Functional Automation Testing of Palace Property Management Software

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ABSTRACT

Till today, there are many web applications developed and tested so that end- user gets maximum user-friendly experience and satisfaction. For testing these applications and their functionalities manual testing is not always feasible. To overcome the challenge. Automation testing is used in which the testing process is automated with minimal manual intervention. Regression testing is deployed to perform the testing for routine flow of an application and when new features are added then automation testing becomes very useful. The focus of this study on automation testing. With the help of Selenium Web driver scripts are executed and reports are generated. The default reports do not show any graphical representation of results. Hence, the main idea behind this study is to focus on automation testing with the combination of Selenium Web driver, Maven, TestNG and Page Object Model which provides cutomised results to our study.

KEYWORDS

Automation testing, Regression testing, Visual Studio, C#, Selenium Web driver, Agile- Scrum.

1. INTRODUCTION

PALACE Company was established in 2006 and is a cloud-based property management solution that caters to residential property managers and management organizations. Accounting, tenant and lease tracking, maintenance management and many more are the key features. With the central dashboard features, Palace helps property managers to keep track of different types of properties. Users can view incoming mail, invoices, charges, and reminders. Palace is rapidly growing in New Zealand as it offers additional features such as role-based access permissions, key tracking and mobile applications for iOS and Android devices that help users to remotely manage operations and routines.

The purpose of this study is to determine the challenges faced by the Palace company in the context of Manual testing. Manual testing is inadequate, as it is labor-intensive, error prone and the same kind of quality checks are not supported that are possible with the use of an automated testing framework. Some of the problems faced with manual testing are:

- Leads to changes in the requirements.
- Documenting of the bugs that were logged and bugs fixed.
- Maintaining Requirements Traceability Matrix without using any tools manually is a very tedious job.

- Carrying out regression   testing daily or weekly or as needed by manual testers is not possible.

Our objective for this study to identify test cases in the Palace Property Management Software application which needs to be automated and should generate automated test reports which can help Palace to save time and money in the future.

This research project is organized as follow: Section 2 focuses on the related work of various studies concentrating on automation testing. Section 3 is focused on the research methodology for this research project. Section 4 of this research is focused on project execution results. Results of this project are provided in section 5. Discussion to results of this project are provided in section 6. Section 7 is dedicated towards conclusion of this research project. Finally, in section 8 future work recommendations are presented.

2. RELATED WORK

There are various studies conducted on automation testing. We will go through the major studies one by one and will explore their significance relevant to our project.

Automation testing is the process of software development, to provide high quality, robust and reliable software product [1]. Selenium Web driver tool is pointed out as an appropriate solution when creating a framework and its widely used.

Test Automation is essential in agile development environments. The main goal is to speed up the test execution cycles and to reduce the effort involved in running tests manually. Test is automated to speedup execution cycles, provide prompt feedback, free from repetitive tasks, and reduce human effort [2].

Test engineer is responsible for generation of script, execution, and deployment of the project. If failures occur at any stage, then it creates a larger impact on the project execution [3]. Selection of correct test cases for automation is very important as it impacts on development cost and scheduled time.

A study was conducted to discuss the existing and improved testing techniques for better-quality assurance   purposes [4]. The study emphasizes the knowledge of test execution along with stakeholders' preferences is necessary in test execution.

Nowadays, technologies, requirements, ideas, implementation strategies and deployment tools are changing rapidly. In order to face such challenges a new movement called DevOps is proposed [5].

A study was conducted to provide a clear understanding and complete overview of Agile software development   culture and practice [6].

Various aspects of functional testing were discussed [7]. Further, it looked at the relation between changing business strategies and changes to applications in development.

Selenium Web driver helps to minimize the risks, reduce the time for development and increase the return on investment [8].

Testing aims to make sure the quality of the software is as efficient as possible   were discussed in the study [9]. Software testing is a verification   process for the assessment of software quality and process for achieving quality.

A study was conducted which focuses on the automation of the document uploading process [10]. It was further stated in the study that any website which maintains the company's documents are of high importance.

A study was conducted which presents the case for one who is developing its automation framework for testing its enterprise products. The test automation is acquiring more importance in an enterprise, as it is helping in improving the product quality at the expenditure of optimum time and cost [11].

All above studies highlights various aspects of testing. However, automation testing is a major factor in the success of the project. Hence, in this project will perform functional automation testing   for Palace software.

3. RESEARCH METHODOLOGY

Research methodology for Palace software research project has been discussed below.

