Interview Preparation

**Tell me about yourself**

1.      First off I would like to thank you guys for giving me the time and opportunity to be part of your company.

2.       I have been in the IT industry for 6 years so far and I am currently an SDET on my team.

3.      After working in different types of Industry I have gained domain knowledge in networking , banking, and healthcare.

4.   I started off as a manual tester and eventually became proficient in automation testing

5.      I have been exposed and have experience in Frontend testing and backend testing

6.      The tools I used in my current project are Selenium WebDriver, Java, TestNg, , cucumber for front end.

a.      Sql, jdbc, and oracle database for back end

b.      I have also worked on api testing in my project and I used Restful , postman, and restassured library

c.      I also used github for version control, and Jenkins for continuous integration/deployment, and maven for framework organization and  jira for project management and bug tracking

d.      amazon aws cloud machine server management

7.      I have been exposed to waterfall methodology early in my career and currently im in a agile scrum team and participate in meetings and analyze artifacts

8.      I have also constructed and design my own framework that are data driven and behavior driven based on POM and I am also able to adapt to any existing frameworks

9.      As an individual im highly motivated person, growing up a low income poverty I learned at a very young age that hard work pays off and you must be hungry for success.  Im a positive person and I love helping companies achieve their goals and grow with them . I’m a team player and my team that I’m in right would say that i'm very reliable and that have good communication skills to ensure that we meet our goals during the sprint.

What are the challenges you faced in Automation?

What are your strengths?

What are your weaknesses?

Describe me a test case you worked on?

Explain to me a test scenario you work on

Tell me a time you take a leadership role and led a group to do something at your work

Describe me your trophy bug?

What is your scrum team composition?

How long is your sprint?

How many test cases you automate a week?

How many defects you found a week?

**Testing**

What is a test strategy?

* A test plan for software project can be defined as a document that defines the scope, objective, approach and emphasis on a software testing effort

What is a test plan? (**go over test plan doc)**

* Documentation about the test/testing process
  + Consist of
    - Introduction
    - Test strategy
      * Test objectives
      * Test assumptions
      * Data approach
      * Scope and levels of testing
    - Execution strategy
      * Describes how the test will be performed and process to identify and report defects, and to fix and implement fixes
    - Test management process
      * Handles the logistics of the test and all the events that come up during execution
    - Test execution
    - Test Environment
    - Must be reviewed before execution by Devs, testers, and business team

What does Test case consist of?

* Prerequisite or pre-condition that must be followed before executing test steps
* Test steps
* Test results- Pass/Fail
* Automation status
* Date of Execution

What is a Test Scenario?

* Make sure that end to end functionality of application under test is working as expected
* The tester needs to put his/her foot in the end users shoes to check and perform the action as how they are using application under test
* T.S can have many test cases associated with it, Before executing the T.S we need to think of test cases for scenario
* Test Scenario: Validate the login page
* Test Case 1: Enter a valid username and password
* Test Case 2: Reset your password
* Test Case 3: Enter invalid credentials
* In each test case are detailed steps and condition for execution

version

Difference between Test case and Test script?

**Test Case :**

* A test case is a documentation which specifies input values, expected output and the preconditions for executing the test.
* This terminology mostly used for Manual Testing
* It's a layout of the low-level details on how to test the scenario

**Test Script:**

* A test script in software testing is a set of instructions that will be performed on the system under test to test that the system functions as expected.
* This terminology mostly used for Automation Testing

What is Quality Assurance/ Quality Control?

* QA is used to verify the quality of the output

**How to build your framework from scratch**

* Testing Framework - guidelines and rules used for creating and designing test cases

1. **Set up Environment ; install JDK, MAVEN, ECLIPSE IDE**
2. **Create Maven project**
   1. **ArtifactID - name of your project**
   2. **GroupID - identifies your project uniquely across all projects**
3. **Add Dependencies from Maven Repository**
   1. **Selenium Java**
   2. **Cucumber Sandwich**
   3. **JRE System library 1.8 in <properties>**
   4. **TestNG**
   5. **WebDriverManager\_BoniGarcia**
   6. **Cucumber Java**
   7. **Cucumber TestNG**
   8. **Apache POI.XML**
   9. **APACHE POI**
   10. **JDBC**
   11. **Restassured**
   12. **Gson**
   13. **Log4j**
4. **Create framework Structure (packages)**
   1. **Pages**
      1. **Webelements and methods**
   2. **Beans**
      1. **Custom classes**
   3. **Runner**
      1. **Cuckesrunner - generates codes and stores html report to target**
      2. **Smoke**
      3. **regression**
   4. **StepDefinitions**
      1. **Actual codes and hook class**
   5. **Tests**
      1. **Data driven tests**
   6. **JDBC**
   7. **API**
   8. **Utilities**
      1. **ConfigurationReader**
      2. **Driver class (Singleton)**
      3. **browserUtils**
      4. **DBUtils**
      5. **ApiUtils**
   9. **Configuration.properties**
   10. **Testng\_runner.xml**
       1. **One of the runner class**

