

Internship on Software Quality Assurance (SQA)

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This Report Presented in Partial Fulfillment of the Requirements for the Degree of
Bachelor of Science in Computer Science and Engineering

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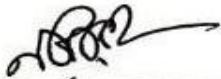
DHAKA, BANGLADESH

July 2024

APPROVAL

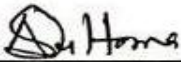
This Internship titled “Internship on Software Quality Assurance (SQA)”, submitted by “Tasnia Afrin”, ID No: 213-15-4515 to the Department of Computer Science and Engineering, Daffodil International University has been accepted as satisfactory for the partial fulfillment of the requirements for the degree of B.Sc. in Computer Science and Engineering and approved as to its style and contents. The presentation has been held on July 2, 2024.

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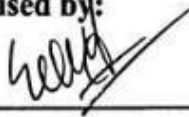
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DECLARATION

We hereby declare that this project has been done by us under the supervision of **Md.Sazzadur Ahamed, Senior Lecturer, and Department of CSE** at Daffodil International University. I also declare that neither this project nor any part of this project has been submitted elsewhere for the award of any degree or diploma.

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ACKNOWLEDGEMENT

First, I express my heartiest thanks and gratefulness to almighty God for His divine blessing makes us possible to complete the final year project successfully.

I really grateful and wish my profound our indebtedness to **Md. Sazzadur Ahamed, Senior Lecturer, Department of CSE** Daffodil International University, Dhaka. Deep Knowledge & keen interest of our supervisor in the field of “Internship on Software Quality Assurance (SQA)” to carry out this project. His endless patience, scholarly guidance, continual encouragement, constant and energetic supervision, constructive criticism, valuable advice, reading many inferior drafts and correcting them at all stage have made it possible to complete this project.

I would like to express our heartiest gratitude to **Professor Dr. Touhid Bhuiyan, Head, Department of CSE**, for his kind help to finish our project and also to other faculty member and the staff of CSE department of Daffodil International University.

I would like to thank our entire course mate in Daffodil International University, who took part in this discuss while completing the course work.

Finally, I must acknowledge with due respect the constant support and patience of our parents.

ABSTRACT

One essential step in the software development lifecycle is software quality assurance, or SQA, which verifies that the programmed complies with standards and specifications. Enhancing software quality through methodical observation and assessment of the development process is the main objective of SQA. A variety of techniques and procedures, including quality planning, control, and improvement, are used in this. Requirements analysis, code inspections, design reviews, testing, and maintenance are all included in SQA. By putting SQA techniques into practice, businesses may lower defect rates, guarantee dependability, and provide software that meets user expectations. Including automated technologies and adhering to international standards enhances the efficacy and efficiency of SQA procedures even further. Time and resources are saved when problems are found and fixed early in the development cycle thanks to automated testing technologies. Respecting guidelines like ISO/IEC 25010 guarantees that software solutions are assessed to internationally accepted criteria for quality. Pipelines for continuous integration and deployment (CI/CD) are essential for preserving code quality since they automate the testing and deployment procedures. To make sure that established procedures and standards are being followed, SQA also entails routine audits and assessments. These exercises assist in pinpointing areas that require enhancement and cultivate a culture of excellence within the development team. Strong, dependable, and easy-to-use software that satisfies user requirements and corporate objectives is the result of employing effective SQA procedures, which also raises customer satisfaction and trust levels.

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CHAPTER 1

INTRODUCTION

1.1 Introduction

Throughout my internship in Software Quality Assurance (SQA), I acquired priceless knowledge about the procedures and methods required to preserve and enhance software quality. My experiences are described in this report, with an emphasis on the techniques and resources used to guarantee that software satisfies strict performance and reliability requirements. I worked on a variety of projects during my internship, including defect tracking, test design, execution, and planning. It was thanks to these efforts that software problems could be found and fixed early in the development cycle. This experience improved my knowledge of SQA and made clear how important it is to producing dependable and effective software.

1.2 Related Work

Considerable progress has been made in the area of Software Quality Assurance (SQA), influencing present procedures and approaches. In the past, automated testing frameworks have replaced manual testing in SQA because they increase dependability and efficiency. The shortcomings of previous linear models like Waterfall have been addressed by the introduction of approaches like Agile, which have encouraged iterative development and continuous testing. Continuous integration and deployment are supported by automated testing technologies, such as Selenium and JUnit, which provide quick defect identification and resolution. Successful SQA deployments are demonstrated by industry case studies from major tech companies like Google and Microsoft, and quality consistency is guaranteed by standards like ISO/IEC 25010 and ISTQB accreditation.