3.1. Tools for the Research

Automation tools are software developed which helps in performing testing activities are called test management tools and few tools are developed which are specific to different needs of testing like functional testing, performance testing, security testing, web services testing, database testing, usability testing, etc. Once the manual test cases are automated, the manual effort of executing the test case for regression testing can be eliminated by executing the scripts using test execution tools. Some of the automation tools that help in carrying out the test script design and execution are Selenium Web driver2.0, QTP and Test Complete [12].

The Palace Company Software project works on an agile methodology for development and testing throughout SDLC. The project is divided into sprints and each sprint is for one week. Daily stand up meeting and discussion will be held to give detail description of project progress and roadblocks and issues facing.

All above studies highlights various aspects of testing. However, automation testing is a major factor in the success of the project. Hence, in this project will perform functional automation testing for Palace software.

Agile projects deliver working software on a regular schedule, either weekly or fortnightly. The components   delivered at each iteration are defined by the business which is prioritized in such a way where the highest value features go first. These practices together help to reduce the risk of shifting resources away from an agile project. Following this methodology ensures that there is not much half-done work at any point, the work that is finished is high value and the state of the project is always unambiguous.

Table 1: Comparison of Test Automation Tools

PARAMETER	SELENIUM	TEST COMPLETE	QTP
Programming Language	Scripts are commonly designed using Java, Ruby, Python, PHP, and Perl.	Support scripting using JavaScript and VBScript only.	Allows scripts to be designed in VBScript, JS Script, Delphi Script, C++ Script, C# Script.
Platform Supported	Windows, MAC, UNIX operating systems.	Supports only in windows.	Runs on Windows Vista and 7.
Open-Source/ Licensed	Completely Open-Source	Paid tool based on each project	It is a licensed tool
Customer Support	Community support	Online support provided	Customer support is provided
Test Execution Report	With plug-in like TestNG can execute and generate reports in HTML format.	The test execution report is generated using QTP and determines the execution status.	Execution results are generated as a separate file

3.2. Selenium Web driver

Selenium Web driver is the latest version that is selected by the Palace team for performing the testing activities. The tool allows the designed test scripts to communicate with the browser directly with the help of native methods. Testing of web applications on desktop well as on mobile devices like Android and iOS devices is supported by Selenium. Since it is an open-source tool the cost of the project is reduced, and the time taken to execute the testscripts on Web driver is less. It allows designing the test scripts that can be executed with multiple browsers.
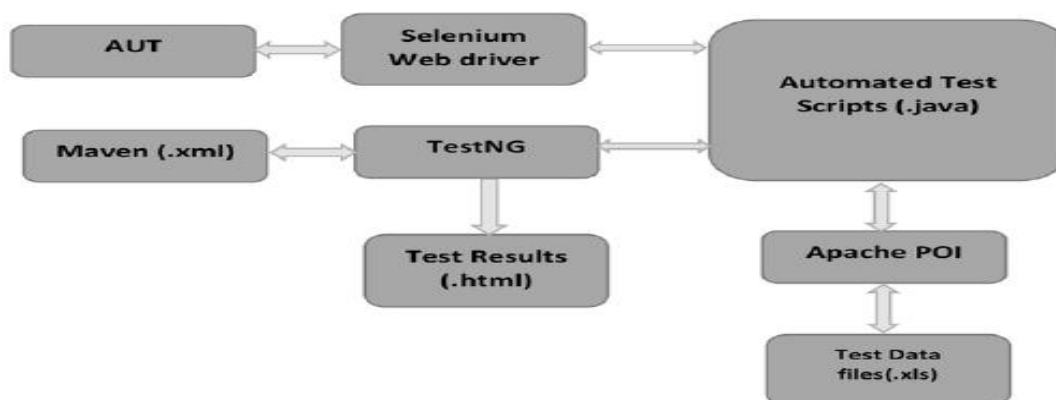

Figure 1: Architecture of the Proposed Automation Framework

3.3. Testing

TestNG commonly named "Test New Generation" is a testing framework used for automation testing along with selenium. With TestNG various levels of testing like unit, integration, system, and user acceptance testing can be performed (UAT) [12].Advantages of TestNG: There is the number of advantages from Selenium viewpoint, real favourable circumstances of TestNG are:

• Enables to deliver HTML reports of execution.
• Annotations made analysers life simple.
• Test case scan be grouped and Prioritized

4. PROJECT EXECUTION

The test plan is a document that acts as a point of reference to the QA team and the testing activities are performed based on the test plan document.

4.1. Test Plan

The test plan is a document that acts as a point of reference to the QA team and the testing activities are performed based on the test plan document.

4.2. Project Scope

The test plan is to identify and prescribe the scope, approach, and resources of testing activities that need to be performed in the Palace property management software project. In this research project, the features of the application that need to be tested are identified from the requirements.

