Consolidated Cheat Sheet: Selenium in Java, Python, and Cypress

**1. Installing Required Tools**

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| **Topic** | **Java Code** | **Python Code** | **Cypress Command** | **Description** |
| Install Selenium | N/A (Handled via Maven/Gradle) | pip install selenium | npm install cypress | Installation command for respective tools. |
| Install Browser | Download ChromeDriver/GeckoDriver | Download ChromeDriver/GeckoDriver | Not needed; built into Cypress | Browser driver setup for Java and Python. |

**2. Importing Libraries**

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| **Topic** | **Java Code** | **Python Code** | **Cypress Command** | **Description** |
| Import Libraries | import org.openqa.selenium.\*; | from selenium import webdriver | Import not required; auto-handled | Add necessary imports in Java and Python. |

**3. Invoking Browsers**

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| **Topic** | **Java Code** | **Python Code** | **Cypress Command** | **Description** |
| **Launch Chrome** | WebDriver driver = new ChromeDriver(); | from selenium import webdriver driver = webdriver.Chrome() | cy.visit('http://example.com'); | Initialize Chrome browser for automation. |
| **Launch Firefox** | WebDriver driver = new FirefoxDriver(); | from selenium import webdriver driver = webdriver.Firefox() | N/A | Initialize Firefox browser for automation. |
| **Maximize Window** | driver.manage().window().maximize(); | driver.maximize\_window() | Handled by default in Cypress | Ensure the browser window is maximized. |

**4. Basic Browser Operations**

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| Topic | **Java Code** | **Python Code** | **Cypress Command** | **Description** |
| Navigate to URL | driver.get("http://example.com"); | driver.get("http://example.com") | cy.visit('http://example.com'); | Opens the specified URL. |
| Back Navigation | driver.navigate().back(); | driver.back() | cy.go('back'); | Navigates back in browser history. |
| Forward Navigation | driver.navigate().forward(); | driver.forward() | cy.go('forward'); | Navigates forward in browser history. |
| Refresh Page | driver.navigate().refresh(); | driver.refresh() | cy.reload(); | Refreshes the current browser page. |

**5. Locating Elements**

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| **Topic** | **Java Code** | **Python Code** | **Cypress Command** | **Description** |
| **By ID** | driver.findElement(By.id("id")); | driver.find\_element\_by\_id("id") | cy.get('#id'); | Locate element by its ID. |
| **By Name** | driver.findElement(By.name("name")); | driver.find\_element\_by\_name("name") | cy.get('[name="name"]'); | Locate element by its name. |
| **By XPath** | driver.findElement(By.xpath ("//tag[@attr='value']")); | driver.find\_element\_by\_xpath("//tag[@attr='value']") | cy.xpath('//tag[@attr="value"]'); | Locate element using XPath expressions. |

