Testing Tools

- Selenium,
- Nunit,
- Junit,
- ZAP,
- Acunetix,
- Neoload

Junit:

What is Junit ?

- JUnit is a unit testing open-source framework for the Java programming language. Java Developers use this framework to write and execute automated tests.
- In Java, there are test cases that have to be re-executed every time a new code is added. This is done to make sure that nothing in the code is broken.
- JUnit has several graphs that represent the progress of a test. When the test runs smoothly, the graph displays a green color, and it turns red if the test fails.
- JUnit Testing enables developers to develop highly reliable and bug-free code.
- JUnit plays a huge role when it comes to regression testing. Regression Testing is a type of software testing that checks if the recent changes made to the code do not adversely affect the previously written code.

What is the need for JUnit Testing?

- The top reasons to take up JUnit Testing are:
- To find bugs early in the development phase, which increases the code's reliability
- The framework enables the developer to invest more time in reading the code than writing it This makes the code more readable, reliable, and bug-free
- It boosts the confidence of the developer and motivates them immensely.

Features of Junit

- There are several features of JUnit that make it so popular. Some of them are as follows:

Open Source Network:

- JUnit is an open-source network that enables developers to write codes fast and with better quality.

Provides Annotations:

- It provides several annotations to identify test methods.

Provides Assertions:

- There are assertions to test expected results.

Provides Test Runners:

- JUnit has test runners to run tests.

Improves Code Quality:

- JUnit is the most popular testing framework for efficient testing. It allows faster code writing, which results in an increase in the code's quality.

Automated Test Running:

- The test results do not require manual checking. All the tests run automatically on JUnit, the results obtained again automatically checked, and it provides feedback.

Easily interpretable results:

- The test results are represented interactively by showing test progress in a bar, thus making them easily interpretable.

Neoload

- Neoload is a low-priced high-efficiency load and stress testing tool that is used to measure the performance of web and mobile applications.
- Neoload simulates traffic through virtual users to determine the application performance under load and analyze the transaction response times and pinpoint the number of the simultaneous users which the internet, intranet or the mobile application can handle.
- Among all the performance testing tools, I feel comfortable with Neoload because of its user-friendly record and script enhancement options that make the tester's job much easier when compared to the other tools.
- **Performance Testing**
- Performance testing is used to determine how fast a website or app will be responding to a user request when multiple users access it.
- It is also performed to check the stability of the system i.e. whether the server is able to handle thousands of users at a time.

Why Performance Testing ?

- If the site or app is not performing well then it may lead to user drops i.e. the user may not be interested to use that site due to poor performance.
- We need to do Performance testing in order to get the answers to the below questions:
- How fast is my system responding to load?
- Is my system able to handle a large volume of users?
- Is my system responding quickly? If no what will be the reason?

Selenium

- Selenium is a free (open-source) automated testing framework used to validate web applications across different browsers and platforms. You can use multiple programming languages like Java, C#, Python, etc to create Selenium Test Scripts.
- Testing done using the Selenium testing tool is usually referred to as Selenium Testing.

- **Selenium Tool Suite**
- Selenium Software is not just a single tool but a suite of software, each piece catering to different Selenium QA testing needs of an organization. Here is the list of tools
- Selenium Integrated Development Environment (IDE)
- Selenium Remote Control (RC)
- WebDriver
- Selenium Grid

Selenium provides several tools that allow developers to automate their tests, including:

- **Selenium WebDriver:** A tool for automating browser interactions and for controlling web browsers programmatically.
- **Selenium IDE:** A browser-based tool for recording and playing back user interactions with a web application.
- **Selenium Grid:** A tool for running tests in parallel on multiple machines, allowing for faster test execution and improved resource utilization.

Who developed Selenium?

- Since Selenium is a collection of different tools, it also had different developers.
- Primarily, Selenium was created by Jason Huggins in 2004. An engineer at ThoughtWorks, he was working on a web application that required frequent testing. Having realized that their application's repetitious Manual Testing was becoming increasingly inefficient, he created a JavaScript program that would automatically control the browser's actions. He named this program the "JavaScriptTestRunner."
- Seeing potential in this idea to help automate other web applications, he made JavaScriptRunner open-source, which was later re-named Selenium Core. For those interested in exploring other options for web application testing, take a look at these Selenium alternatives.