4.3. Quality Objective

The test objectives are to verify the functionalities of the Palace application. The project should focus on testing the login functionality, Add New User, Current User, Archive User, Add New Owner, Custom Views and Logout functionalities.

4.4. Deliverables

Test deliverables along with the testing task id are given in the below table 2.

Table 2: Testing tasks along with Test Deliverables

TESTINGTASK ID	TEST DELIVERABLES
#1	Review and analyse the guidelines of the Palace website.
#2	Understanding the software.
#3	Read the documents related to the application.
#4	Set up the testing environment.
#5	Manual test case design.
#6	Manual test execution.
#7	Automation environment set up.

4.5. Manual Test Cases

Manual test cases for palace property management software are given below in table 3.

Table 3: Manual Test Cases for Palace Application

MANUAL TEST CASES – PALACE PROPERTY MANAGEMENT SOFTWARE						
Test Case ID	Test Case Description	Test Steps	Test Data	Expected Output	Actual Output	Status
TC_001	Verify the **User Login Functionality** for valid Email and Password	1. Open the Chrome browser 2. Enter the URL 3. Enter the valid Email and Password4. click the sign-in button	URL= https://preprod.getpalace.com/ Email= "divyapodduturi27@gmail.com" Password ="XXXXXX"	User should land on the Palace Login Page and should be logged in successfully	As Expected	Pass
TC_002	Verify the User Login Functionality for Invalid Email and valid Password	1. Open the Chrome browser 2. Enter the URL 3. Enter the Invalid Email and Valid Password4. click the sign-in button	URL= https://preprod.getpalace.com/ Email="divyapodduturi27@gml.com" Password ="XXXXXX"	User should land on the Palace Login Page and should not be logged in	As Expected	Pass
TC_003	Verify the User Login Functionality for valid Email and invalid Password	1. Open the Chrome browser 2. Enter the URL 3. Enter the Valid Email and Invalid Password4. click the sign-in button	URL= https://preprod.getpalace.com/ Email="divyapodduturi27@maill.com" Password ="XXXXXX"	User should land on the Palace Login Page and should not be logged in	As Expected	Pass
TC_004	Verify the User Login Functionality for Invalid Email and invalid Password	1. Open the Chrome browser 2. Enter the URL 3. Enter the Invalid Email and Invalid Password4. click the sign-in button	URL= https://preprod.getpalace.com/ Email="divyapodduturi27@maill.com" Password ="XXXXXX"	User should land on the Palace Login Page and should not be logged in	As Expected	Pass
TC_005	Verify the Users Feature functionality	1. Click the "Users" icon		User should see the "Current users", "Archived users", and "Add users"	As Expected	Pass
TC_006	Verify if the User can "Add new user" without filling any fields	1. Click the "Users" icon 2. Click the "Add users" icon 3. click the "Save & Close" button		User should be able to see error information "Please enter in a username"	As Expected	Pass
TC_007	Verify if the User can "Add new user" without filling mandatory fields	1. Click the "Users" icon 2. Click the "Add users" icon 3. Click the "Save & Close" button		User should be able to see error information "Please enter in a username"	As Expected	Pass
TC_008	Verify if the User can "Add new user" with filling the mandatory fields	1. Click the "Users" icon 2. Click the "Add users" icon 3. Fill in the "Username" field 4. click the "Save & Close" button	Username="XYZ"	User should be able to create a New user and should be able to see the user in the current user list with only the Username	As expected	Pass

