AUTOMATED WEB UI TESTING

A report on Internship Project at

FOURTEK IT SOLUTIONS PVT. LTD.

under

SUMMER PRACTICAL TRAINING PROGRAM

Submitted To

Division of Information Technology
Netaji Subhas Institute of Technology

By

Aditi Kumar
706/IT/14

Arushi Bhatt
718/IT/14

ACKNOWLEDGEMENT

The compilation of this project would not have been possible without immense efforts and the kind support of many individuals. We would like to extend our sincere thanks to all of them.

We are highly indebted to the company & our supervisor ***Mr. Abhinav Sharma*** *for his guidance and constant supervision for providing necessary information and constructive suggestions regarding the project.*

We cannot end this list without thanking our lovely parents who always provide us with every facility to enhance our skills.

Aditi Kumar & Arushi Bhatt

INTRODUCTION

PROJECT PROFILE

PROJECT TITLE : Automated Web UI Testing

OBJECTIVE: The project aims to do User Interface testing of a website. This was done using Selenium WebDriver Automation tool. All the Automation Scripts were coded in Scala programming language on Ammonite Shell and were further tested using ScalaTest Framework.

PROJECT DURATION: 5 June - 31 July 2017 (2 months)

PROJECT GUIDED BY: Abhinav Sharma

PROJECT SUBMITTED BY: Aditi Kumar and Arushi Bhatt

TECHNOLOGY USED :

BUILDING PLATFORM: Ammonite Shell for Scripting in Scala,

Visual Studio Code IDE

FRAMEWORKS : Selenium WebDriver for Automation,

ScalaTest Framework

ABOUT THE COMPANY

Fourtek IT Solutions is a leading web and software development company providing both offshore and onshore solutions to business enterprises belonging to different domains. They have offices in New Delhi (Head Office), Andhra Pradesh (Operations) and in JAPAN (Marketing).

They provide flexible services at affordable rates to manage the online businesses of the clients in the most effective way. With the latest development tools, secured internet connectivity, upgraded communication servers and 24/7 customer service; they provide reliable solutions in the domains such as business websites, e-commerce websites, shopping cart solutions, link building services, search engine optimization, e-mail marketing, brand management, database application development, mobile application development and business consulting.

The company's focus is on accelerating the business growth of the clients by applying the latest technical tools. At Fourtek, their vision is to help companies achieve organizational success through increased revenue, cost management and quality services.

SERVICES :

- Application Development
- Game Development
- Website Design
- Website Development
- E - Commerce Website
- Search Engine Optimization
- Social Media Optimization

AUTOMATION TESTING

Automation testing is when the tester writes scripts and uses another software to test the software. This process involves automation of a manual process. Automation Testing is used to re-run the test scenarios that were performed manually, quickly and repeatedly. Automation Testing saves time and money in comparison to manual testing.

The automation software can also enter test data into the System Under Test , compare expected and actual results and generate detailed test reports.
Test Automation demands considerable investments of money and resources.
Successive development cycles will require execution of same test suite repeatedly.
Using a test automation tool it's possible to record this test suite and re-play it as required.
Once the test suite is automated, no human intervention is required .
This improved ROI of Test Automation.
Goal of Automation is to reduce number of test cases to be run manually and not eliminate Manual Testing all together.

