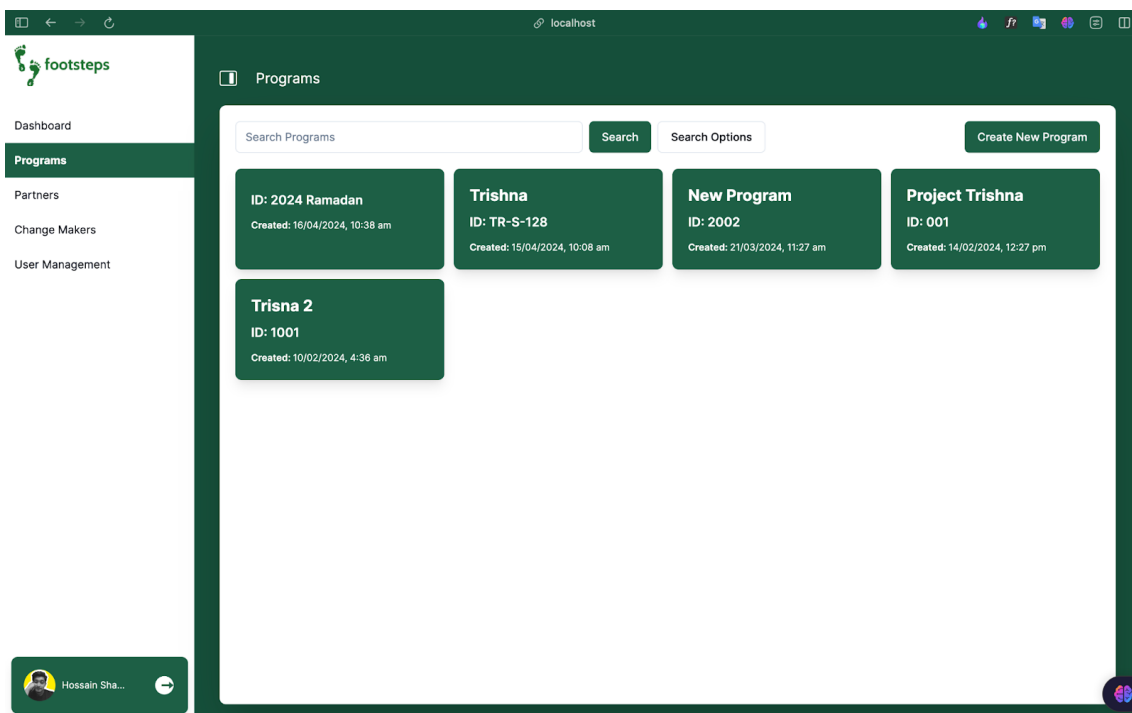


Figure 4.1: Footsteps Bangladesh Dashboard.

Scholar Jimmy Library

The Scholar Jimmy Library was designed to be an expositive AI tool that can help teachers, students, and researchers find relevant material. My contributions focused exclusively on frontend testing, including:

- **UI Testing:** The final steps distinguish the working and high availability of the user interface for different types of devices and display sizes.
- **Cross-Browser Testing:** To make sure that application runs in consistency in a different browser.
- **Functional Testing:** Confirming a frontend experience where navigation, forms, and access are modified to meet the needs of different types of users – teachers, students, and researchers.
- **Bug Reporting:** Reporting problems with the frontend and working directly with the development team to find solutions for such problems.