Features of Selenium

- **Cross-browser compatibility:** Selenium supports testing on multiple browsers like Chrome, Firefox, Safari, Edge, and Internet Explorer.
- **Language support:** Selenium supports multiple programming languages like Java, Python, C#, Ruby, and JavaScript.
- **Multiple testing frameworks:** Selenium can integrate with multiple testing frameworks like JUnit, TestNG, and NUnit.
- **Record and playback:** Selenium provides the option to record and playback test scripts, which makes it easy for testers to create test cases without having to write code.
- **Parallel execution:** Selenium can execute test cases in parallel across multiple machines, which reduces the overall execution time.
- **Handling dynamic elements:** Selenium can handle dynamic web elements like dropdowns, pop-ups, and alerts.
- **Integration with third-party tools:** Selenium can integrate with various third-party tools like Jenkins, Docker, and Appium.

Advantages of using Selenium

- Open-source: Selenium is open-source, making it freely available to anyone who wants to use it.
- Cross-platform compatibility: Selenium supports multiple operating systems and browsers, making it a versatile tool for automating web applications.
- Multiple programming language support: Selenium supports multiple programming languages, including Java, Python, Ruby, and C#, making it accessible to a wide range of developers.
- Large community: Selenium has a large and active community of users, providing a wealth of resources and support for those who use it.
- Cost-effective: Because Selenium is open-source, there is no need to pay for expensive licenses, making it a cost-effective solution for automating web applications.
- Integration with other tools: Selenium can be integrated with other testing tools, such as JUnit and TestNG, making it a flexible and comprehensive solution for automating web applications.

NUnit

- NUnit is a popular open-source unit testing framework for C#. It is ported from the JUnit framework.
- It is used for the development and execution of tests with the .NET language. It also facilitates batch execution of tests through console runner (nunit-console.exe). The console runner helps in loading, exploring, and executing tests with the help of NUnit Test Engine.

- **What is NUnit Testing Framework?**
- NUnit is a unit testing framework for all .NET languages. This open source platform was initially ported from JUnit. However, the current version, NUnit 3.0, is completely rewritten and supports a wide range of .NET platforms.

- Developers can write and execute automated tests for their code using the NUnit framework. NUnit is written in C# and can test code in any.NET language, including C#, VB.NET, and F#. The framework includes several assert methods for ensuring that the code under test is working properly.
- It also has a number of attributes that can be used to control test execution and set up and tear down the test environment. NUnit is a popular tool among developers to ensure that their code is high quality and free of defects.

ZAP

- Zed Attack Proxy (ZAP) is a free, open-source penetration testing tool being maintained under the umbrella of The Software Security Project (SSP). ZAP is designed specifically for testing web applications and is both flexible and extensible.
- At its core, ZAP is what is known as a “man-in-the-middle proxy.” It stands between the tester’s browser and the web application so that it can intercept and inspect messages sent between browser and web application, modify the contents if needed, and then forward those packets on to the destination. It can be used as a stand-alone application, and as a daemon process.
- ZAP provides functionality for a range of skill levels – from developers, to testers new to security testing, to security testing specialists.

- ZAP has versions for each major OS and Docker, so you are not tied to a single OS. Additional functionality is freely available from a variety of add-ons in the ZAP Marketplace, accessible from within the ZAP client.
- Because ZAP is open-source, the source code can be examined to see exactly how the functionality is implemented. Anyone can volunteer to work on ZAP, fix bugs, add features, create pull requests to pull fixes into the project, and author add-ons to support specialized situations.

Acunetix

- As many as 70% of web sites have vulnerabilities that could lead to the theft of sensitive corporate data such as credit card information and customer lists.
- Find out if your web site is secure before hackers download sensitive data, commit a crime using your web site as a launch pad, and endanger your business.
- Acunetix Web Vulnerability Scanner crawls your web site, automatically analyzes your web applications and finds perilous SQL injection, Cross site scripting and other vulnerabilities that expose your on line business.
- Concise reports identify where web applications need to be fixed, thus enabling you to protect your business from impending hacker attacks!

Acunetix - a world-wide leader in web application security

- Acunetix has pioneered the web application security scanning technology: Its engineers have focused on web security as early as 1997 and developed an engineering lead in web site analysis and vulnerability detection.

Acunetix Web Vulnerability Scanner includes many innovative features:

- AcuSensor Technology
- An automatic client script analyzer allowing for security testing of Ajax and Web 2.0 applications
- Industries' most advanced and in-depth SQL injection and Cross site scripting testing
- Advanced penetration testing tools, such as the HTTP Editor and the HTTP Fuzzer
- Visual macro recorder makes testing web forms and password protected areas easy
- Support for pages with CAPTHCA, single sign-on and Two Factor authentication mechanisms
- Multi-threaded and lightning fast scanner crawls hundreds of thousands of pages with ease
- Intelligent crawler detects web server type and application language
- Acunetix crawls and analyzes websites including flash content, SOAP and AJAX
- Port scans a web server and runs security checks against network services running on the server