

GAO Tek: IoT Hardware — IoT Systems — Test Equipment

by

Rabab Shah
20101456

A thesis submitted to the Department of Computer Science and Engineering
in partial fulfillment of the requirements for the degree of
B.Sc. in Computer Science and Engineering

Department of Computer Science and Engineering
Brac University
October, 2025.

© 2025. Brac University
All rights reserved.

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.

Student's Full Name & Signature:

Rabab Shah
20101456

Approval

The thesis/project titled “GAO Tek Inc.” submitted by

1. Rabab Shah (20101456)

of Summer, 2025 has been accepted as satisfactory in partial fulfillment of the requirement for the degree of B.Sc. in Computer Science on 10th October, 2025.

Examining Committee:

Supervisor:
(Member)

Md. Tawhid Anwar

Senior Lecturer
Computer Science and Engineering
BRAC University

Co-Supervisor:
(Member)

Md. Rafi Bin Hasnat

Senior Software Developer
Development Team
GAO Tek Inc.

Head of Department:
(Chair)

Sadia Hamid Kazi, PhD

Chairperson and Associate Professor
Department of Computer Science and Engineering
Brac University

Acknowledgement

At first, all gratitude to the Great Allah for allowing my internship to be finished in time without facing any difficulty. I would like to thank my co-supervisor Md. Rafi Bin Hasnat, Senior Software Developer, GAO Tek Inc., for allowing me to complete an internship within the firm, as well as for his constructive feedback and support throughout my internship. Then, I would like to thank my supervisor, Md. Tawhid Anwar for the facilities provided to accomplish my internship. Finally, I am grateful to my parents for their efforts on my behalf, support and their prayers, without which I would not be able to finish my internship and complete my graduation program.

Table of Contents

Declaration	i
Approval	ii
Table of Contents	iv
Abstract	1
1 Introduction	2
1.1 Preamble	2
1.2 Information Sources	2
1.2.1 Primary data source	3
1.2.2 Secondary Data Source	3
1.3 Document Overview	3
2 Company's Profile	4
2.1 Overview	4
2.2 First day of Joining GAO Tek Inc.	5
2.3 Products and Services	5
3 Work Place Details	6
3.1 My Responsibilities	6
3.2 Communication and Meetings	6
3.3 Guidance and Support	6
4 My Countributions	7
4.1 Project Overview	7
4.2 System Analysis and Design	7
4.3 Work Plan	9
4.4 Manual Testing	9
4.4.1 Bug Identification	10
4.4.2 Test Case Scenerio	14
4.5 Jira	15
4.6 API testing using Postman	16
4.6.1 GET method	16
4.6.2 POST method	17

5	Growth	18
5.1	Team Work	18
5.2	Time management	18
5.3	Technical Growth	18
5.3.1	API Testing with Postman	18
5.3.2	Quality assurance and SDLC	18
5.3.3	Jira	19
5.4	Interpersonal skills	19
5.4.1	Self-Confidence	19
5.4.2	Positive Attitude	19
6	Conclusion	20
6.1	Conclusion	20
6.2	Recommendations	20
7	Bibliography	21

Abstract

In this modern technological era, business and organizations are depending more on advanced equipment and trustable technical services. This helps to maintain the business smoothly and more efficiently. GAOTek Inc. has been a reliable, high-quality test and measurement equipment provider. The office is located in New York and Toronto. It also works on IoT solutions, RFID solutions and technical services for global clients. GaoTek Inc. The online platform of the company is very user-friendly and easily accessible to a wide range of products with detailed information. GAOTek Inc. has built a good reputation and reliable platform for delivering cost-effective and high-quality solutions over the last few years. It supports empowering professionals across multiple industries and factories. The company continues to contribute to advancements and expand its global partnership which is contributing in advancements in electronics and telecommunications.

Chapter 1

Introduction

1.1 Preamble

An internship is a professional learning opportunity that allows students and recent graduates to gain primary experience in a field related to their academic studies and career interests. It does not only provide a chance to acquire practical skills but also industry exposure. Internships bridge theoretical knowledge and practical application and help to enable individuals to apply their academic learning in real-life scenarios. BRAC University offers its students the opportunity to complete a thesis or an internship as part of their bachelor's degree program. The fundamental objective of the internship program is to offer students a structured experience that supports academic, professional, and personal growth. It also helps students view their chosen career field so that they may evaluate how closely the practical work life aligns with their academic knowledge. For all the students who want to pursue a Bachelor of Computer Science and Engineering (CSE), choosing an internship requires fulfilling all program prerequisites. They have to secure a role related to their field and complete six months of work experience. BRAC University supports students throughout this process by guidance to help them flourish in their internships. As a student of BRAC University, I preferred an internship as part of my CSE400 course. I began my internship at GAO Tek Inc. as a manual tester in software quality assurance the 18th of November, 2014. GAO Tek Inc. is a technology company that specializes in advanced engineering products and services such as RFID systems, LoRaWAN solutions, and IoT technologies. This internship represents an excellent opportunity for me to utilize my academic knowledge and technical skills in a professional framework. Also, the practical and professional abilities I will evolve during this period will significantly contribute to my future career in the technology industry.