1.3 Background of the Study

For software systems to be reliable and effective, software quality assurance, or SQA, is crucial. With the introduction of automated testing tools and approaches like Agile and DevOps, SQA—which was once centered on manual testing—has changed. Through continuous testing and integration made possible by these innovations, problems can be quickly identified and fixed throughout the software development lifecycle. During my internship, I gained practical insights into contemporary software quality assurance (SQA) procedures and realized how important they are to producing software that meets the demands of the ever-changing technology market.

1.4 Scope of the study

Within the framework of a particular organizational environment, this study focuses on the influence and practical use of Software Quality Assurance (SQA) techniques. It includes using automated testing tools and SQA approaches like Agile and DevOps to guarantee the effectiveness and dependability of software. Determining quality standards, creating and carrying out test plans, handling errors, and incorporating continuous testing techniques are all included in the scope. The goal of the study is to examine how various SQA techniques help to improve software quality and development efficiency, which in turn leads to better results for the organization and end users.

1.5 The Main Objective of this Report

This report's primary goal is to record and analyze my internship in software quality assurance (SQA). It seeks to give a thorough rundown of the approaches, resources, and procedures used throughout the internship. This paper aims to demonstrate how SQA principles may be applied practically in an actual organizational environment by

describing the projects worked on, the difficulties encountered, and the lessons discovered. In the end, it seeks to show how crucial SQA is to guaranteeing software dependability, enhancing development procedures, and producing software that is of a high caliber.

1.6 Summary of Report

This paper offers a thorough analysis of my internship in software quality assurance (SQA), with a particular emphasis on the techniques, resources, and policies used to guarantee the dependability and caliber of software. An overview of SQA and its historical development is given at the outset, and then relevant works that have influenced modern SQA procedures are examined. The report then goes into great detail on the study's background and scope, including how SQA approaches like Agile and DevOps are actually implemented in real-world settings and how automated testing tools are used. Documenting project experiences, examining difficulties encountered, and talking about how SQA affects software development efficiency are some of the main goals.

CHAPTER2

OrganizationOverview

2.1 Company Profile

Creative Soft Technology Ltd started its journey in January 2015. Since then, it becomes a leading IT provider. Creative Soft Technology was created to provide software solutions, website development, digital marketing and consulting services to small, medium, large and blue-chip companies. It also provides IT solutions and services to the National Government, Local Government, and Private Agencies. It has more than 20 customers and partners and more than 50 successful projects by the end of 2022.

2.2 ServiceAreas

- SoftwareDevelopment
- Mobile Application
- WebDevelopment
- Domain& Hosting Solutions
- E-commerceConsultancy
- DigitalMarketingSolutions
- SQA&Testing
- SocialMediaManagement

CHAPTER3

Activity

3.1 WorkLoad

During the internship, the workload encompassed a variety of tasks essential to Software Quality Assurance (SQA). These included:

- TestPlanning: Participating in the development of test plans to ensure comprehensive coverage of software features and functionalities.
- TestCaseDevelopment: Creating detailed test cases based on software requirements and specifications.
- TestExecution: Performing test execution to identify defects and ensure software functionality met expected standards.
- DefectTracking: Using bug tracking systems to report and monitor defects throughout their lifecycle.
- Documentation: Documenting test results, procedures, and findings for reference and future improvements.
- Collaboration: Collaborating with developers and other team members to resolve issues and improve software quality.

This chapter will delve into the specifics of these tasks, detailing the methodologies, tools, and challenges encountered in executing them effectively during the internship period.

CHAPTER4

RoadtoSQA& Tester

4.1 TestCase Development

I actively participated in the creation of test cases during my internship, which is a crucial component of software quality assurance (SQA). The first stage in this approach was to fully comprehend the requirements and specifications for the software. Next, comprehensive test cases with test procedures, expected outcomes, and preconditions were designed. I used JIRA, TestRail, and Selenium for automation and management to generate a variety of test cases, including functional, boundary, negative, and regression tests. Peer evaluations guaranteed completeness and accuracy, and running these test cases aided in finding bugs and confirming the functionality of the product. I gained a solid foundation in SQA procedures from the experience, which also showed me the value of thorough documentation, clear communication, and flexibility in the face of change.