TC_009	Verify if the User can "Add new user" with filling all the fields in the form	1. Click the "Users" icon 2. Click the "Add users" icon 3. Fill in the profile details of the new user, "Username" and "Position" 4. Fill in the Personal details of the New user, "Title", "User code", "First name", "Last Name", "Full Name", "Postal Address", "Region" and "Branch" 5. Fill in the User codes of the New User REAXML codes and Real estate code6. Fill in the Contact Information of the New user, "(ph.)Home", "(ph.)Work", "(ph.)Mobile", "Fax", "primary email" and "Secondary email" 7. Select the Date started, and Date ended" 8. click the "Save & Close" button	Username e="XYZ" Position= "Property Manager" Title="Owner" User code="1234" First name="X YZ1" Last name="X YZ2" Full name="X YZ1 XYZ2" Postal Address=" 3214" Region=" Auckland" Branch "Auckland" REAXML Codes="0 00" Real Estate code="00 01" (Ph)Home =123456 (Ph)Work =321654 (Ph)Mobil e=147852 Primary email=xyz @gmail.c om Secondar y email=xyz @gmail.c om	User should be able to create a New user and should be able to see the user in the current user list with all the user details	As expe cted	Pass
TC_010	Verify if the User can "Add new user" with filling only a few primary details	1. Click the "Users" icon 2. Click the "Add users" icon 3. Fill in the profile details of the new user "Username" 4. Fill in the Personal details of the new user "Title" and "Full name" 5. Fill in the User codes of the New user REAXML codes6. Fill in the Contact Information of the New user "Primary email" 7. Click the "Save & Close" button	Username e="XYZ" Title="Owner" Full name="X YZ1 XYZ2" REAXML Codes="0 00" Primary email ="xyz@g mail.com"	User should be able to create a new user and should be able to see the user in the current user list with the provided user details	As expe cted	Pass
TC_011	Verify if the User can "Add new user" with filling only Profile details	1. Click the "Users" icon 2. Click the "Add users" icon 3. Fill in the profile details of the new user, "Username" and "Position" 4. Click the "Save & Close" button	Username e="XYZ" Position= "Property Manager"	User should be able to create a new user and should be able to see the user in the current user list with the provided user profile details	As expe cted	Pass
TC_012	Verify if the User can "Add new user" with filling only "Profile" and "Personal details"	1. Click the "Users" icon 2. Click the "Add users" icon 3. Fill in the profile details of the new user, "Username" and "Position" 4. Fill in the Personal details of the New user, "Title", "User code", "First name", "Last Name", "Full Name", "Postal Address", "Region" and "Branch" 5. Click the "Save & Close" button	Username e="XYZ" Position= "Property Manager" Title="Owner" User code="1234" First name="X YZ1" Last name="X YZ2" Full name="X YZ1 XYZ2" Postal Address=" 3214" Region=" Auckland" Branch "Auckland"	User should be able to create a new user and should be able to see the user in the current user list with the provided user profile and Personal details	As expe cted	Pass

TC_013	Verify if the User can "Add new User" with filling only "Profile", "Personal details" and "User codes"	1. Click the "Users" icon 2. Click the "Add users" icon 3. Fill in the profile details of the new user, "Username" and "Position" 4. Fill in the Personal details of the New user, "Title", "User code", "First name", "Last Name", "Full Name", "Postal Address", "Region" and "Branch" 5. Fill in the User codes of the new user REAXML codes 6. Click the "Save & Close" button	Username="XYZ" Position= "Property Manager" Title="Owner" User code="1234" First name="XYZ1" Last name="XYZ2" Full name="XYZ1 XYZ2" Postal Address=" 3214" Region=" Auckland" Branch "Auckland" REAXML Codes="000" Real Estate code="0001"	User should be able to create a new user and should be able to see the user in the current user list with the provided user profile, Personal details, and REAXML codes	As expected	Pass
TC_014	Verify if the User can "Add new User" with filling only "Profile", "Personal details", "User codes" and "Contact information"	1. Click the "Users" icon 2. Click the "Add users" icon 3. Fill in the profile details of the new user, "Username" and "Position" 4. Fill in the Personal details of the New user, "Title", "User code", "First name", "Last Name", "Full Name", "Postal Address", "Region" and "Branch" 5. Fill in the User codes of the new user REAXML codes6. Fill in the Contact Information of the New user, "(ph.)Home", "(ph.)Work", "(ph.)Mobile", "Fax", "primary email" and "Secondary email" 7. Click the "Save & Close" button	Username="XYZ" Position= "Property Manager" Title="Owner" User code="1234" First name="XYZ1" Last name="XYZ2" Full name="XYZ1 XYZ2" Postal Address=" 3214" Region=" Auckland" Branch "Auckland" REAXML Codes="000" Real Estate code="0001" (Ph)Home=123456 (Ph)Work=321654 (Ph)Mobile=147852 Primary email=xyz@gmail.com Secondary email=xyz@gmail.com	User should be able to create a new user and should be able to see the user in the current user list with the provided user profile, Personal details, REAXML codes, and Contact information	As expected	Pass
TC_015	Verify if the user can view the current user's list	Click the "Current users" icon		User should land on the "List of current users" page and should be able to see the current users list	As Expected	Pass
TC_016	Verify if the user can search for a user from the current user list	1. Click the "Current users" icon 2. Enter the username in the Search text box 3. Click on the Search button	username ="System"	User should land on the "List of current users" page and should be able to key in the username and should be able to see the requested user details	As Expected	Pass
TC_017	Verify if the user can search for a user who is not added to the	1. Click the "Current users" icon 2. Enter the username in the Search text box 3. Click on the Search button	username ="John"	User should land on the "List of current users" page and should be able to key in the username and should see	As expected	Pass