1.2 Information Sources

I have presented the information in this report that was available to me during the process of my internship. I have divided the information into two categories, which are primary and secondary data sources. The primary data sources contain the knowledge I have achieved through direct involvement in the process of my internship. The secondary sources represent the insights which are collected from online platforms. In this report, most of the information gathered from the official

websites and employees of GAO Tek Inc. The aforementioned data sources are mentioned below:

1.2.1 Primary data source

- Collaboration and interaction with colleagues.
- Communication and team meetings with the team lead.
- Personal observation throughout the whole process.

1.2.2 Secondary Data Source

- Official website of GAO Tek Inc.
- Online references and resources.

1.3 Document Overview

The purpose of this report of my final internship is to present my overall experience throughout the whole internship process. It represents the approach to overcome the challenges I have in this time period. I have also provided all the assigned tasks and the projects I have worked on. This internship report also contains my detailed responsibilities and the progress I have made during this time.

Chapter 2

Company's Profile

2.1 Overview

GAO Tek Inc. is a well-known international provider of advanced electronic solutions specializing in embedded development tools, electronic measurement instruments, video surveillance, alarms, and other electronic products to meet professionals worldwide. The company operates in both the United States and Canada. GAO Tek Inc. was established in 2001 as GAO Engineering. Initially, GAO Tek Inc. was focused on supplying advanced development tools for engineers and developers in the embedded systems field. Then this company started becoming recognized for good quality and exceptional value driving fast growth. Over time, the company's product portfolio expanded to include telecommunication tools, test and measurement instruments, IT solutions, and a robust selection of RFID products. Later on, GAO Engineering rebranded as GAO Tek Inc. in 2006 to reflect its diverse electronic offerings, more particularly in the RFID sector. This significant growth gradually led to create a separate entity, GAO RFID Inc. which is extremely dedicated to RFID-related products and services. GAO Tek Inc. utilizes modern e-commerce solutions. It helps to enhance the online ordering experience with a reliable product guarantee and professional technical support if the customer needs it. The company's competitive edge lies in its ability to provide good value, high-quality products, and minimum cost advantages compared to the competitors. The main motto of GAO Group is not just to deliver innovative, high-quality. Moreover, It is also focused on cost-effective electronic solutions that empower professionals across various industries worldwide. Enhancing advanced technologies, the company looks forward to providing significant value through its diverse products with cutting-edge research and good customer support. Over the years, GAO Group has now committed to fostering global partnerships. We ensure customer satisfaction and drive advancements in embedded systems, telecommunications, and RFID to meet its enlarged needs.

- Delivering modern technologies in electronics, telecommunications, and RFID solutions to enlarge industrial efficiency and innovation.
- Maintaining well-built global relationships with customers, distributors and also with strategic partners to provide custom solutions.
- Upholding commitments to reliability, quality and cost-efficiency through good research and customer-centric practices.

2.2 First day of Joining GAO Tek Inc.

Since this was a complete remote internship, the first day of my internship was conducted virtually and I could not experience any traditional office environment on my first day. As I joined remotely, it allowed me to work from home while still engaging with the team in a professional setting. I was both nervous and excited at the same time since it was my first time attending the first official introduction session.

The company organized an online meeting for the orientation to welcome our whole intern batch. They introduced themselves and the company's background. They also mentioned the company's mission and vision, its global operations. My team lead also mentioned the structure of the department. As an introduction, I introduced myself and shared details about my academic background at BRAC University.

After this introductory session, my supervisor mentioned the responsibilities I would be handling during this internship period. My colleagues mentioned their experiences and the approaches the company followed throughout the whole time. Their friendly and supportive attitude made me feel very comfortable. Though it was a remote setup, I didn't feel any less. It was a very nice welcome I received on my very first day in the company.

2.3 Products and Services

GAO Tek Inc. is a leading provider of advanced electronics, RFID solutions and wide range industrial instrumentations. The company supplies innovative products in IoT, networking, telecommunications etc. IT also includes RFID tags and readers. GAO Tek Inc. is renowned for offering efficiency, reliability in advanced technology. The company's technical expertise is also focused on gathering cutting-edge engineering and research based solutions, which will make the customers receive cost-efficient and reliable solutions. GAO Tek Inc. maintains its position as a forward looking company in the industrial sector.