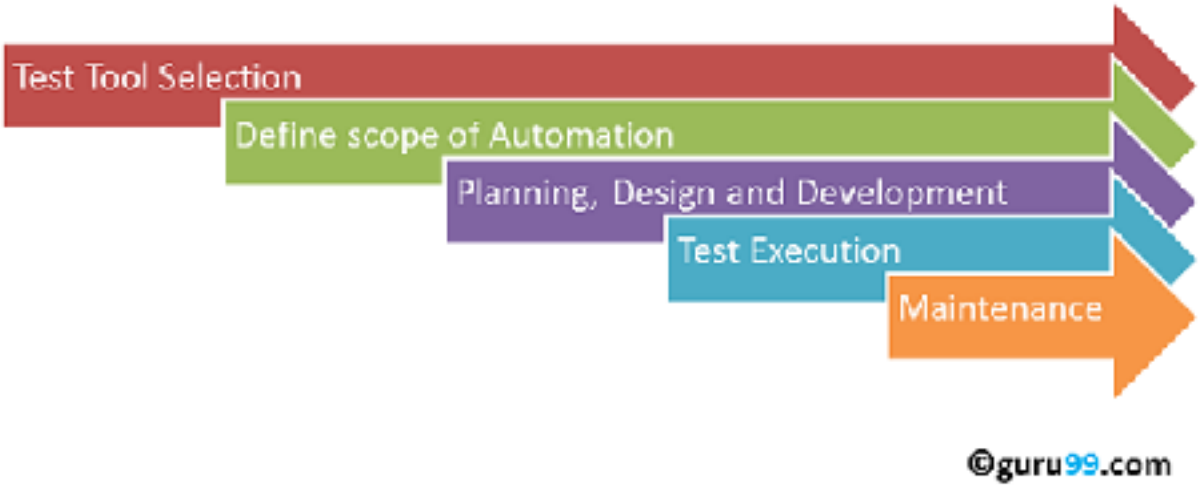
Automated software testing is important due to following reasons:

- Manual Testing of all work flows, all fields , all negative scenarios is time and cost consuming
- It is difficult to test for multi lingual sites manually
- Automation does not require Human intervention. You can run automated test unattended (overnight)
- Automation increases speed of test execution
- Automation helps increase Test Coverage
- Manual Testing can become boring and hence error prone.

Benefits of Automation Testing

- 70% faster than the manual testing
- Wider test coverage of application features
- Reliable in results
- Ensure Consistency
- Saves Time and Cost
- Improves accuracy
- Human Intervention is not required while execution
- Increases Efficiency

- Better speed in executing tests
- Re-usable test scripts
- Test Frequently and thoroughly
- More cycle of execution can be achieved through automation
- Early time to market



Automation Testing Tools

There are tons of Functional and Regression Testing Tools available in market. Here are 5 best tools certified by our experts.

Selenium

It is a software testing tool used for Regression Testing. It is an open source testing tool that provides playback and recording facility for Regression Testing. The Selenium IDE only supports Mozilla Firebox web browser.

- It provides the provision to export recorded script in other languages like Java, Ruby, RSpec, Python, C#,etc
- It can be used with frameworks like Junit and TestNG
- It can execute multiple tests at a time
- Autocomplete for Selenium commands that are common
- Identifies the element using id, name , X-path, etc.
- Store tests as Ruby Script, HTML, and any other format
- It allows to insert comments in the middle of the script for better understanding and debugging

Selenium Web Driver

The biggest change in Selenium recently has been the inclusion of the WebDriver API. Driving a browser natively as a user would either locally or on a remote machine using the Selenium Server it marks a leap forward in terms of browser automation.
WebDriver is the name of the key interface against which tests should be written in Java, the implementing classes one should use are listed as below:
ChromeDriver,

- EventFiringWebDriver,
- FirefoxDriver,
- HtmlUnitDriver,
- InternetExplorerDriver,
- PhantomJSDriver,
- RemoteWebDriver,
- SafariDriver

Scala, short for Scalable Language, is a hybrid functional programming language. It was created by Martin Odersky. Scala smoothly integrates the

features of object-oriented and functional languages. Scala is compiled to run on the Java Virtual Machine. Many existing companies, who depend on Java for business critical applications, are turning to Scala to boost their development productivity, applications scalability and overall reliability.
Here we have presented a few points that makes Scala the first choice of application developers.

