Test Automation Best Practices:
A Case Study Analysis

1、 摘要

Test Automation is a process in which one uses software tools and scripts to execute predefined test cases automatically. Which involves the creation of scripts or code that simulate user interactions with an application or system, allowing for the repetitive execution of tests with minimal human intervention.

2、 緣由與目的

Our topic is a collaboration between Sunbird Inc. and National Taipei University of Technology (NTUT) to complete test cases for Sunbird Data Center Infrastructure Management (DCIM) software. [1] Conducted as part of an internship program, this research aims to enhance our test automation knowledge. We also analyze past progress and identify the factors which influence the recent progress trends.

3、 研究範圍

In addition to being familiar with Robot Framework and Python, we focus on how to write test scripts in a simple and readable way, as well as the reusability of keywords, and conduct the scrum process to learn the development model in the industry.

4、 使用技術方法

(a) Robot Framework
A generic open-source automation framework for acceptance testing, acceptance test-driven development, and robotic process automation. [2]

(b) Python
An interpreted, object-oriented, high-level programming language with dynamic semantics. [3]

(c) XML Path Language (XPath)
Used to uniquely identify or address parts of an XML document. [4]

(d) Git
Source code management, tracks changes in the source code, allowing multiple developers to work together on non-linear development. [5]

(e) Scrum and Mob Programming
A collaborative software development approach, that follows an empirical process based on experience and real-time decision-making.
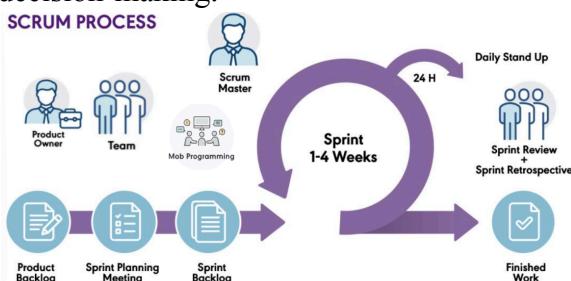
Figure 1. Scrum Process [6]

5、 工具說明

Terms	Descriptions
Robot Editor	To compose and implement automated testing protocols.
Selenium API	An API used to interact with a browser by mimicking real user behavior on an operating system. [7]

|	
VSCode	To reference past programs, ensuring code consistency.
Microsoft Teams	Online meeting platform for collaboration and discussion.
Jenkins	Execute program multiple times, verifying its accuracy and confirming its stability.
Github	A platform utilizing Git software.

6、 開發流程
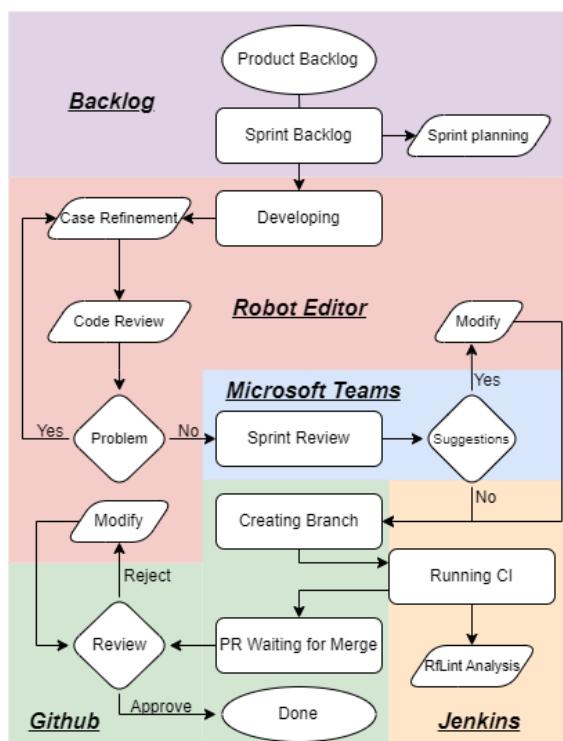
Figure 2. Development Process

7、 研究結果與討論
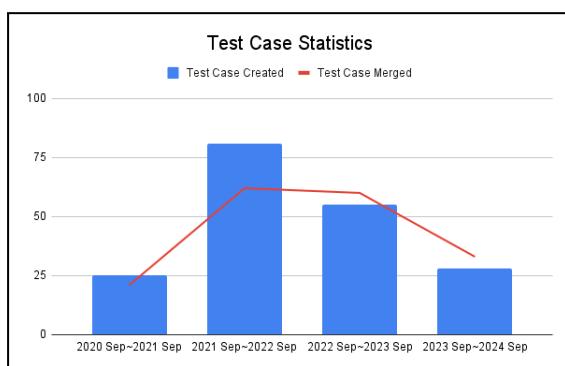
The statistics indicate a decline in the number of test cases produced in recent years. We attribute this reduction to several contributing factors, including increased requirement complexity, unstable product versions, and communication challenges.

8、 結論

In summary, this essay investigates test automation best practices via a case study with Sunbird Inc. and NTUT, focusing on testing Sunbird's DCIM software. Key aspects include utilizing tools and Scrum methodology. Additionally, we examined past trends and the factors contributing to recent declines in test case production. These findings offer valuable insights for future software testing initiatives and development strategies.

參考文獻

[1] "What Is Data Center Infrastructure Management? Find Out!" *Sunbird*, info2.sunbirddcim.com/what-is-dcim-2/. Accessed 10 May 2024.

[2] "Robot Framework." *GitHub*, github.com/robotframework/robotframework. Accessed 10 May 2024.

[3] "What Is Python? Executive Summary." *Python.Org*, www.python.org/doc/essays/blurb/. Accessed 10 May 2024.

[4] "XPath Overview." *IBM Documentation*, www.ibm.com/docs/en/app-connect/11.0.0?topic=xpath-overview. Accessed 11 May 2024.

[5] Perveez, Sayeda Haifa. "What Is Git: Features, Commands, Branch and Workflow in Git." *Simplilearn.Com*, Simplilearn, 27 July 2023, www.simplilearn.com/tutorials/git-tutorial/what-is-git.

[6] "What Is Scrum? An Overview of Scrum and The Agile Journey." *PM Partners*, 25 Mar. 2024, www.pm-partners.com.au/insights/the-agile-journey-a-scrum-overview.

[7] Colantonio, Joe. "What Is Selenium Ultimate Overview." *Test Guild - Automation Testing Tools Community*, 27 Mar. 2024, testguild.com/selenium-webdriver/.