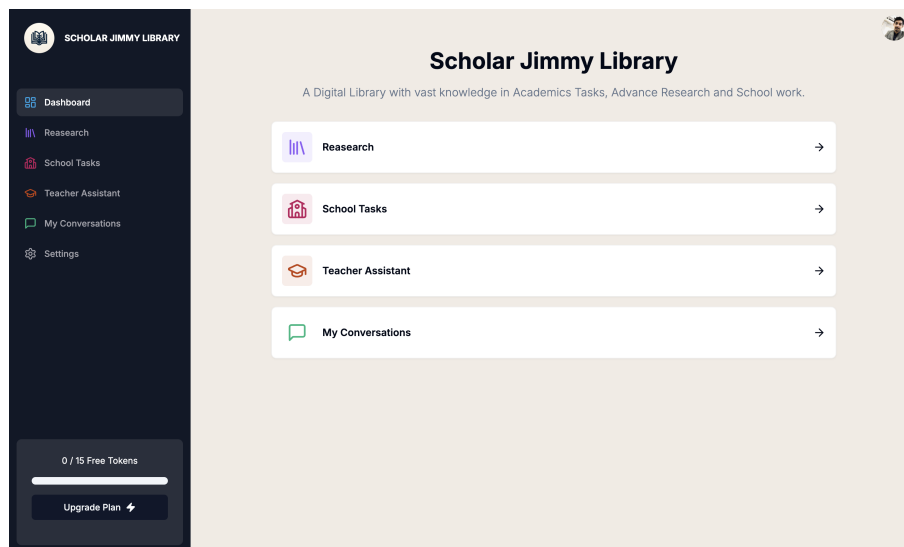


Figure 4.2: Scholar Jimmy Library Dashboard

4.2 Testing Process

4.2.1 Functional Testing

Footsteps Bangladesh

This project is built on Next JS and Sanity as a back-end service. So there are two parts to test. First thing I need to add mock testing for the Front-end Part if all the components are working and functioning. and then making a CRUD API Test for the required data is flowing. My Job is to focusing if the project is aligning with the requirements of the UI and data.

```

1 import React from "react";
2 import { render, screen, fireEvent, waitFor } from "@testing-library/react";
3 import AddDonation from "../app/(pages)/app/partners/AddDonation";
4 import { v4 as uuidv4 } from "uuid";
5 import { insertDonationApi } from "@lib/partnersapi";
6 import { mutate } from "swr";
7
8 // Mock dependencies
9 jest.mock("@lib/partnersapi");
10 jest.mock("uuid", () => ({ v4: jest.fn(() => "test-uuid") }));
11 jest.mock("swr", () => ({ mutate: jest.fn() }));
12
13 const availableActivities = [
14   {
15     _id: "activity1",
16     activityname: "Activity 1",
17     implorg: { orgname: "Org 1" },
18   },
19   {
20     _id: "activity2",
21     activityname: "Activity 2",
22     implorg: { orgname: "Org 2" },
23   },
24 ];
25
26 const donor = {
27   _id: "donor1",
28   poc: { personname: "John Doe" },
29 };
30
31 describe("AddDonation Component", () => {
32   beforeEach(() => {
33     jest.clearAllMocks();
34   });
35
36   it("renders correctly and displays Add Donation button", () => {
37     render(
38       <AddDonation availableActivities={availableActivities} donor={donor} />
39     );
40     expect(screen.getByText("Add Donation")).toBeInTheDocument();
41   });
42

```

Figure 4.3: Testing Front-end Components for Footsteps Bangladesh

```

1 import sanityClient from "../lib/sanity";
2 import {
3   getAllPartnerApi,
4   getAllActivitiesApi,
5   updatePartnerApi,
6   insertDonationApi,
7   deleteDonationApi,
8   addNewPartnerApi,
9   deletePartner,
10 } from "../lib/partnersapi";
11
12 // Mock the sanityClient functions
13 jest.mock("../sanity", () => ({
14   fetch: jest.fn(),
15   patch: jest.fn(() => ({
16     set: jest.fn().mockReturnThis(),
17     commit: jest.fn(),
18     insert: jest.fn().mockReturnThis(),
19     unset: jest.fn().mockReturnThis(),
20   })),
21   create: jest.fn(),
22   delete: jest.fn(),
23 }));
24
25 describe("Partner API Functions", () => {
26   afterEach(() => {
27     jest.clearAllMocks();
28   });
29
30   it("should fetch all partners with getAllPartnerApi", async () => {
31     const mockData = [{ _id: "partner1", name: "Partner 1" }];
32     sanityClient.fetch.mockResolvedValue(mockData);
33
34     const response = await getAllPartnerApi();
35
36     expect(sanityClient.fetch).toHaveBeenCalledWith(expect.any(String), {}, { cache: "no-cache" });
37     expect(response).toEqual(mockData);
38   });
39

```

Figure 4.4: Testing CRUD API for Footsteps Bangladesh

Scholar Jimmy Library

As I only have the Front-end Testing for the project, I just tested it with the jest and the components. And Match with the Figma design so that it is matching with the UI and fulfill the requirement of the stockholders.