				"custom views"		
TC_022	Verify if the User can "Add new owner" without filling any fields	1. Click the "Owners" icon 2. Click the "Add owner" icon 3. Click the "Save & Close" button		Users should be able to see error information "Because you selected 'Direct Credit' as a Payment Type you will now be required to enter an owner bank account." and "The Last name * field is required."	As Expected	Pass
TC_023	Verify if the User can "Add new owner" without filling any fields	1. Click the "Owners" icon 2. Click the "Add owner" icon 3. Click the "Save & Close" button 4. Click "OK" once the "Owner bank account" error message appears		Users should be able to see error information "The Last name * field is required."	As Expected	Pass
TC_024	Verify if the User can "Add new Owner" with filling only mandatory fields in Owner details	1. Click the "Owners" icon 2. Click the "Add owner" icon 3. Enter the last name 4. Click the "Save & Close" button"	Last name = "John"	User should be able to see error information "Please enter an email address"	As Expected	Pass
TC_025	Verify if the User can "Add new owner" without filling mandatory fields	1. Click the "Owners" icon 2. Click the "Add owner" icon 3. Enter the last name 4. Enter the primary email Id5. Payment type drop-down is selected as either "hold" or "cheque" 4. Click the "Save & Close" button	Last name = "John" Primary email="john@gmail.com"	User should be successfully created a new owner	As Expected	Pass
TC_026	Verify the User can "Add new	1. Click the "Owners" icon 2. Click the "Add owner" icon3. Enter the Profile	Title= "Mr" First	User should see error information	As Expected	Pass
	current user's list			an error message saying "There are no items to display"		
TC_018	Verify if the user can view the Archived users list	Click the "Archived users" icon		User should land on the "List of archived users" page and should be able to see the archived users list	As expected	Pass
TC_019	Verify if the user can search for a user from the current user list	1. Click the "Archived users" icon 2. Enter the username in the Search text box 3. Click on the Search button	username ="Xyz"	User should land on the "List of archived users" page and should be able to key in the username and also should be able to see the requested user details	As expected	Pass
TC_020	Verify if the user can search for a user who is not added to the archived user's list	1. Click the "Archived users" icon 2. Enter the username in the Search text box 3. Click on the Search button	username ="John"	User should land on the "List of archived users" page and should be able to key in the username and should see an error message saying "There are no items to display"	As expected	Pass
TC_021	Verify the Owners Feature functionality	1. Click the "Owners" icon		User should see the "Current owners", "Archived owners", "Add owners", "owner reports" and	As Expected	Pass

			@gmail.c om Secondar y email=xyz @gmail.c om Country code=""00 64""			
	owner" with only filling the Profile details	details of the new owner 4. Click the "Save & Close" button	name="P eter" Last name="Jo hn" Postal address=" 10 Rosedale Road"	"Please enter an email address"		
TC_027	Verify the user can "Add new owner" with only filling the Contact informatio n	1. Click the "Owners" icon 2. Click the "Add owner" icon 3. Enter the Contact Information of the new owner 4. Click the "Save & Close" button	Ph)Home =123456 (Ph)Work =321654 (Ph)Mobil e=147852 Primary email=xyz @gmail.c om Secondar y email=xyz @gmail.c om Country code="00 64" Alternate address=" 100 Rosedale Road"	Users should be able to see error information "The Last name * field is required."	As Expe cted	Pass
TC_028	Verify the user can "Add new owner" with filling all the fields in the Details page and selecting the "Payment set up" dropdown as "Hold"	1. Click the "Owners" icon 2. Click the "Add owner" icon 3. Enter all the details of the owner 4. Click the "Save & Close" button	Title= "Mr" First name="P eter" Last name="Jo hn" Postal address=" 10 Rosedale Road" (Ph)Home =123456 (Ph)Work =321654 (Ph)Mobil e=147852 Primary email=xyz	User should see the success message as "Page has been saved successfully"	As Expe cted	Pass

4.6. Functional Test Cases

Functional test cases for Palace property management software are given below in Table 4.

Table 4: Functional Test Cases for Palace Application

TEST CASE ID	TEST SCENARIO	TEST STEPS	EXPECTED OUTPUT
FTC_001	Launching the browser and Login Functionality	1. Launch the browser, navigate to the URL "https://preprod.getp alace.com/ 2. Enter valid username 3. Enter valid Password 4. Click on the Sign-in button	• Verify that the browser is launched, and the Palace application is opened. • Verify that the user successfully logged in to the application. • Verify that the homepage is opened.
FTC_002	Add New User Functionality	1. Click the User icon 2. Select the Add User icon 3. Fill in all the Mandatory fields 4. Click the "Save & Close" button	• Verify the user can click the Add User icon. • Verify the user can fill the mandatory fields. • Verify the user can click the save & close button.
FTC_003	Current User Functionality	1. Click the Current users' icon 2. Enter the username in the search text box 3. Click the search button	• Verify the user can click the current user icon. • Verify the user can enter the username in the search box. • Verify the user can click the search button.
FTC_004	Archived User Functionality	1. Click the Archived users' icon 2. Enter the username in the search text box 3. Click the search button	• Verify the user can click the archived user icon. • Verify the user can enter the username in the search box.