4.2 Functional Testing

A crucial component of Software Quality Assurance (SQA) is functional testing, which aims to confirm that every software function performs in accordance with the necessary specifications. I carried out functional testing during my internship to make sure the program operated as intended in a variety of scenarios. This required writing and running test cases to assess particular functionalities and features. I carefully followed the test procedures to ensure that the program generated the desired results, and I automated repetitious test cases to increase accuracy and efficiency using technologies like Selenium. The development team was notified of any differences between the expected and actual outcomes and flaws were recorded in order to be resolved.

Functional testing also included validating user interactions and interface components to ensure a seamless user experience. This hands-on experience with functional testing deepened my understanding of its importance in delivering reliable and user-friendly software products, and highlighted the necessity of detailed test planning and execution in the SQA process.

4.3 NonFunctionaltesting

Non-functional testing focuses on the aspects of the software that may not be related to specific behaviors or functions but are crucial for the overall user experience and performance. During my internship, I engaged in various types of non-functional testing, such as:

- **Performance Testing:** Evaluating how the software performs under different workloads, including response times, throughput, and resource usage. This involved using tools like JMeter to simulate user load and measure the system's performance.
- **Security Testing:** Ensuring the software is secure from potential threats and vulnerabilities. This included running security scans and performing penetration testing to identify and address security weaknesses.
- **Usability Testing:** Assessing the software's ease of use and overall user experience. This involved gathering feedback from users and observing their interactions with the software to identify areas for improvement.
- **Compatibility Testing:** Verifying that the software works across different environments, including various browsers, operating systems, and devices. Tools like Browser Stack were used to test compatibility and ensure a consistent user experience.

Non-functional testing provided valuable insights into the software's robustness, scalability, and user satisfaction, contributing to the delivery of a high-quality product.

4.4 UI Testing

User Interface (UI) testing focuses on verifying that the software's user interface meets the specified design and functionality requirements. During my internship, I was involved in testing the UI to ensure that all visual elements were correctly implemented and functioned as intended.

UI testing activities included:

- **Checking Layout and Design:** Ensuring that the layout, fonts, colors, and other design elements matched the design specifications.
- **Validating User Interactions:** Testing buttons, links, forms, and other interactive elements to ensure they responded correctly to user inputs.
- **Cross-Browser Testing:** Verifying that the UI was consistent and functional across different web browsers and devices using tools like Selenium and Browser Stack.
- **Accessibility Testing:** Ensuring the UI was accessible to users with disabilities, including testing for screen reader compatibility and keyboard navigation.

	A	B	C	D	E	F	G	H	I
1	TEST CASE ID	TEST SCENARIO	TEST CASE	PRE CONDITION	TEST STEPS	TEST DATA	EXPECTED RESULT	ACTUAL RESULT	STATUS(PASS/FAIL)
2			1.Valid Name2 Valid E	User will be able to enter the signup page	1.Enter Valid Name 2.Enter Valid Email 3.Enter Valid Mobile Number	456 5.tasnia123 456			
3	TC_001	Sign Up functionality for Teacher	1.Invalid Name2 Valid E	Sign up page	1.Enter Invalid Name 2.Enter Valid Email 3.Enter Valid Mobile Number	6.Na 456 5.tasnia123	Teacher Account Cr	User Created	PASS
4	TC_002	Sign Up functionality for Teacher	1.Valid Name2 Valid E	User will be able to enter the signup page	1.Enter Valid Name 2.Enter Valid Email 3.Enter Valid Mobile Number	456 5.tasnia123 456	Will show Invalid Na	Not showed Invalid Na	FAIL
5	TC_003	Sign Up functionality for Teacher	1.Valid Name2 Valid E	Sign up page	5.Enter Valid Confirm Password 6.Click	5.tasnia123 456 6.Na	Will show Invalid En	Not showed Invalid Em	FAIL
6	TC_004	Sign Up functionality for Teacher			5.Enter Valid Confirm Password 6.Click		Will show Invalid P	Showed Invalid phone n	PASS