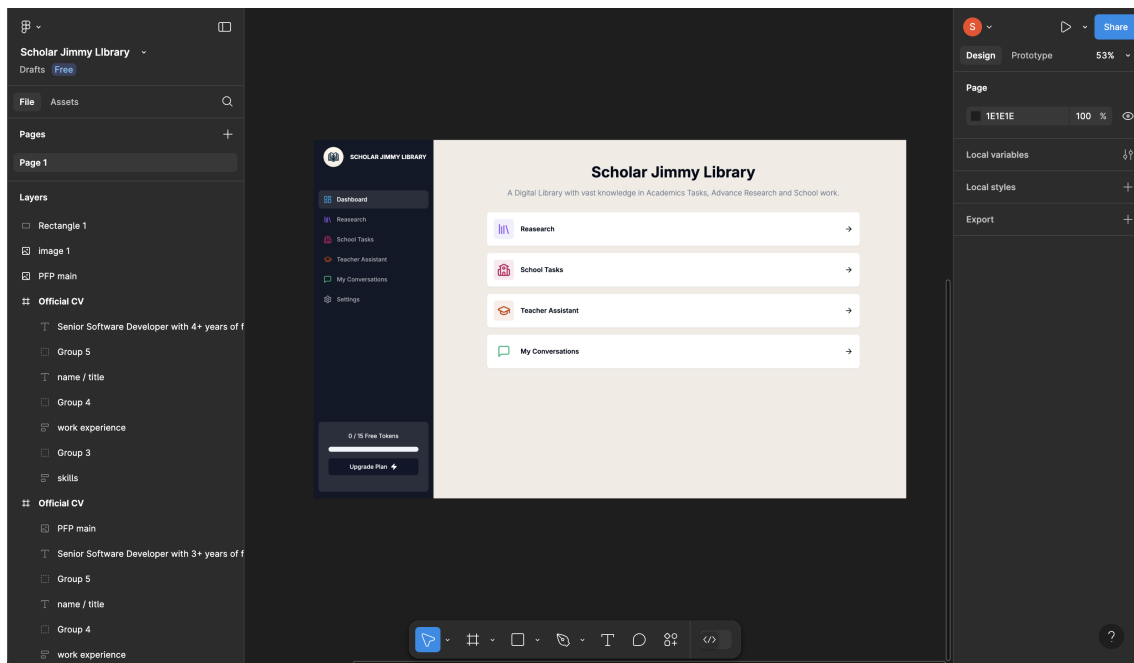


Figure 4.5: Scholar Jimmy Library Figma Design

4.2.2 Performance and Security Testing

I have used Grafana K6 for the load testing over APIs. K6 actually runs in the machine and calls the APIs and gives me the metrics of performance so that I can report it to the dev team for the improvement.

```
$ k6 run script.js

...
✓ is status 200

...
checks.....: 100.00% ✓ 1      x 0
data_received.....: 11 kB    12 kB/s
```

Figure 4.6: Grafana K6 response

I have also installed ZAP for the security test. ZAP is a tool to attack on any URL and finds out the vulnerabilities on the network. This helps me to report to the back-end developers to resolve the security issues.

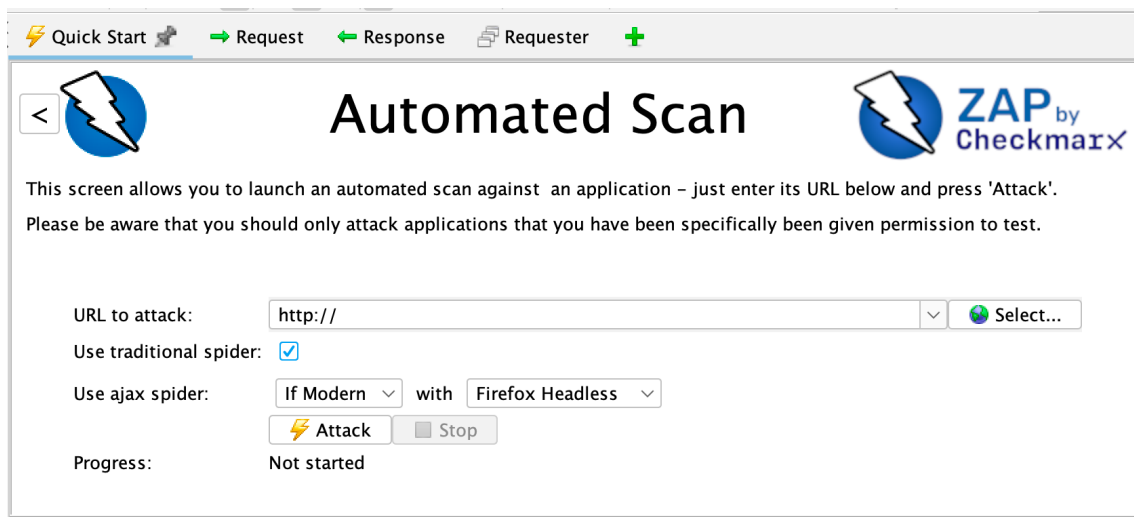


Figure 4.7: ZAP attacking on URL

4.3 Other Responsibilities

After getting all the test report. I look forward to the Developer team with my line manager. Then, we thoroughly discuss the issues over discord and when done I put the issue officially to the Click-ups for the Dev Team.