FTC_005	Add Owner Functionality	1. Click the Owner icon 2. Select the Add Owner icon 3. Fill in the Mandatory fields 4. Click the "Save & Close" button	• Verify the user can click the search button. • Verify the user can click the add owner icon. • Verify the user can fill the mandatory fields. • Verify the user can click the save & close button.
FTC_006	Custom views Functionality	1. Click the Owner icon 2. Select the custom views icon 3. Select the owner list 4. Enter the owner name in the search text box	• Verify the user can click the add owner icon. • Verify the user can select the custom view icon. • Verify the user can enter the owner's name. • Verify the user can see the details of the selected owner.
FTC_007	Logout Functionality	1. Users should see the logout icon on the top right corner. 2. Click the Logout button. 3. Users should successfully log out of the application.	• Verify the user can see the logout icon. • Verify the user can click the logout button.

4.7. Gantt Chart for Project

Gantt chart for the project is given below in Table 5.

Table 5: Gantt Chart for Palace Application

	Oct 28th - Nov 1st	Nov 4th - 8th	Nov 11th - 15th	Nov 18th - Nov 22nd	Nov 25th - 29th
	M T W T F	M T W T F	M T W T F	M T W T F	M T W T F
SPRINT 1					
Discussion about the Palace					
Analyzing documents of the project					
Understanding the website					
SPRINT 2					
Exploratory testing on Palace website					
Review document and tools that are to be used in a website					
Set up the test environment, links provided by a project manager					
SPRINT 3					
Manual test cases are to be designed for the Palace website					
Test case execution					
Finding the issues					
SPRINT 4					
Raised issues are to be assigned to the Developer					
The automation test environment will be set up					
Automation test scripts will be generated					
Meeting with the project manager if any roadblocks in generating the automation scripts					
SPRINT 5					
Automation test execution					
Report generation					
Feedback will be taken for issues that need to resolve to continue further testing					

4.8. Research framework

The framework for the research project is depicted in figure 2.
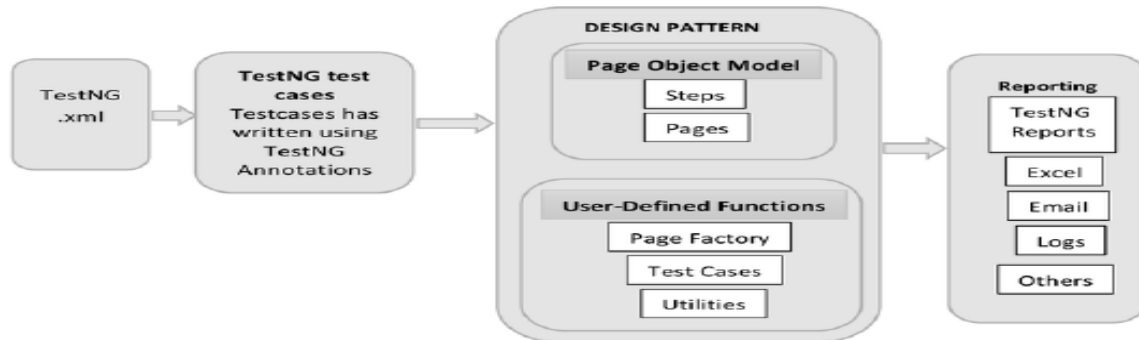
Figure 2: Architecture of Testing Framework with POM Design Pattern

Project Object Model (POM) is the fundamental unit of work in the Maven framework. The framework contains many helpers, utilities, reporters, etc. that are extended by the TestNG framework. Some of the classes are:

Testcase Helper: This is the main and important class which helps the test cases to execute correctly.

Browser Helper: This class gets the browser name to launch the Palace application with like Chrome. It has methods to set the capabilities of the browser to maximize the window, get the URL name, get the Page Title name, etc.

Page Factory Action Helper: This class gets methods that perform actions of the web elements like button clicks, finding an item in the drop-down list, input for the textbox, select the checkbox/radio button, etc.

Wait: This class gets various wait events such as wait until the element is visible, page to load, the element is clickable.