**6. Interacting with Elements**

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| Action | Java (Selenium) | Python (Selenium) | Cypress (JavaScript) |
| Open a URL | WebDriver driver = new ChromeDriver();driver.get("https://example.com"); | from selenium import webdriverdriver = webdriver.Chrome()driver.get("https://example.com") | cy.visit('https://example.com') |
| Find Element by ID | WebElement element = driver.findElement(By.id("elementID")); | element = driver.find\_element(By.ID, "elementID") | cy.get('#elementID') |
| Click an Element | WebElement button = driver.findElement(By.id("submitButton"));  button.click(); | button = driver.find\_element(By.ID, "submitButton")  button.click() | cy.get('#submitButton').click() |
| Send Text to Input Field | WebElement input = driver.findElement(By.name("username"));  input.sendKeys("myUsername"); | input = driver.find\_element(By.NAME, "username")  input.send\_keys("myUsername") | cy.get('input[name="username"]').type('myUsername') |
| Get Text of Element | WebElement textElement = driver.findElement(By.xpath("//h1"));  String text = textElement.getText(); | textElement = driver.find\_element(By.XPATH, "//h1")  text = textElement.text | cy.get('h1').invoke('text') |
| Check if Element is Visible | WebElement element = driver.findElement(By.id("elementID"));  boolean isVisible = element.isDisplayed(); | element = driver.find\_element(By.ID, "elementID")  isVisible = element.is\_displayed() | cy.get('#elementID').should('be.visible') |
| Select Dropdown Option | WebElement dropdown = driver.findElement(By.id("dropdown"));  Select select = new Select(dropdown);  select.selectByVisibleText("Option 1"); | from selenium.webdriver.support.ui  import Select  dropdown = driver.find\_element(By.ID, "dropdown")  select = Select(dropdown)  select.select\_by\_visible\_text("Option 1") | cy.get('#dropdown').select('Option 1') |
| Mouse Hover | Actions actions = new Actions(driver);  WebElement element = driver.findElement(By.id("hoverElement"));  actions.moveToElement(element).perform(); | from selenium.webdriver.common.action\_chains  import ActionChainsactions = ActionChains(driver)  element = driver.find\_element(By.ID, "hoverElement")  actions.move\_to\_element(element).perform() | cy.get('#hoverElement').trigger('mouseover') |
| Wait for Element to be Visible | WebDriverWait wait = new WebDriverWait(driver, 10);  WebElement element = wait.until(ExpectedConditions.visibilityOfElementLocated(By.id("elementID"))); | from selenium.webdriver.support.ui  import WebDriverWaitfrom  selenium.webdriver.support  import expected\_conditions as EC  wait = WebDriverWait(driver, 10)  element = wait.until(EC.visibility\_of\_element\_located((By.ID, "elementID"))) | cy.get('#elementID').should('be.visible') |
| Get Element's Attribute Value | WebElement element = driver.findElement(By.id("inputField"));  String value = element.getAttribute("value"); | element = driver.find\_element(By.ID, "inputField")  value = element.get\_attribute("value") | cy.get('#inputField').invoke('val') |

**7. Assertions**

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| **Assertion** | **Java Code** | **Python Code** | **Cypress Command** | **Description** |
| **Assert Equals** | assertEquals(expected, actual); (JUnit) | assert expected == actual | expect(actual).to.equal(expected); | Checks if two values are equal. |
| **Assert Not Equals** | assertNotEquals(expected, actual); (JUnit) | assert expected != actual | expect(actual).not.to.equal(expected); | Checks if two values are not equal. |
| **Assert True** | assertTrue(condition); (JUnit) | assert condition | expect(condition).to.be.true; | Asserts that the condition is true. |
| **Assert False** | assertFalse(condition); (JUnit) | assert not condition | expect(condition).to.be.false; | Asserts that the condition is false. |
| **Assert Null** | assertNull(object); (JUnit) | assert object is None | expect(object).to.be.null; | Asserts that the object is null. |
| **Assert Not Null** | assertNotNull(object); (JUnit) | assert object is not None | expect(object).to.not.be.null; | Asserts that the object is not null. |
| **Assert Array Size** | assertEquals(expectedSize, array.length); | assert len(array) == expected\_size | expect(array).to.have.length(expected\_size); | Asserts that the array or collection has the expected size. |
| **Assert List Size** | assertEquals(expectedSize, list.size()); | assert len(list) == expected\_size | expect(list).to.have.length(expected\_size); | Asserts that the list has the expected size. |
| **Assert Contains** | assertTrue(list.contains(element)); | assert element in list | expect(list).to.include(element); | Asserts that an element is contained in the collection. |
| **Assert Not Contains** | assertFalse(list.contains(element)); | assert element not in list | expect(list).to.not.include(element); | Asserts that an element is not contained in the collection. |
| **Assert String Equals** | assertEquals(expectedString, actualString); | assert expected\_string == actual\_string | expect(actual\_string).to.equal(expected\_string); | Asserts that two strings are equal. |
| **Assert String Contains** | assertTrue(actualString.contains(expectedSubstring)); | assert expected\_substring in actual\_string | expect(actual\_string).to.include(expected\_substring); | Asserts that a string contains a specific substring. |
| **Assert Exception** | assertThrows(ExpectedException.class, () -> { /\* code \*/ }); | with pytest.raises(ExpectedException):# code | N/A | Asserts that a specific exception is thrown. |
| **Assert Greater Than** | assertTrue(actual > expected); | assert actual > expected | expect(actual).to.be.greaterThan(expected); | Asserts that the actual value is greater than the expected. |
| **Assert Less Than** | assertTrue(actual < expected); | assert actual < expected | expect(actual).to.be.lessThan(expected); | Asserts that the actual value is less than the expected. |
| **Assert Object Equality** | N/A | N/A | expect(actualObject).to.deep.equal(expectedObject); | Asserts that two JavaScript objects are deeply equal. |

