What is Selenium:

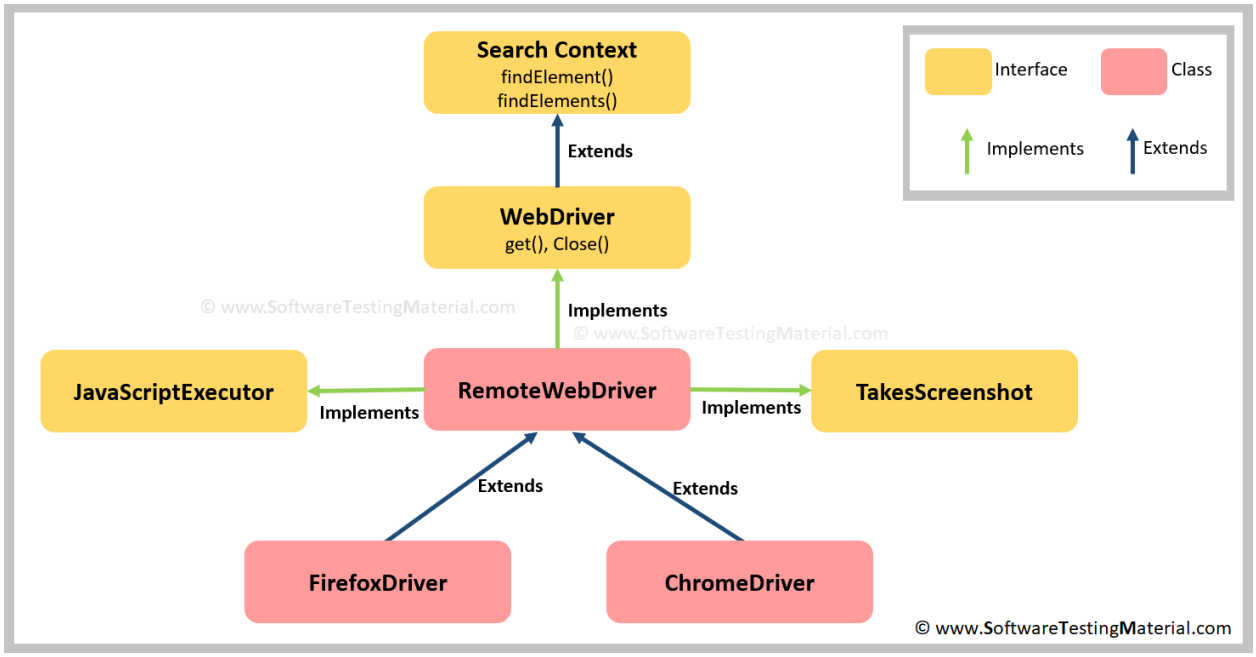
Selenium is an **open-source automation testing tool** used to automate web applications across different browsers and operating systems.
It mainly automates browser actions like clicking, typing, navigating, and validating elements — just like a real user would.

Selenium Components

Selenium has **four main components** (known as the Selenium Suite):

Component	Description
1. Selenium IDE	**IDE = Integrated Development Environment** (Firefox/Chrome plugin). Used for **record-and-playback testing**. Best for beginners and quick test creation.
2. Selenium RC (Remote Control)	Used before WebDriver was created. It relied on a **server** (Selenium Server) to run tests — **now deprecated**.
3. Selenium WebDriver	The **core component** now used for automation. It **directly interacts with the browser** using native automation APIs — no server required.
4. Selenium Grid	Used to **run tests in parallel** across multiple machines and browsers. Helps achieve **distributed testing**.

Selenium WebDriver Architecture



Selenium Setup — Step-by-Step

Step 1: Browser Configuration

1. **Download Browser Driver**
    - Chrome → chromedriver.chromium.org
    - Firefox → github.com/mozilla/geckodriver

Set System Property (Java Example):

```
System.setProperty("webdriver.chrome.driver",
"C:\\drivers\\chromedriver.exe");
```

2.

Step 2: Initialization

Create WebDriver Instance

```
WebDriver driver = new ChromeDriver();
```

Open a Website

```
driver.get("https://www.google.com");
```

Perform Actions

```
driver.findElement(By.name("q")).sendKeys("Selenium");
driver.findElement(By.name("btnK")).click();
```

Close Browser

```
driver.quit();
```

What is WebDriver?

WebDriver is an **interface** in the `org.openqa.selenium` package.
It provides **abstract methods** to control browsers.
Different browser drivers (like `ChromeDriver`, `FirefoxDriver`) **implement** this interface.

WebDriver Interface Methods

Abstract Methods (11)

No	Method	Description

1	`get(String url)`	Opens a specified URL in the browser.
2	`getTitle()`	Returns the current page title.
3	`getCurrentUrl()`	Returns the current URL.
4	`getPageSource()`	Returns the HTML source of the page.
5	`close()`	Closes the current browser window.
6	`quit()`	Closes all browser windows and ends session.
7	`findElement(By locator)`	Finds the first element matching a locator.
8	`findElements(By locator)`	Finds all elements matching a locator.
9	`getWindowHandle()`	Returns the current window's unique handle ID.
10	`getWindowHandles()`	Returns all window handles (for multi-window handling).
11	`switchTo()`	Switches control to frame, window, or alert.

Inherited Methods (2)

WebDriver **inherits** methods from **`SearchContext`** interface:

No	Method	Description
1	`findElement(By locator)`	Locates a single web element.
2	`findElements(By locator)`	Locates multiple elements and returns a list.

Note: `SearchContext` is the **super interface** of WebDriver.