Chapter 3

Work Place Details

3.1 My Responsibilities

During the initial phase of my internship In GAO Tek Inc. I spent most of my time learning the Software development lifecycle (SDLC). It introduced me to different models and frameworks applied in the company's project in the development and maintenance of the websites. This helped me understand the structure and the processes in real-world software development projects.

I also have learned about manual testing as part of my responsibilities. This allowed me to practice finding and reporting bugs to ensure the quality of the system. This also helped me to understand different testing scenarios, techniques and utilization before deployment of a software.

Although my internship was more focused on learning rather than a heavy workload, my co-supervisor assigned me to different small projects for better understanding and its implementation. This has extremely contributed to building my skills to apply my theoretical knowledge into practical tasks. My teammates were so supportive and helpful towards me to learn new things in this process.

3.2 Communication and Meetings

We primarily use Microsoft Teams for communication. We have daily update meetings every working day to discuss progress. Moreover, if any queries or concerns arise, our team lead schedules team meetings to address them properly and to give instructions to solve them. This ensures not only smooth communication but also efficient task management within the team.

3.3 Guidance and Support

My supervisor guided me with all the essential resources. Additionally, he was available and helpful throughout the whole time to assist whenever I encountered difficulties in my tasks. He suggested all the necessary steps to resolve issues including describing me to improve my understanding of the job. My teammates are also very supportive. They help me by answering queries and offering assistance on various tasks I face problems. Additionally, I got suggestions for online resources and tutorials to learn and solve challenges effectively.

Chapter 4

My Contributions

4.1 Project Overview

I have worked on the project for the GAO RFID website during my internship. This website is designed to provide detailed information about all the RFID products, solutions and services which are offered by the company. This website provides the insights of GAO Tek Inc.'s wide range of advanced electronic products along with the RFID technologies, tags, readers etc.

My contribution to this project was related to Software Development Life Cycle (SDLC), which introduced me with in-depth knowledge about SDLC models and frameworks in managing website development, starting from requirement analysis and using models to implementation and testing. Moreover, I have learned about the manual testing and got familiar with the API testing (using Postman). I have worked on this project to ensure that all the features of the website function correctly. By using Postman I have gained basic understanding about retrieved and validated between frontend and backend systems.

Our primary goal of this project was to ensure that the website provides reliable, user-friendly experience with maintaining high-quality standards. I gained valuable experience of how software projects are managed and how critical testing is for delivering a polished final product.

4.2 System Analysis and Design

The goal of this analysis for the GAO RFID website was to gather clear requirements and reduce the ambiguity in features to ensure that the website is user-friendly. Here is a simple flowchart diagram and an usecase diagram prepared to visualize admin interaction with the system and navigate the website.