Scala is object-oriented:

Scala is a pure object-oriented language in the sense that every value is an object. Types and behavior of objects are described by classes and traits which will be explained in subsequent chapters.
Classes are extended by subclassing and a flexible mixin-based composition mechanism as a clean replacement for multiple inheritance.

Scala is functional

Scala is also a functional language in the sense that every function is a value and every value is an object so ultimately every function is an object.
Scala provides a lightweight syntax for defining anonymous functions, it supports higher-order functions, it allows functions to be nested, and supports currying. These concepts will be explained in subsequent chapters.

Scala is statically typed

Scala, unlike some of the other statically typed languages (C, Pascal, Rust, etc.), does not expect you to provide redundant type information. You don't have to specify a type in most cases, and you certainly don't have to repeat it.

Scala runs on the JVM

Scala is compiled into Java Byte Code which is executed by the Java Virtual Machine (JVM). This means that Scala and Java have a common runtime platform. You can easily move from Java to Scala.
The Scala compiler compiles your Scala code into Java Byte Code, which can then be executed by the 'scala' command. The 'scala' command is similar to the java command, in that it executes your compiled Scala code.

Scala can Execute Java Code

Scala enables you to use all the classes of the Java SDK and also your own custom Java classes, or your favorite Java open source projects.

Scala can do Concurrent & Synchronize processing

Scala allows you to express general programming patterns in an effective way. It reduces the number of lines and helps the programmer to code in a type-safe way. It allows you to write codes in an immutable manner, which makes it easy to apply concurrency and parallelism (Synchronize).

AMMONITE

Ammonite lets you use the Scala language for scripting purposes: in the REPL, as scripts, as a library to use in existing projects, or as a standalone systems shell.

Ammonite-REPL

A Modernized Scala REPL. With syntax highlighting, multi-line editing, the ability to load maven artifacts directly in the REPL, and many other quality-of-life improvements missing in the default Scala REPL.Ammonite is a project by Li Haoyi

Scala Scripts

Lightweight Programming in Scala. Create scripts that you can run easily from the command line, without the overhead of setting up a "project" or waiting for SBT's slow startup times.

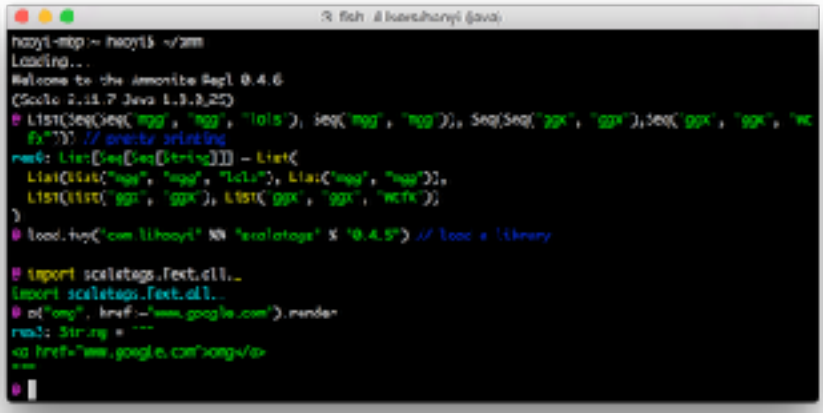
Ammonite-Ops

A Rock-solid Filesystem Library for Scala. Deal with the filesystem easily from your existing Scala projects or applications, as easily as you would from a Bash or Python script.

Ammonite-Shell

A modern replacement for the Bash system shell. Provides a systems shell in the high-level Scala language, letting you seamlessly mix system operations with real code without the hassle or the frustration of trying to write complex code in Bash.

The goal of Ammonite is to liberate your Scala code from heavyweight "projects", using the lightweight Ammonite runtime: if you want to run some Scala, open the Ammonite-REPL and run it, interactively! If you want to run it later, save it into some Scala Scripts and run those later.