TestNG Test Cases: The Test cases are written using annotations such as @Test, @Before Test, @AfterTest, @@BeforeSuite, @AfterSuite, @AfterMethod, etc. The test cases read data from ReadTestData class as TestNG does not involve feature files and writing scenarios into it. The test cases execute based only on the annotations. TestNG finds for its annotations when executing test cases. The executing can be done in two ways: Firstly, by creating testing.xml: The .xml file contains the name of the classes to execute, the name of the test suite, etc. Secondly, by right-clicking on any test and selecting Run As~ TestNG, the test is executed.
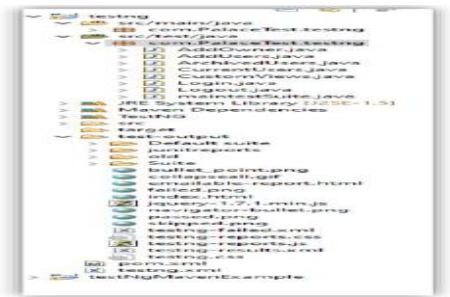
Figure 3: Architecture of Pages and Tests

Figure 4 shows the snippet of the pom.xml file is by default created in which dependencies, suite files, project details, etc, are added. Once the dependencies are added, jars and packages are automatically downloaded from the maven repository into the project.

Figure 4: POM.XML file for Test Suite Configuration

Below figures 5, 6 and 7 shows the main test suite of the Maven project where all the class methods are called in this test suite.

Figure 5: Main Test suite where all Class Methods Called

Figure 6: Main Test suite where all Class Methods Called

Figure 7: Main Test suite where all Class Methods Called

5. RESULTS

The results are shown in figure 8, 9, 10, 11 and 12 followed by discussion in section 6 discussion.

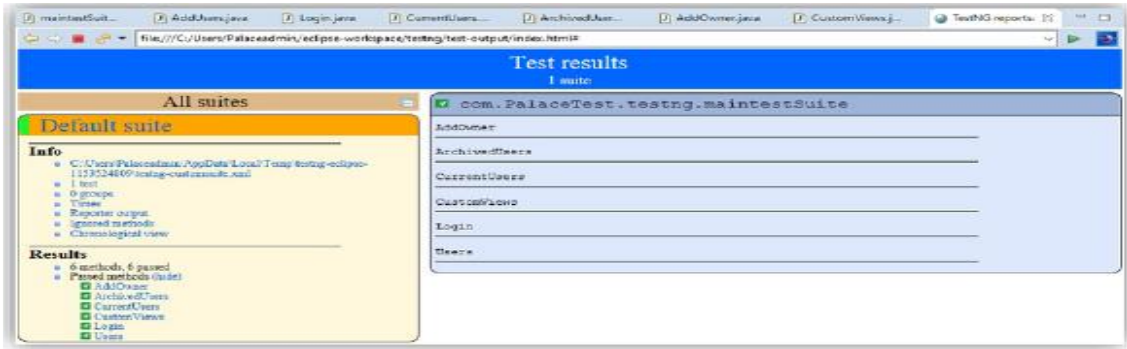Figure 8: Output of the Execution on the Console