Figure 4.4: UI Testing

#	A	B	C	D	E	F	G	H	I
1	BUG ID	MODULE	URL	ISSUES	DESCRIPTION	FEEDBACK	ATTACHMENT	SEVERITY	PRIORITY
2	BI_001	Sign-up Student	https://connect.csttestserver.com/student/login	Invalid Name accepted	When I put invalid name with special character the system	It should not accept # as nar	https://print.sc/0Gu-80CP0FaC	Major	High
3	BI_002	Sign-up Teacher	https://connect.csttestserver.com/teacher/login	Invalid Name accepted	When I put invalid name with special character the system	It should not accept # as nar	https://print.sc/TUpoGU_S6o8I	Major	High
4	BI_003	Teacher	https://connect.csttestserver.com/teacher-list	Language difference	When I keep the website in English translation, it shows Bengali words in dropdown menu of "Select Upazila" it happens after I once click the "search" button	It should show options in En	https://print.sc/K2aSEncRBL7	Minor	Medium
5	BI_004	Teacher	https://connect.csttestserver.com/teacher-list	Doesn't take input in Bengali format	When I give phone number input in Bengali format inside "Phone No or Email" box, it doesn't show any result	It should show teacher inform	https://print.sc/C2esaGXv8K9	Major	Medium
6	BI_005	Student	https://connect.csttestserver.com/student-list	Language difference	When I keep the website in English translation, it shows Bengali words in dropdown menu of "Select Upazila" it happens after I once click the "search" button	It should show options in En	https://print.sc/l8gQ2qTGDq5	Minor	Medium
7	BI_006	Student	https://connect.csttestserver.com/student-list	Doesn't take input in Bengali format	When I give phone number input in Bengali format inside "Phone No or Email" box, it doesn't show any result	It should show student inform	https://print.sc/8gr4sSYdwW5	Major	Medium
8	BI_007	Student	https://connect.csttestserver.com/student-list?page=2	Redirect to another page bar	When I search "Bandarban" under "Select District" option, it shows there are 3 pages of students below the page. But after I click right arrow in the bar, it returns to all students list with 12 pages shown in the bar	It should show the 2nd page of student after clicking the arrow	https://print.sc/czvCH2S4H4Uj	Major	High
9	BI_008	School Corner	https://connect.csttestserver.com/school-list	Language difference	When I keep the website in Bengali translation, it shows En	It should show options in Be	https://print.sc/K04HYJMLelmz	Minor	Low
10	BI_009	School Corner	https://connect.csttestserver.com/school-list	Title doesn't match with URL	In the homepage, the corresponding button is titled as "School Corner", but the in the URL link it's written as "school-list"	Title should match the URL	https://print.sc/8wJkYFH_v4F	Minor	Low

Figure4.4: BugReport for Modules

#	A	B	C	D	E	F	G	H	I
1	BUG ID	MODULE	URL	ISSUES	DESCRIPTION	FEEDBACK	ATTACHMENT	SEVERITY	PRIORITY
2	BI_001	Home	WIN AGRO LIMITED – Win Agro	Button not working	There is a Learn More button in the home page. But it's not working	It should work properly.	https://paste.pics/c3ee9bcb0	Major	Medium
3	BI_002	Insecticides	https://winagrolimited.com/insecticides/	Some product images are missing	Some of the product images are missing. Though, they are listed.	It should show all the products title and images	https://paste.pics/95ff0f1213	Major	High
4	BI_003	Herbicides	Herbicides – WIN AGRO LIMITED	Some product images are missing	Some of the product images are missing. Though, they are listed.	It should show all the products title and images	https://paste.pics/bb49153310ef02cdfaabe2e4aaafcc80	Major	High
5	BI_004	Fungicides	Fungicides – WIN AGRO LIMITED	Some product images are missing	Some of the product images are missing. Though, they are listed.	It should show all the products title and images	https://paste.pics/a7f78b9f49a38733ff48cb96d000eff9	Major	High
6	BI_005	Agro Machineries & Equipments	https://winagrolimited.com/agro-machineries-equipments/	Heading mismatch	Menu text is Agro Machineries & Equipments but in Heading it show only Agro Machineries	Menu text and Heading have to be same	https://paste.pics/a7f78b9f49a38733ff48cb96d000eff9	Minor	Low
7	BI_006	Processed Foods	https://winagrolimited.com/processed-foods/	Blank page	This page doesn't have any content yet.	It should have some content	https://paste.pics/dd106c50cb5c548924ccda583bf419db	Minor	Medium
8	BI_007	Gallery	https://winagrolimited.com/gallery/	Blurry Hero image	It also shows blurry when I checked the Gallery Page Responsiv	Hero image should have Sharp	https://paste.pics/806c0fdab78b7df0caec355defae2ac9	Major	High