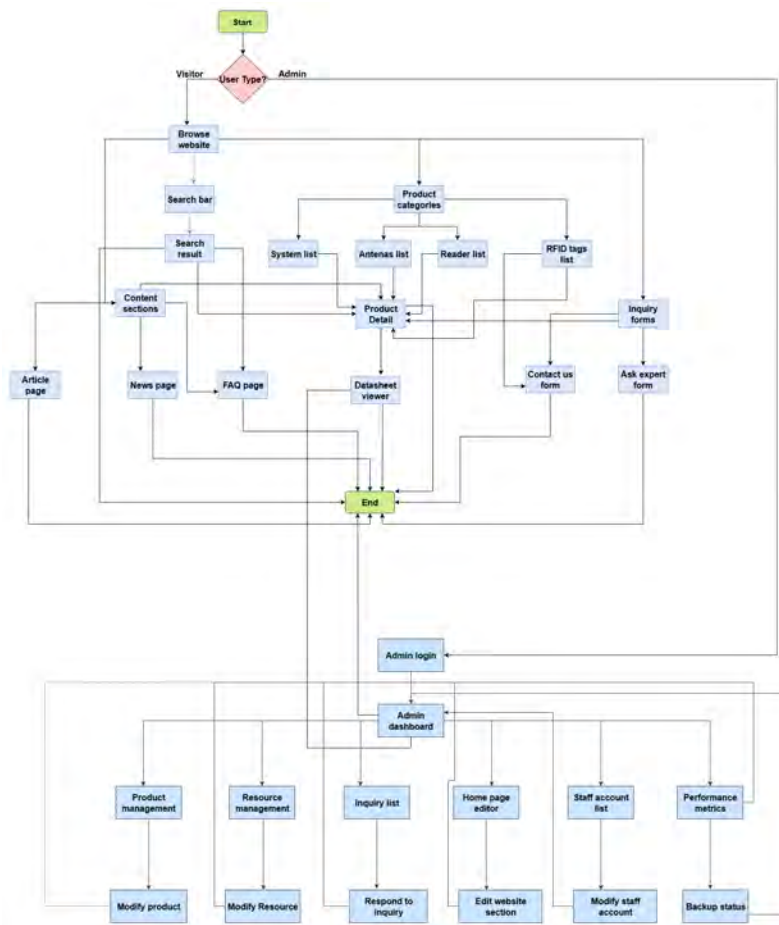


Figure 4.1: Flow Chart diagram of GAO RFID

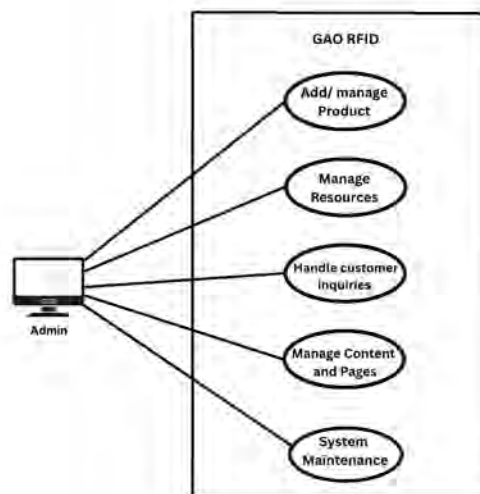


Figure 4.2: Use Case diagram of GAO RFID

4.3 Work Plan

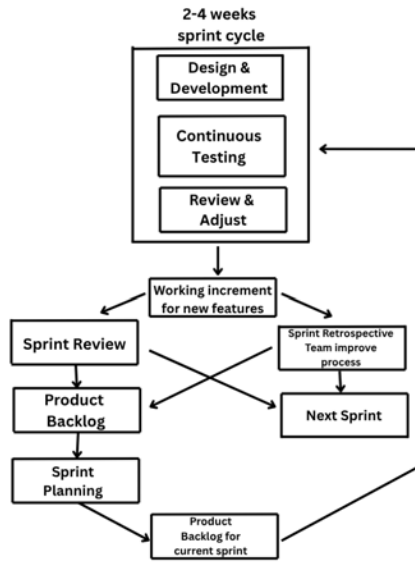


Figure 4.3: Working Plan Using Scrum Method

4.4 Manual Testing

Manual testing is the process of doing testing manually by executing test steps by steps and comparing the results with the expected results. Afterwards, the tester reports it if there are any defects to run the program.

4.4.1 Bug Identification

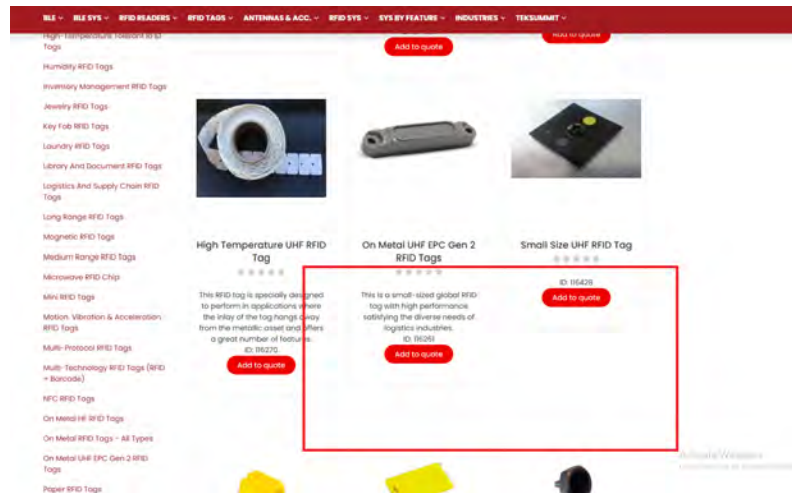


Figure 4.4: UI/UX Bug

- Bug Title: Uneven alignment of product details.
- Bug Type: UI/UX Bug
- Description: The product cart alignments are not aligned with each other.