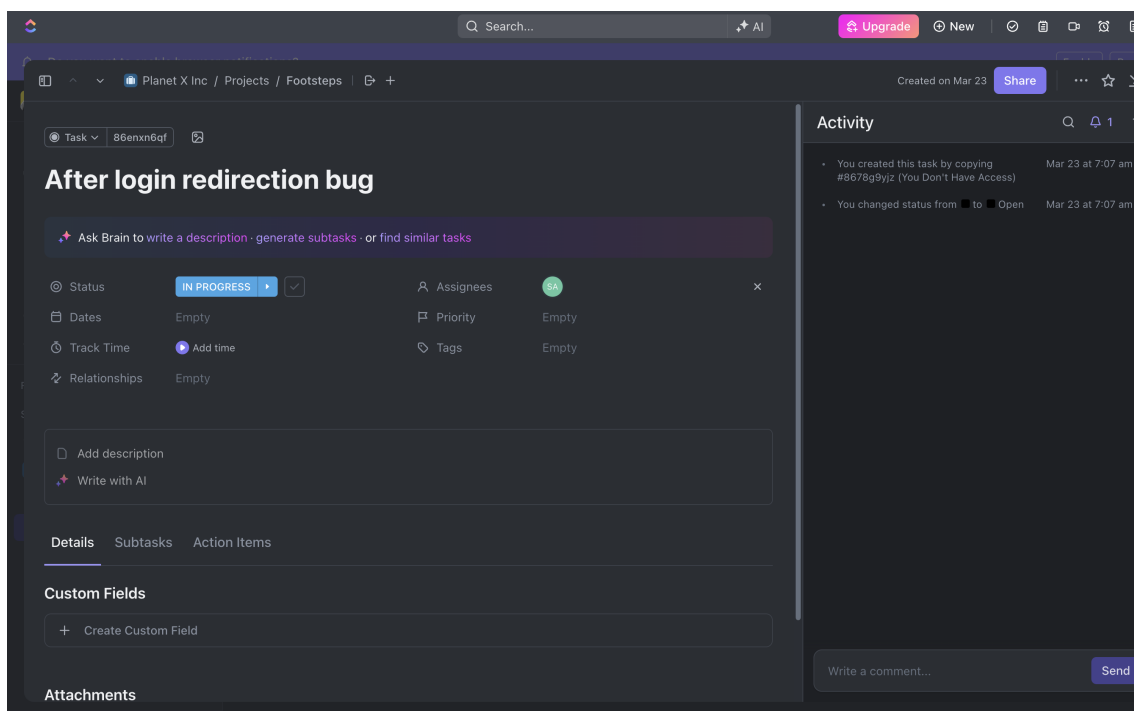


Figure 4.8: Reporting Bugs on Click Up

4.4 Key Challenges

When I was interning I had my fair share of challenges during the internship which I tested my problem solving skills and adaptability. The most difficult aspect was managing complex frontend workflow for features who had different user roles and permissions. In order to make sure that the appropriate functionality was available to the right people without security holes, extensive testing and validation were a must.

Another challenge was the cross browser compatibility where some features worked perfectly on a browser and got weird in some other browsers. To achieve this consistency, this even needed thorough debugging and testing over multiple browsers and browsers' different versions.

Another important feature was responsive design because the application was to work correctly on different types of devices, for example on desktops, tablets, and mobile phones. Working with the development team to define the alignment of the UI across different screen sizes and rendering resolution was done to avoid CSS and flex properties as well as developing media queries.

Along with these technical challenges, I struggled to stay in sync with the development team as far as testing schedules were concerned, especially when there would be last minute changes. To adapt quickly and have smooth collaboration, effective communication and agile methodologies were crucial.

4.5 Learning and Growth

My internship was full of technical as well as professional growth. I gained deeper knowledge of QA methodologies like unit testing, integration testing and exploratory testing; also learned how to use the tools such as Jest, k6, ZAP to check for security and performance.