Figure4.4: BugReport for Modules

RevisionHistory

Revision History			
Date	Version	Author	Description
11.04.2023	1.0	TASNIA AFRIN	Test scheduling & overview
13.04.2023	1.1	TASNIA AFRIN	Test Cases and bug reports
14.04.2023	1.2	TASNIA AFRIN	Performance testing
16.04.2023	1.3	TASNIA AFRIN	Re-testing

Figure4.4:RevisionHistory

CHAPTER 5

Challenges

5.1 Academic Preparation

My academic background provided a solid foundation for understanding the principles of Software Quality Assurance (SQA). Courses in software engineering, programming, and systems analysis equipped me with the theoretical knowledge required for testing and quality assurance. However, transitioning from academic learning to practical application presented challenges. The theoretical concepts learned in the classroom needed to be adapted to real-world scenarios, which often involved complexities and nuances not covered in textbooks. This experience underscored the importance of practical exposure and the need for continual learning beyond academic coursework.

5.2 Identified

During the internship, several challenges were identified that impacted the SQA process:

- **Incomplete Requirements:** Frequently, the software requirements were either incomplete or subject to change, making it difficult to develop comprehensive test cases.
- **Tool Proficiency:** Initially, there was a learning curve associated with mastering various SQA tools such as Selenium, JIRA, and TestRail. Gaining proficiency in these tools required additional self-study and practice.
- **Communication Gaps:** Effective communication between developers and testers was sometimes challenging, leading to misunderstandings and delays in

addressing defects.

- **Time Constraints:** Balancing multiple testing tasks with tight deadlines was a significant challenge, requiring efficient time management and prioritization skills.

5.3 Personal Skills

The internship experience highlighted and helped develop several personal skills:

- **Problem-Solving:** Tackling the challenges of incomplete requirements and unexpected software behavior enhanced my problem-solving abilities.
- **Adaptability:** Navigating changes in project scope and requirements improved my adaptability and flexibility in handling evolving situations.
- **Communication:** The need for clear and effective communication with team members honed my interpersonal and communication skills.
- **Attention to Detail:** Ensuring thorough test coverage and identifying subtle defects sharpened my attention to detail.
- **Time Management:** Managing multiple tasks and meeting deadlines under pressure strengthened my time management and organizational skills.

These personal skills not only contributed to my success during the internship but also prepared me for future roles in the field of software quality assurance.

Chapter 6

Acquired Knowledge

6.1 Implications to University's Internship Program

My internship experience highlighted the importance of integrating practical training with theoretical learning. The university's internship program can benefit by incorporating more real-world projects and case studies into the curriculum. Additionally, partnerships with industry professionals to provide workshops and seminars on current SQA tools and methodologies could better prepare students for internships. Emphasizing hands-on experience with popular SQA tools and techniques will enhance students' readiness for industry challenges.

6.2 Effects on Personal Skills

The internship significantly impacted my personal skills. I developed stronger problem-solving abilities as I encountered and resolved various software issues. My adaptability improved as I learned to handle changing requirements and project scopes. Enhanced communication skills were a key outcome, as I regularly interacted with developers and team members to discuss defects and solutions. Overall, these experiences boosted my confidence and effectiveness in a professional setting.

6.3 Ability to learn

The dynamic nature of the internship environment accelerated my learning process. I quickly became proficient in using new SQA tools and methodologies through self-study and practical application. This experience reinforced the value of continuous learning and adaptability, as I had to stay updated with the latest industry practices and technologies to perform effectively.

6.4 Dependability

Dependability was crucial during my internship. I learned to manage my tasks efficiently, ensuring that test cases were developed, executed, and documented accurately and on time. My reliability in completing assignments and maintaining high standards of work quality earned the trust of my supervisors and colleagues, reinforcing the importance of being dependable in a professional environment.

6.5 Initiative

Taking initiative became a vital part of my role. I proactively sought opportunities to improve testing processes, volunteered for additional responsibilities, and suggested improvements based on my observations. This proactive approach not only enhanced my learning experience but also demonstrated my commitment to contributing positively to the team and the project.