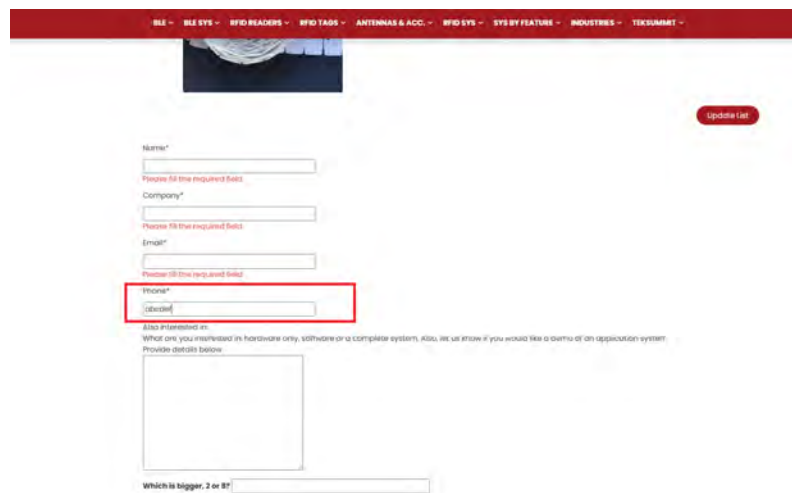


Figure 4.5: Functional Bug

- Bug Title: Phone number field takes invalid character inputs.
- Bug Type: Functional Bug
- Description: The phone number input field takes invalid character inputs other than numbers. It is considered a functional/validation bug.

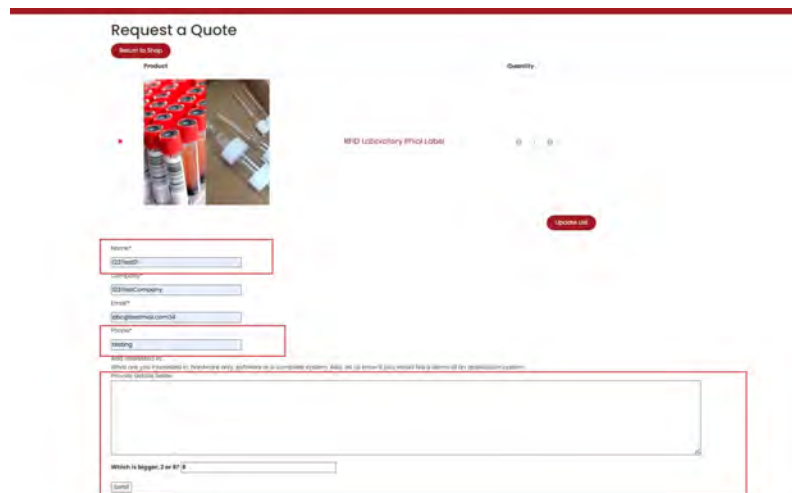


Figure 4.6: UI/UX Bug

- Bug Title: Product image missing in mobile view
- Bug Type: UI/UX Bug
- Description: In desktop version image appears correctly but in mobile version the image is missing.

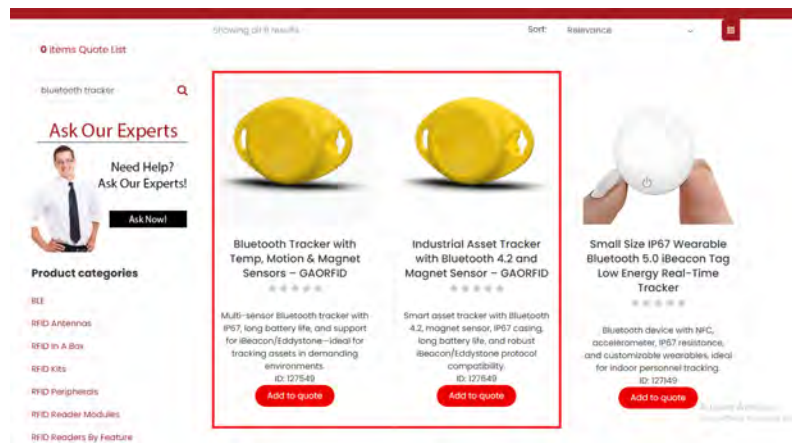


Figure 4.7: Data bug

- Bug Title: Duplicate product thumbnail image for multiple products.
- Bug Type: Data bug
- Description: Two different products have the same thumbnail, which may confuse customers and also may cause a lack of attention.

Figure 4.8: Security prevention Bug

- Bug Title: Non-randomized security question with a fixed obvious answer.
- Bug Type: Security prevention Bug.
- Description: The prompt never changes, which has a permanent answer. It should come with different prompts each time.