Frontend workflow, the general cross browser compatibility and responsive design which I came across and solved as I solved issues, all improved my problem solving abilities. The processes of each challenge helped me learn about debugging techniques, structured testing processes and documentation best practices.

I also sharpened my communication and collaboration skills to excel in my interaction with and working with developers, product managers, and other QA engineers. Team discussions, the stand up meetings, and the retrospectives together helped me craft relatively good feedback and efficient testing strategies.

This internship also helped me adapt to a dynamic project environment where changes were last minute. I also learnt the value of having agility along with structured planning to accommodate changes without being a compromise in a testing coverage and quality.

Overall, I think it was good experience at Planet X Inc. I learned practical experience, I became confident with applying safety best practices, and I got a more clear view for the role of the safety in the software development cycle.

Chapter 5

Growth

5.1 Professional Growth

Internship was important to deepen my knowledge about the QA processes and improve my proficiency in application of server testing methods. During the internship, I collaborated with developers, product managers and other QA engineers, all of whom really relied on me as I brought my A-game every day. This experience allowed me to learn the power of QA within the software development lifecycle and the involvement of many teams to bring a smooth product to the users. Another thing it also helped with was improving my documentation of test cases, clearer reporting of bugs and constructive feedback in general as a QA skill that anyone in the industry would be vouching for.

5.2 Technical Growth

This experience gave me opportunity to learn about the technical side of software testing in two different projects. I learnt frontend testing methodology particularly UI validation, cross browser testing and responsive testing. Additionally I also got the hands on experience with Jest, k6, and with the OWASP ZAP to be able to conduct unit testing, performance testing, and security assessments effectively. This tool helped me to check bugs earlier and fix them; so that the software is up to industry level. Besides that, I learned the significance of automated testing and the role of automated testing in preserving the software quality over the time.

5.3 Personal Growth

By far, my personal growth during the internship was huge. As a result, I became more adaptable and was able to work with tight deadlines and handle changing project requirements: multiple tasks at once. I had improved communication skills as I was actively participating in team discussions, stand up meetings, and bug review sessions. By working under pressure to meet project deadlines I gained a better resilience and time management skills, so I became more efficient when dealing with challenges.

5.4 Lessons Learned

During my internship I concluded that we need a structured QA process, good intangible communication practices as well as continuous learning to produce high quality software. I understood the significance of writing in-depth test cases, posting well thought out bug reports and cooperation with the developers for prompt addressing of issues. I also knew that in order to continuously build up my expertise in this field, I should always be on the lookout for changes in industry trends and management in their different areas of testing, to enhance the QA process and remain in relevance in the area.

5.5 Future Aspirations

Since I have intern at Planet X Inc., my internship confirmed to me that I wanted to become a QA autonomous engineer and a security tester. I intend to familiarize myself with automated testing frameworks and security testing tools to provide skills in creating robust and convenient applications. Furthermore I intend to work on projects related to AI driven Software solutions and more advanced security implementation to improve my technical skillset as well as strengthen my industry relevance.

I learned about QA practices, which gives me a deep foundation to this field. Now, I am eager to learn more and improving my skill in this field. There are many forward opportunities that will allow me to use my knowledge and skill set to create high quality software solutions, and I look forward to more opportunity to do this.

Chapter 6

Conclusion

My experience at Planet X Inc as an intern was a rewarding one, which I was able to use my lessons learned from my university to enable me to use them in a real world environment around software testing and quality assurance. Throughout this journey, I had a chance to work in two important projects where challenges and learning experiences were different.

Doing that, I became familiar with different testing approaches such as functional, usability, performance, and security testing and learned much about the software development process, that is, in delivering a user friendly, tested product. I was able to gain the technical expertise by working with tools such as Jest, k6, and ZAP, and improved communication and teamwork skills while collaborating with developers and QA engineers daily.

Debugging complex frontend workflows and ensuring cross browser compatibility proved to be a challenge and became a better problem solving and adaptability areas for me. I also created a structured way of testing, which aims for automation and efficiency, that's of great importance to me in the future of my career.

Finally, the work for this internship has been a clear reinforcement of my desire to become a QA automation engineer and security tester. In the future, I would like to delve into automated testing frameworks and security best practices, which would help to build robust as well as scalable software solutions. From my experience, there is no doubt that the career path of my life would be in some way affected by my time at Planet X Inc as I am sure the skills and knowledge will serve as a pillar for me and help me grow professionally.

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