**8. Advanced Concepts**

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| **Topic** | **Java Code** | **Python Code** | **Cypress Command** | **Description** |
| **Handling Alerts** | driver.switchTo().alert().accept(); | `alert = driver.switch\_to.alert  alert.accept()` | cy.on('window:alert', () => { ... }) | Handle JavaScript alerts. |
| **Handling Frames** | driver.switchTo().frame("frameName"); | driver.switch\_to.frame("frameName") | cy.frameLoaded('iframeSelector') | Switch to a specific frame. |
| **File Upload** | driver.findElement(By.id("upload")).sendKeys("path"); `element = driver.find\_element\_by\_id("upload") | element.send\_keys("path")` | cy.get('#upload').attachFile('file.jpg'); | Automate file uploads. |
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| **Taking Screenshots** | `File screenshot = ((TakesScreenshot) driver).getScreenshotAs(OutputType.FILE);  FileUtils.copyFile(screenshot, new File("path/to/screenshot.png"));` | driver.save\_screenshot("screenshot.png") | cy.screenshot('screenshot') | Capture a screenshot of the browser. |

**9. Mouse Actions**

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| **Topic** | **Java Code** | **Python Code** | **Cypress Command** | **Description** |
| **Hover Over Element** | Actions actions = new Actions(driver);  actions.moveToElement(element).perform(); | from selenium.webdriver.common.action\_chains  import ActionChainsactions = ActionChains(driver)  actions.move\_to\_element(element).perform() | cy.get('#id').trigger('mouseover') | Simulate hovering over an element. |
| **Double Click** | Actions actions = new Actions(driver);  actions.doubleClick(element).perform(); | actions = ActionChains(driver)  actions.double\_click(element).perform() | cy.get('#id').dblclick() | Perform a double-click operation. |
| **Drag and Drop** | Actions actions = new Actions(driver);actions.dragAndDrop(source, target).perform(); | actions = ActionChains(driver)  actions.drag\_and\_drop(source, target).perform() | N/A | Simulate drag-and-drop actions. |
| **File Upload via Mouse** | N/A | actions.click\_and\_hold(element).perform() | N/A | Simulate file upload by dragging files. |