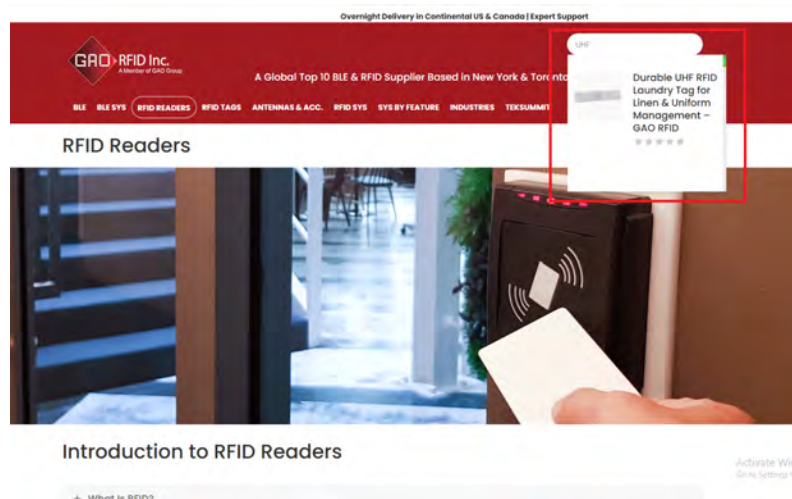


Figure 4.9: UI Design Bug

- Bug Title: It displays one product at a time.
- Bug Type: UI Design Bug.
- Description: The product list displays one product at a time, which requires excessive vertical scrolling. This might be a cause of a bad user experience.

4.4.2 Test Case Scenerio

Test case scenario plays an important role in manual testing because it provides a structured way to ensure the functionalities of an application work as expected. It reduces the risk of missing out on any critical functionality. It defines clear steps, expected outcomes and actual outcomes, which gives a clear understanding of whether the feature works properly. Moreover, test case scenarios serve a necessary documentation where all the functionalities and its results remains as recorded.

H5						
	A	B	C	D	E	F
1	Test case ID	Title	Steps	Expected Result	Actual Results	Fail/Pass
2	UI-ANT-041	Display product grid correctly.	Navigate to "13.56 MHz RFID Antennas"	Products display in a neat grid; images, titles.	Layout appears as expected	Pass
3	UI-ANT-042	Responsive layout on mobile screen	Open the page on a mobile viewport	No overlapping; readable fonts	layout appears without any issues.	Pass
4	UI-ANT-043	Consistent spacing between cards	scroll down to see the product list	product layout contains equal margin.	Layout appears as expected	Pass
5	UI-ANT-044	Phone number field accepts valid input in the "Request a quote" page	Navigate to the form page. Go to "Phone" input field. Enter special character.	The field should reject non-numeric input.	The field is takes alphabetical input without showing any errors.	Fail
6	UI-ANT-045	Correct hovering	Hover over an antenna product image.	Image zoom effect should shows correctly.	It appears as expected without making any issue.	Pass
7	UI-ANT-046	Duplicate product ID assigned to multiple products	Go to the section "Industrial Asset Tracker with Bluetooth 4.2 and Magnet Sensor"	Each product should have a unique product ID and picture.	Both product contain the different product ID but the same picture.	Fail

Figure 4.11: Test Case Scenerio (1)

Test case ID	Title	Steps	Expected Result	Actual Results	Fail/Pass
FUNC-VEH-025	Product price - low to high.	choose "sort by price low to high"	products with lower price tags appear first	appears with lower to higher price tags	Pass
FUNC-VEH-026	Details page of a product showing 404 error.	Open detail page of the product "UHF 860-960 MHZ"	Product details page appears.	Giving 404 error.	Fail
FUNC-VEH-027	Sort by rating/popularity	choose "sort by popularity".	Appears as mentioned.	As expected.	Pass
FUNC-VEH-027	contact page works properly.	Click "need any help? Fill out the form and submit".	Submits successfully.	Works as expected.	Pass

Figure 4.12: Test Case Scenerio (2)

	A	B	C	D	E	F
1	Test case ID	Title	Steps	Expected Result	Actual Results	Fail/Pass
2	UI-ANT-041	Display product grid correctly.	Navigate to "13.56 MHz RFID Antennas"	Products display in a neat grid; images, titles.	Layout appears as expected	Pass
3	UI-ANT-042	Responsive layout on mobile screen	Open the page on a mobile viewport	No overlapping; readable fonts	layout appears without any issues.	Pass
4	UI-ANT-043	Consistent spacing between cards	scroll down to see the product list	product layout contains equal margin.	Layout appears as expected	Pass
5	UI-ANT-044	Phone number field accepts valid input in the "Request a quote" page	Navigate to the form page. Go to "Phone" input field. Enter special character.	The field should reject non-numeric input.	The field is takes alphabetical input without showing any errors.	Fail
6	UI-ANT-045	Correct hovering	Hover over an antenna product image.	Image zoom effect should shows correctly.	It appears as expected without making any issue.	Pass
7	UI-ANT-046	Duplicate product ID assigned to multiple products	Go to the section "Industrial Asset Tracker with Bluetooth 4.2 and Magnet Sensor" and	Each product should have a unique product ID and picture.	Both product contain the different product ID but the same picture.	Fail