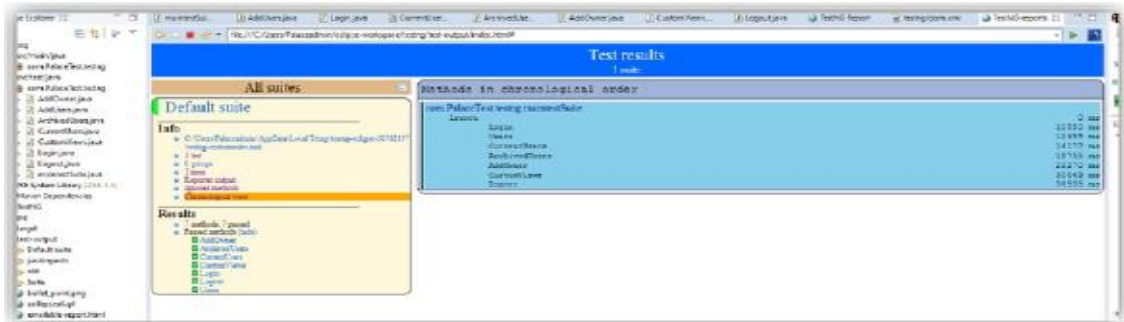Figure 9: Report 1 Generated by Testing

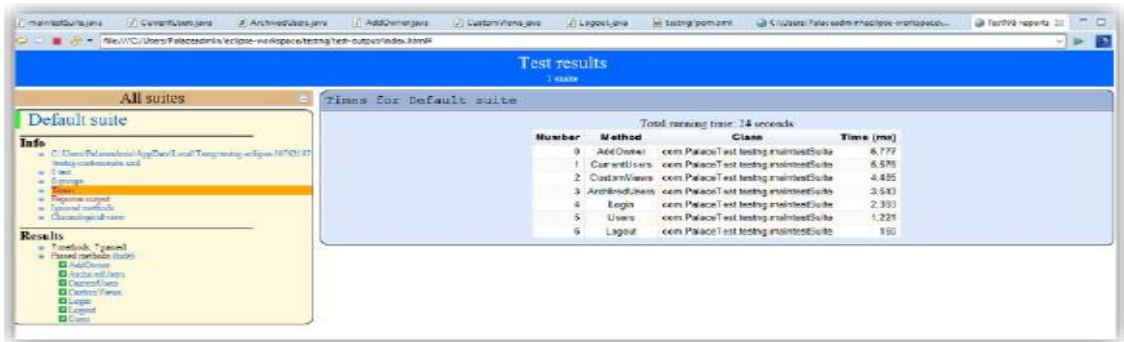Figure 10: Report 2 Generated by Testing
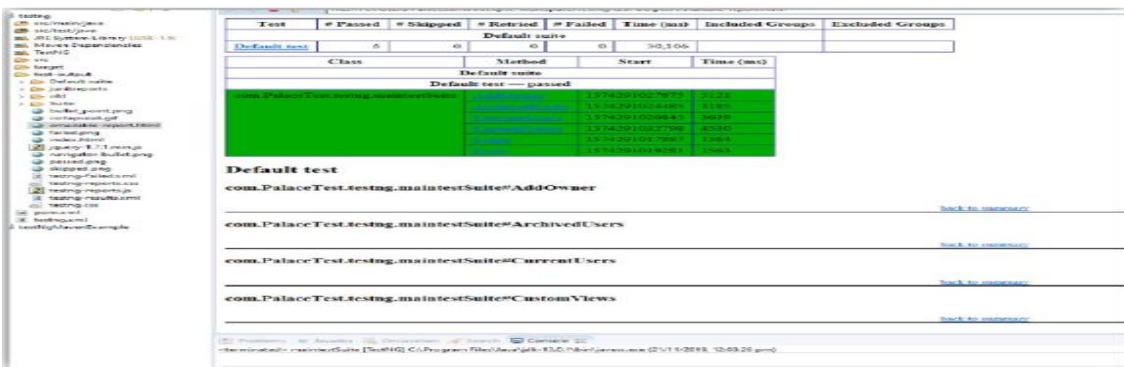

Figure 11: Report 3 Generated by Testing

Figure 12: Report 4 Generated by Testing

6. DISCUSSION

TestNG library provides a very easy understanding and handy reporting feature. Once the execution is done, TestNG will generate a test-output folder at the root of the project. Two types of reports are included in this folder: a) Index.html b) emailable-report.html.

Index.html: This file is a complete report of the current execution which has information like reporter logs, TestNg XML files, errors, groups, time, etc.

Emailable-report.html: This file is a summarized report of the current execution which shows the passed test cases highlighting in green colour and for the failed test cases in red colour.

- **Figure 8**: is the real-time console report which shows the default test that has the number of tests run, the number of tests failed, and several tests skipped.
- **Figure 10**: is the index.html file which gives the details of all Suites. Information on all the test methods, results of test methods and the test methods are shown in the chronological order.
- **Figure 11**: is the index.html file which gives the number of methods executed, the name of the methods, under the specific class the methods are, the time (ms) each method takes to execute and the total running time of all the methods to get executed is shown.
- **Figure 12**: is the emailable report which is colourful and easy to understand. The passed test cases are highlighted in green, the test methods, start time and the execution time of each method is displayed.

7. CONCLUSION

This research project discusses the Palace property management software that covers a brief introduction to the company's Palace, about the website and its achievements. The Palace team is using an agile methodology for the development of their project. Exploratory and manual testing is being performed by the team to check the functionalities of the website against the client requirements. To overcome the challenges facing by the Palace team, the proposed solution is to be implementing a robust and specific automation framework (maven) and using the selenium web driver interface for testing the Palace software.

8. FUTURE WORK RECOMMENDATIONS

The findings of this research project demonstrates that automation testing has a minimum of two benefits when compared to manual testing, accuracy, and efficiency. During this research project, when automation testing is performed efficiency increases, the cost gets down and manual intervention is reduced. In this research project Selenium with the TestNG framework is used as the test automation tool which provides a serious cost-benefit. Though, initially switching to automation is time-consuming, the switch to Selenium has a lot of long-term benefits.

By using the TestNg framework with Maven, one can generate the customized test reports and analyse the failures using screenshots of failed test cases. This framework is very useful for dynamically changing web applications. A tester can easily read and understand the automation test scripts using this framework. In this way, the automation framework help organizations to test web applications efficiently.

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