VISUAL STUDIO CODE

Visual Studio Code is a source code editor developed by Microsoft for Windows, Linux and macOS. It includes support for debugging, embedded Git control, syntax highlighting, intelligent code completion, snippets, and code refactoring. It is also customizable, so users can change the editor's theme, keyboard shortcuts, and preferences. It is free and open-source,[7][8] although the official download is under a proprietary license.[6]

SCALATEST

- The central concept in ScalaTest is the suite, a collection of zero to many tests.
- A test can be anything with a name that can start and either succeed, fail, be pending, or canceled.
- The central unit of composition in ScalaTest is Suite, which represents a suite of tests.
- Trait Suite declares run and other “lifecycle” methods that define a default way to write and run tests.
- These lifecycle methods can be overridden to customize how tests are written and run.

- ScalaTest offers style traits that extend Suite and override lifecycle methods to support different testing styles.
- It provides mixin traits that override lifecycle methods of the style traits to address particular testing needs.
- You define test classes by composing Suite style and mixin traits.
- You define test suites by composing Suite instances.

ScalaTest supports different styles of testing, each designed to address a particular set of needs.

The style you choose dictates only how the declarations of your tests will look. Everything else in ScalaTest—assertions, matchers, mixin traits, etc.—works consistently the same way no matter what style you chose.
Style Traits:
- FunSuite
- FlatSpec
- FunSpec
- WordSpec
- FreeSpec
- PropSpec
- FeatureSpec

ScalaTest with Selenium

The second programming language I want to talk about is Scala. Scala is a JDK-based language that is much younger than Java and allows both objective and functional programming paradigms. Two most popular testing frameworks for Scala are ScalaTest and Specs2. Depending on our needs we should choose Specs2 if we need to have our tests integrated with our service. The main advantage of this framework is its ability to easily start the service under test before the tests themselves are started with the help of Play framework. On the other hand if you don't need to integrate tests with a product and can write a standalone test suite, then I recommend ScalaTest framework which has, in my opinion, a more intuitive and definitely more user friendly syntax.

DEMO WEBSITE : BASECAMP

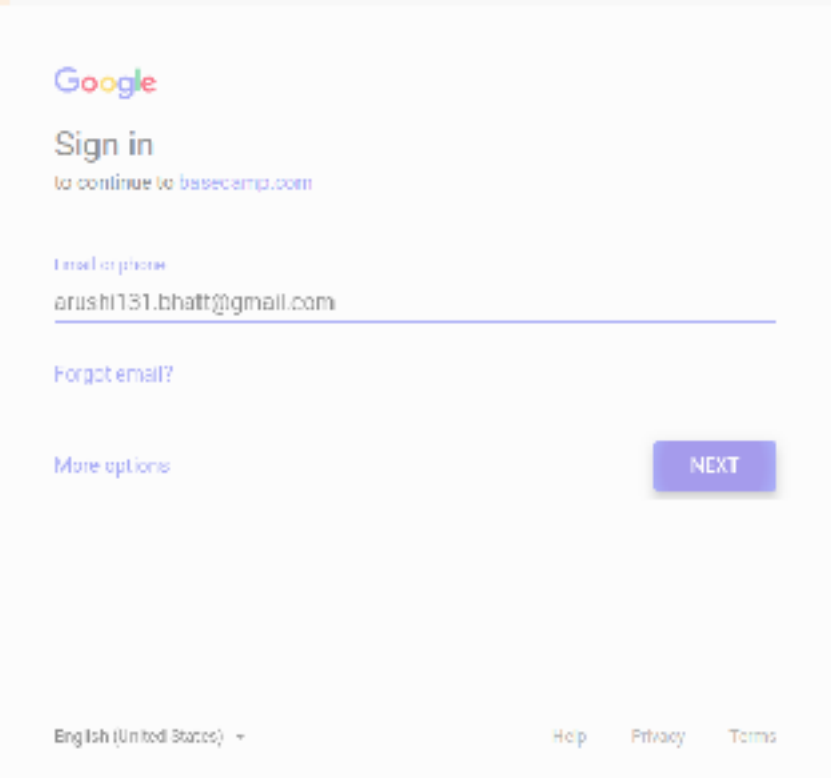
To show you a glimpse of the work :
We have taken a demo website :