Figure 4.13: Test Case Scenerio (3)

4.5 Jira

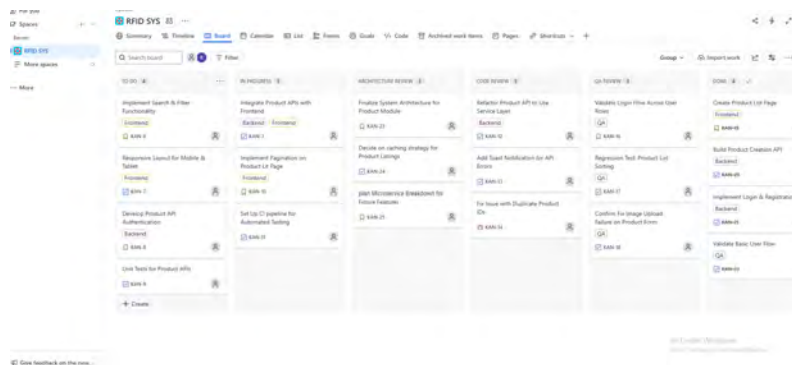


Figure 4.14: Kanban Board for RFID SYS

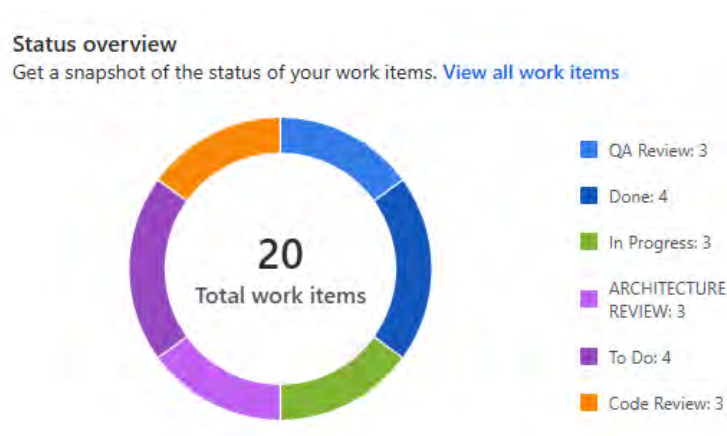


Figure 4.15: Status Overview for Kanban Board

4.6 API testing using Postman

During my internship at GAO Tek Inc., I had the opportunity to learn Postman. Postman is an API testing tool which is widely used for Quality Assurance. Postman allowed me to interact with the GET and POST method. It got me the opportunity to analyze responses returned by the server.

4.6.1 GET method

The GET method allowed me to practice retrieving data from APIs. In the GET method, we check if the APIs are returning the expected information. Through this experience, I got to learn how to pass query parameters in the URL, check responses body etc.

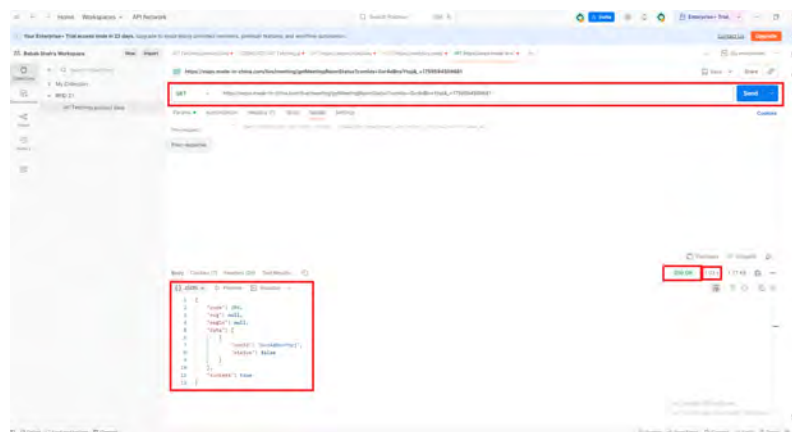


Figure 4.16: API testing using GET method

4.6.2 POST method

In Postman, the POST method is one of the most important methods which is commonly used in HTTP requests. By using it we can send data to the server. As a QA engineer, I need to ensure if the API handles data correctly.

