Q) What is selenium? Why do we use selenium for automation testing? What is the relevance of selenium in automation testing using Python?

A) Selenium is used to automate web browsers. Testers and developers use it as an automation tool to copy user interaction with a web browser like the way users click buttons, scroll up and down, fill out forms, or navigate pages. It is used for regression testing, automated testing of web applications, end-to-end testing like simulating real user behaviour like login, add to cart, and logout. It can also help in data scrapping.

For example: shopping from different websites like Amazon and Flipkart requires login, searching items and adding the product to the cart, successful payment gateway and logout. These steps can be automated by selenium for testing purpose. It works efficiently when a certain task needs to be done repeatedly. It can do that with accuracy and with speed.

We need selenium for automation testing because -

* Behaves like real user- while testing selenium acts like a real user clicks button, scroll up and down, hit enter or fill out forms.
* Cross browser testing - it works perfectly different browsers available like Chrome, Firefox, safari.
* Supports multiple language – it works fine with Python, JAVA, C## and more.
* Integration testing – during deployment or when different users are woking at the same project, then the integration of work with CI/CD pipeline through different platforms like TestNG, JUnit, PyTest, Jenkins, etc.
* Regression testing – running the entire code after any changes to make sure nothing is broken.
* Running nightly tests on latest version of the app – this is done to catch bugs early, reduce daytime load.

Relevance of selenium in automation testing using python:-

* Readable syntax - Python is an open source library, easy and simple to learn and implement. While writing codes indentaion works as blocks of code. Framing scripts are easier and faster here. It is such an efficient tool that sometimes reading python code is like reading English language. Webdriver is used to interact with the browser.
* Strong community support – There ia strong community support available for this combination. Specially Stack overflow works best. There are different types of available libraries and tutorials available for the same.
* Rich Ecosystem **-** Easily use it alongside tools like Pytest, unittest, and reporting libraries like Allure,etc.
* Fast prototyping – prototyping refers to a rough draft before making a final version, where Python helps in fast spin and run automation testing which is helpful in the agile framework.

We have different types of framework in selenium. Framework helps in framing structured way of writing test which is modular, reusable and maintainable.

* Data-Driven Framework – separates test data from code (e.g., in Excel, CSV).
* Keyword-Driven Framework – uses action-based keywords like Click, Login.
* Hybrid Framework – combination of above two: data driven framwork and keyword driven framework.
* Page Object Model (POM**)** – each web page is a class; actions and locators are grouped.

Like all other softwares, selenium has also evolved through time. From selenium 1.0(RC) to selenium 4.0 version. The latest version is modern, more stable, powerful and with relative locators.