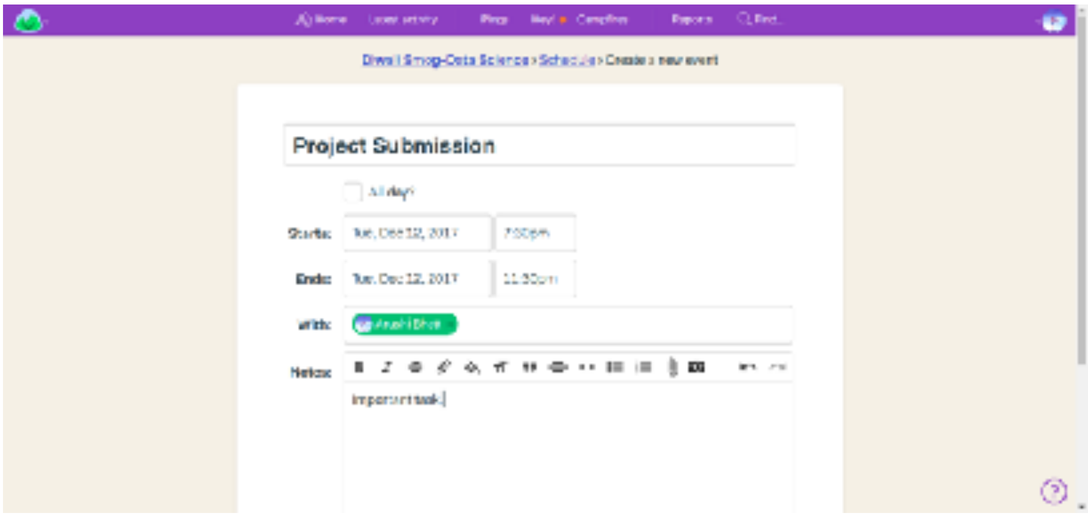
BASECAMP : https://3.basecamp.com

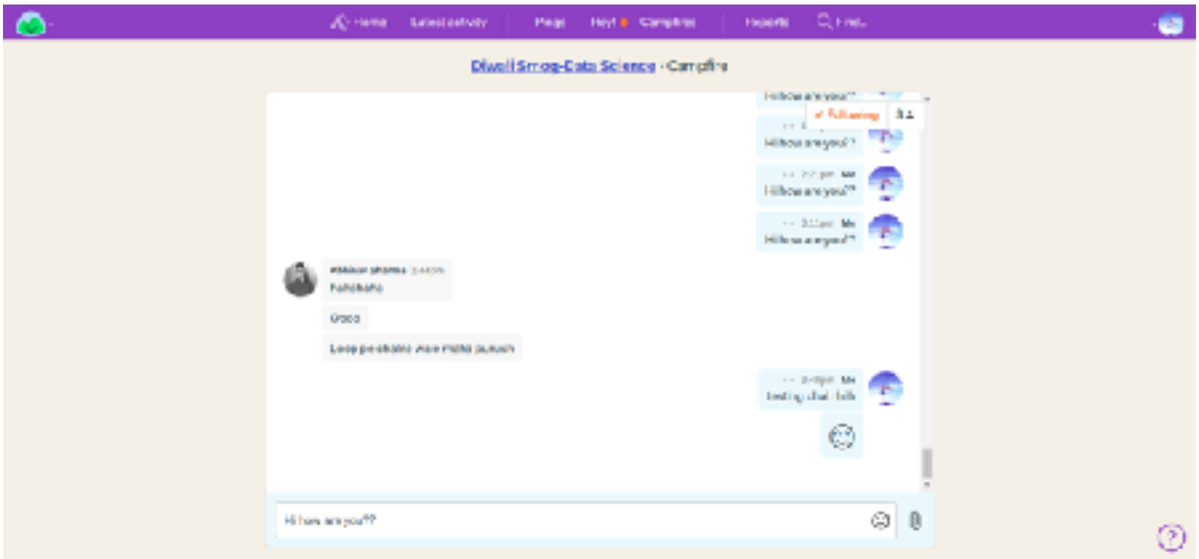
Basecamp is a web based Project Management Tool designed to help people work together on Project.
With Basecamp, You can:

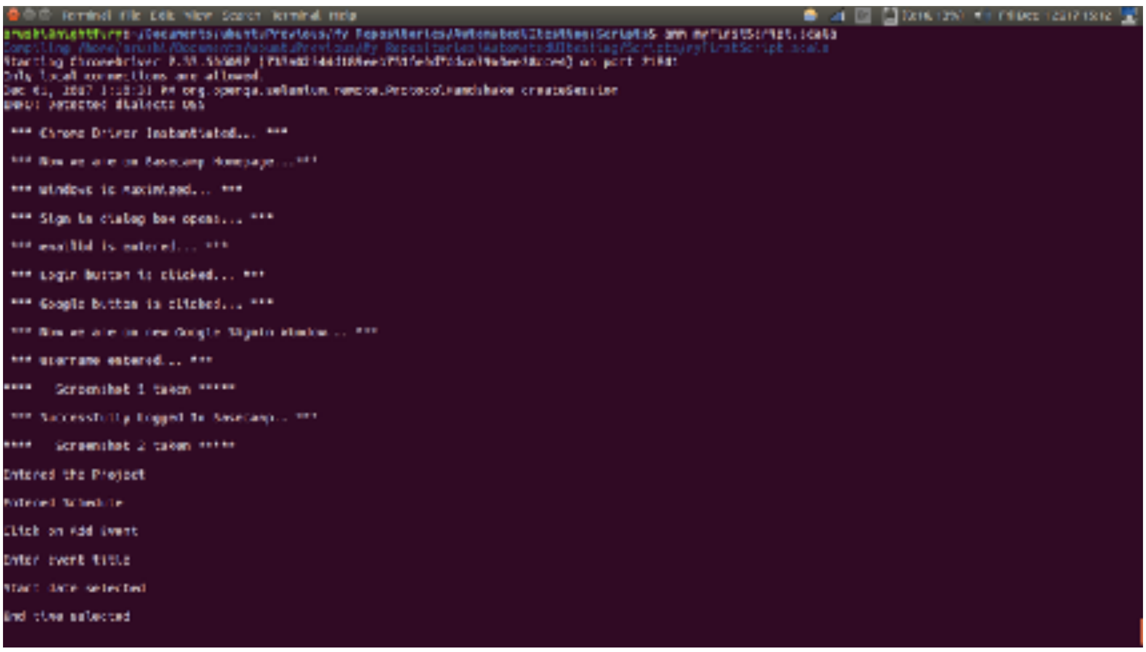
- Discuss your project work,
- Organize Project Schedules,
- Assign tasks,
- Maintain ToDo's Lists,
- Track progress of your teammates,
- Upload relevant files, link google docs, etc.

Following are the screenshots of Output Screens :




Diwali Smog-Data Science › Schedule › Create a new event
Project Submission
All day?
Starts:
Ends:
With:
Notes:
Important task


Diwali Smog-Data Science › Campfire
Good


*** Chrome Driver Instantiated... ***
*** Window is maximized... ***
*** Sign in dialog box opens... ***
*** Login button is clicked... ***
*** Google button is clicked... ***
*** username entered... ***
**** Screenshot 1 taken *****
**** Screenshot 2 taken *****
Entered the Project
Entered Schedule
Click on Add Event
Enter Event title
Start date selected
End time selected