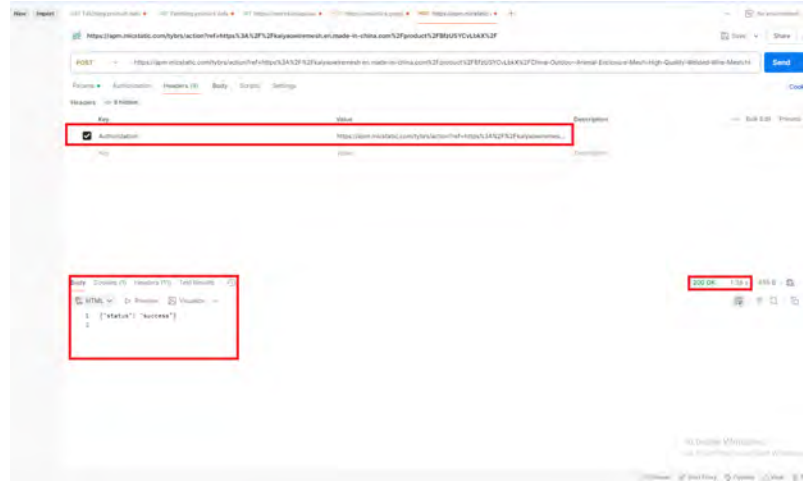


Figure 4.17: API testing using POST method

Chapter 5

Growth

5.1 Team Work

While doing my internship in the corporate world I learned the importance of teamwork in a professional environment. I got the opportunity to work with all the team members on documentation, testing and project discussion. This taught me how strong coordination can help to ensure progress in projects even within a tight deadline.

5.2 Time management

Working in a corporate environment like GAO Tek Inc, allowed me to learn both time management and discipline at the same time. All tasks required me to finish within the deadline. This helped me to improve my ability on prioritizing tasks.

5.3 Technical Growth

As I have done my internship in this company as a tech support, It enhanced my technical skills and introduced me to real-world applications. Through working on SDLC models, test cases I achieved so much practical insights into this technical fields.

5.3.1 API Testing with Postman

I enhanced my API testing skills by using Postman by sending GET and POST requests and learned how QA fits into each phase. It gave me hand-on experience in Testing, which is very important in modern web applications.

5.3.2 Quality assurance and SDLC

I have been introduced to the Software Development Life Cycle (SDLC) and learned how Quality Assurance plays an important role in this. This allowed me to improve my problem solving skills and manage projects at the same time.

5.3.3 Jira

I became familiar with Jira, which is widely used as a project management tool. This tool is used for issue tracking and managing a project smoothly. It allowed me to learn how it keeps teams organized. It allows to track workflow and progress in an organized way. This application is so effective for cross-functional collaboration.

5.4 Interpersonal skills

5.4.1 Self-Confidence

This internship boosted my confidence in communicating with professionals and discussing issues with teammates. I became more expressive in sharing ideas, discussing bugs and test results.

5.4.2 Positive Attitude

The friendly and supportive professional environment at GAO Tek Inc. encouraged me to approach tasks with a positive mindset. My supervisor along with all the colleagues were so supportive, which inspired me to be enthusiastic in my work.

Chapter 6

Conclusion

6.1 Conclusion

In this report, I have shared all my experiences while working in GAO Tek Inc. as a Tech Support Intern. It got me the opportunity to let me know how a real-world environment is so practical and engaging than learning theories. It allows me to strengthen my professional practices. It also helped me to explore new technologies and improved my understanding on Quality Assurance.

I faced my challenges with good team coordination and it taught me to act more professionally in a corporate environment. This experience enhanced my skills and provided me with valuable insights which will help to have a good career in future. I am grateful to my supervisor for encouraging and guiding me throughout this journey.

6.2 Recommendations

GAO Tek Inc. is a great company for interns to get introduced with real-world experience and to build a strong foundation to start their career. Though it is a remote job for our country people, GAO Tek Inc. ensures proper guidance through proper communication. I would highly recommend this company to future interns to start their career and to gain practical experience to the corporate world.

Chapter 7

Bibliography

1. Software Development Lifecycle (SDLC) Models and Phases. BrowserStack. Accessed Oct. 7, 2025. Available at: <https://www.browserstack.com/guide/sdlc-models-and-sdlc-phases>
2. Sunil Pandey. “6 Jira Capabilities that are Fuelling ‘Agile’ Project Execution in 2022”. Techment Blogs, Nov. 4, 2021. Accessed Oct. 7, 2025. Available at: <https://www.techment.com/blogs/6-jira-capabilities-that-are-fuelling-agile-project-execution-in-2022/>
3. RFID Systems — RFID Solutions. GAO RFID. Accessed Oct. 7, 2025. Available at: <https://gaorfid.com/>
4. IoT Hardware — IoT Systems — Test Equipment. GAO Tek. Accessed Oct. 7, 2025. Available at: <https://gaotek.com/>