6.6 Judgment

The internship helped refine my judgment skills, particularly in prioritizing tasks and making decisions under pressure. I learned to evaluate the severity of defects, assess the impact of software issues, and decide the best course of action for testing and reporting. This experience enhanced my ability to make informed and effective decisions in a fast-paced environment.

These acquired knowledge and skills not only contributed to my growth during the internship but also prepared me for future challenges in the field of Software Quality Assurance.

CHAPTER 7

Concluding Statements

7.0 Concluding Statements

The internship experience in Software Quality Assurance (SQA) has been both challenging and rewarding, providing invaluable insights into the practical aspects of ensuring software quality. This journey has significantly enhanced my technical skills, personal abilities, and professional understanding. The hands-on experience with various SQA tools and methodologies has prepared me well for future endeavors in the field.

7.1 Summary

This report documented my internship experience in SQA, covering the tasks and responsibilities undertaken, the challenges faced, and the personal and professional growth achieved. Starting with an introduction to the importance of SQA, the report detailed the activities involved in test case development, functional and non-functional testing, and UI testing. It also highlighted the challenges encountered, the personal skills developed, and the knowledge acquired during the internship.

7.2 Recommendations for Future Strategic Actions

To further enhance the effectiveness of SQA practices and internship experiences, the following strategic actions are recommended:

- **Integration of Emerging Technologies:** Embrace AI and machine learning tools to predict and prevent potential defects, enhancing the efficiency of testing processes.

- **Continuous Learning Programs:** Establish regular training sessions to keep the team updated on the latest SQA tools and methodologies.
- **Enhanced Collaboration:** Foster better communication and collaboration between development and QA teams to streamline defect resolution and improve overall software quality.

7.3. Organization

For the organization, the following actions are recommended:

- **Invest in Training:** Regularly train employees on the latest SQA tools and best practices to maintain high standards of software quality.
- **Improve Requirement Clarity:** Ensure that software requirements are clear and complete to facilitate better test case development and defect tracking.
- **Promote a Quality-First Culture:** Encourage a culture where quality is prioritized at every stage of the software development lifecycle.

7.4 University

- **Increase Practical Exposure:** Incorporate more real-world projects and practical training into the curriculum to better prepare students for internships.
- **Enhance Industry Partnerships:** Develop stronger partnerships with industry professionals to provide students with workshops, seminars, and hands-on experience with current SQA tools.
- **Continuous Feedback Loop:** Establish a feedback mechanism where students can share their internship experiences to continuously improve the program.

7.5 Professional

For professionals entering the field of SQA, the following recommendations are offered:

- **Stay Updated:** Continuously learn and stay updated with the latest SQA tools and methodologies to remain competitive in the field.
- **Develop Soft Skills:** Focus on enhancing communication, problem-solving and time management skills to effectively handle the diverse challenges in SQA.
- **Seek Mentorship:** Find mentors within the industry who can provide guidance and support in navigating career development in SQA.

CHAPTER 8

CONCLUSUION

8.1 Summeryofthe Report

This report provides a comprehensive account of my internship experience in Software Quality Assurance (SQA). It began with an introduction to SQA and its significance in the software development lifecycle. The organization overview detailed the company profile, service areas, vision, mission, values, major clients, and my declaration of activities. Subsequent chapters described the practical tasks and responsibilities undertaken, including test case development, functional testing, non-functional testing, and UI testing. Challenges faced during the internship were discussed, focusing on academic preparation, identified challenges, and the development of personal skills. The report then explored the knowledge acquired, its implications for the university'sinternshipprogram,andtheeffectsonpersonalskills,learningability,dependability, initiative, and judgment. The concluding statements provided summary, strategic recommendations for the organization, university, and professionals, emphasizing continuous improvement and professional growth.

8.2 Conclusion

In conclusion,myinternshipinSoftwareQuality Assurancewas apivotal experiencethat significantly enhanced my understanding and application of SQA practices. The practical exposure to real-world projects and the use of advanced tools and methodologiesprovided a robust foundation for my future career. The challenges encountered and overcome during the internship reinforced the importance of adaptability, continuous learning, and effective communication. This experience has not only prepared me for a successful career in SQA but also highlighted areas for improvement in both organizationalpracticesandacademicprograms.Byintegratingthelessonslearnedand

recommendations provided, both the organization and the university can further enhance their SQA processes and internship programs, ultimately contributing to the development of high-quality software products and well-prepared professionals in the field.

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