**10. Chrome options**

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| **Option** | **Java Code** | **Python Code** | **Cypress Command** | **Description** |
| **Disable Notifications** | ChromeOptions options = new ChromeOptions();options.addArguments("--disable-notifications");  WebDriver driver = new ChromeDriver(options); | from selenium.webdriver.chrome.options  import Optionsoptions = Options()  options.add\_argument("--disable-notifications")  driver = webdriver.Chrome(options=options) | N/A | Disable browser notifications. |
| **Headless Mode** | ChromeOptions options = new ChromeOptions();  options.addArguments("--headless");  WebDriver driver = new ChromeDriver(options); | from selenium.webdriver.chrome.options  import Optionsoptions = Options()  options.add\_argument("--headless")  driver = webdriver.Chrome(options=options) | npx cypress run --headless | Run Chrome without a UI. |
| **Set Proxy** | ChromeOptions options = new ChromeOptions();  options.addArguments("--proxy-server=http://proxy.example.com:8080");  WebDriver driver = new ChromeDriver(options); | from selenium.webdriver.chrome.options  import Optionsoptions = Options()  options.add\_argument("--proxy-server=http://proxy.example .com:8080")  driver = webdriver.Chrome(options=options) | --proxy=http://proxy.example.com:8080 | Set the browser's proxy server. |
| **Disable GPU Hardware Acceleration** | ChromeOptions options = new ChromeOptions();  options.addArguments("--disable-gpu");  WebDriver driver = new ChromeDriver(options); | from selenium.webdriver.chrome.options  import Options  options = Options()  options.add\_argument("--disable-gpu")  driver = webdriver.Chrome(options=options) | N/A | Disable GPU hardware acceleration. |
| **Disable Extensions** | ChromeOptions options = new ChromeOptions();  options.addArguments("--disable-extensions");  WebDriver driver = new ChromeDriver(options); | from selenium.webdriver.chrome.options  import Options  options = Options()  options.add\_argument("--disable-extensions")  driver = webdriver.Chrome(options=options) | N/A | Disable all browser extensions. |
| **Set Window Size** | ChromeOptions options = new ChromeOptions();  options.addArguments("window-size=1200x600");  WebDriver driver = new ChromeDriver(options); | from selenium.webdriver.chrome.options  import Options  options = Options()  options.add\_argument("window-size=1200x600")  driver = webdriver.Chrome(options=options) | "viewportWidth": 1200, "viewportHeight": 600 | Set the initial window size of the browser. |
| **Incorporate User Data** | ChromeOptions options = new ChromeOptions();  options.addArguments("user-data-dir=/path/to/your/chrome/profile");  WebDriver driver = new ChromeDriver(options); | from selenium.webdriver.chrome.options  import Options  options = Options()  options.add\_argument("user-data-dir=<path>")  driver = webdriver.Chrome(options=options) | N/A | Use a specific Chrome profile or user data. |
| **Incognito Mode** | ChromeOptions options = new ChromeOptions();  options.addArguments("--incognito");  WebDriver driver = new ChromeDriver(options); | from selenium.webdriver.chrome.options  import Options  options = Options()  options.add\_argument("--incognito")  driver = webdriver.Chrome(options=options) | N/A | Open the browser in incognito (private browsing) mode. |
| **Remote Debugging** | ChromeOptions options = new ChromeOptions();  options.addArguments("--remote-debugging-port=9222");  WebDriver driver = new ChromeDriver(options); | from selenium.webdriver.chrome.options  import Optionsoptions = Options()  options.add\_argument("--remote-debugging-port=9222")  driver = webdriver.Chrome(options=options) | N/A | Enable remote debugging of the browser. |
| **Disable Sandbox** | ChromeOptions options = new ChromeOptions();  options.addArguments("--no-sandbox");  WebDriver driver = new ChromeDriver(options); | from selenium.webdriver.chrome.options  import Optionsoptions = Options()  options.add\_argument("--no-sandbox")  driver = webdriver.Chrome(options=options) | N/A | Disable the sandboxing feature for Chrome. |

**11. File Downloads**

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| **Topic** | **Java Code** | **Python Code** | **Cypress Command** | **Description** |
| **Automate Downloads** | HashMap<String, Object> prefs = new HashMap<>(); prefs.put("download.default\_directory", "path/to/download"); ChromeOptions options = new ChromeOptions(); options.setExperimentalOption("prefs", prefs); WebDriver driver = new ChromeDriver(options); | from selenium.webdriver.chrome.options  import Options options = Options() prefs = {"download.default\_directory": "path/to/download"} options.add\_experimental\_option("prefs", prefs) driver = webdriver.Chrome(options=options) | N/A | Configures browser settings for file downloads. |
| **Verify File Exists** | Java File I/O APIs to check file existence at download location | import os assert os.path.exists("path/to/downloaded/file") | Use Node.js fs module for checking files | Validates that the file is downloaded successfully. |

**12. Using Service() Method in Python**

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| **Topic** | **Java Code** | **Python Code** | **Cypress Command** | **Description** |
| **Service Initialization** | N/A | from selenium.webdriver.chrome.service import Service from selenium import webdriver service = Service("path/to/chromedriver") driver = webdriver.Chrome(service=service) | N/A | Demonstrates how to use Service() for initializing WebDriver. |

**13. Additional Chrome Options**

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| **Topic** | **Java Code** | **Python Code** | **Cypress Command** | **Description** |
| **Disable Notifications** | ChromeOptions options = new ChromeOptions(); options.addArguments("--disable-notifications"); WebDriver driver = new ChromeDriver(options); | options = Options() options.add\_argument("--disable-notifications") driver = webdriver.Chrome(options=options) | N/A | Suppresses browser notifications. |
| **Start in Incognito** | options.addArguments("--incognito"); WebDriver driver = new ChromeDriver(options); | options.add\_argument("--incognito") driver = webdriver.Chrome(options=options) | N/A | Opens the browser in incognito mode. |