**Call the packages with com.app.utilities**

**5.  Create feature folder with feature file (.feature) in resources**

* **File executable specification written in a gherkin language**

**6. After you finish writing your scenario, run your cukesrunner with dryrun=false, this will give you implementation code that you will store in Stepdefinition class**

**7.  How to run your code?**

* **Use runner class - run codes and generate cucumber report and html reports**

**8.  Send framework to github**

* **Create new repo**
* **Copy git url and go to eclipse**
* **Configure git repo and add the url**
* **Right click project, click team, click commit and you’ll be in git staging**
* **NOW YOUR CODE IS IN GITHUB**

**9. NOW FOR JENKINS INTEGRATION**

Jenkins

* Open source automation server
* Helps to automate the non-human part of the software development process
* Allows continuous integration
* Development practice that requires dev to integrate code into a shared repo at reg intervals
* Port is 8081 localhost

To run your project in jenkins

* Login to jenkins account
* Create project - freestyle
* Install plugins -cucumber report and git
* Under source code management choose git and past git url
* Build trigger - choose build periodically
* Invoke top-level maven
  + Maven version ; MAVEN\_HOME
  + Goals ; **clean verify -Drunner=smoke\_runnerxml**
* Under post-build actions
  + Choose cucumber reports
  + Choose editable email notify
* Editable email notification
  + Attach build log ; choose build log
  + Click advanced settings
* Failure-Any
  + Click advanced
  + Recipient list - email address who will receive the report. Add comma if multiple
  + Click add trigger - like failure always
  + Attach build log; select attach build log
  + Save
* Final step
  + Click build now and test will run and gives your cucumber report

What is Software Testing?

1. Process of executing a program or application with the intent of find software bugs using functional and automation tools
2. Process of validating/verifying a software program/application
3. Testers should test to break approach, not test to pass

What is Software Development Life Cycle

1. Requirement Gathering
   1. Gathering information used to plan project approach and feasibility study
   2. Identifying risks
   3. Planning QA requirements
2. Defining Requirements
   1. Phase to clear define/document product requirements
   2. SRS (Software Requirement Specification)
3. Designing
   1. How the application will be built
4. Developing (coding)
   1. Based on requirements, developers will write the application
      1. Using tools/ techniques chosen during design phase
5. Testing
6. Deployment
   1. Releasing product
7. Maintenance
   1. Making sure product is stable
   2. Looking at customer report on bugs and fixing it

How many environments you have?

* Development
  + Unit testing
  + Less stable than test environment
* Test environment
  + Manual testing happens here
  + **Replicates the production environment exactly**
  + Changes are deployed in intervals
  + Automated smoke tests are ran here
  + Automation tests are ran here
  + Automated Integration tests run here
* Pre-production Environment
  + UAT environment
  + Demo happens here
  + load/performance testing happen here
  + Changes are deployed in big intervals
  + Automated major  regression tests here (before release)
    - This test is decided in test plan
  + Very stable
* Production environment

How is code deployed to production environment?

* From Local

1. check in code to Git using pull and push
2. Run unit tests
3. Deploy changes to server
   1. Done by jenkins automatically every time developer checks in code.After it passes deploy changes to Dev environment

* From Dev environment
  + Deploy changes  to Test environment done by Jenkins
    - Can be scheduled or manually triggered
* From Test
  + Deploy changes done by Jenkins
* From Pre-production

**Smoke test**

* Runs against the test environment
* Run everytime changes are deployed to Test environment
* Can be ran in dev environment

**Regression Test**

* Runs against the UAT environment
* To find out if new changes result in any defects
* Runs after major bug fixes and every release

What is RTM?

1. Requirement Traceability Matrix
   1. Connecting the test cases to the requirements

What is Regression Hierarchy?

**Describe me your Framework**

//MY FRAMEWORK and how to explain to interviewer - Andy Lam and little bit of Alex

//based on Data Driven and Behavior Driven - Hybrid framework

//Maven - build tool and not only for dependency management but also as a command prompt tool using the pom xml file, i also have specific xml file that run my smoke,

//regression, and functionality tests

//Java as programming language - working frontend,backend(api), and database i use java collection framework to store data and compare

//i also have a properties file that stores sensitive/reusable data - url, password, browser

//and i use testng testing tool to control flow and assert data, after formatting data to java, in order to find defects

I also have driver class in utility package that uses singleton pattern to create and use only one universal webdriver

//for FRONT END ; selenium webdriver, and in my framework i am using Page object model as my design pattern; - create page objects;identify webelements and

//and store as a webelement variable -----------POM = REUSABILITY OF ELEMENT/METHODS BASED PAGE OBJECT

//i also use Page Factory design pattern to instantiate my webelements using @FindBy - easier/convenient

//utility; browser util - where static reusable code that makes your life easier, to make codes for automating browser easier;

//BACK END  (Api)

//using RESTASSURED in your framework in order for the process of Deserialization and serialization to occur

//that way you store json response into a java collection data structure(/i produce high level pojos and map objects) and assert the data with the expected value (also stored in java data structure)

//i also have a api utility class - reusable codes -method where one line creates a pojo

//i use postman for manual testing first BEFORE I INVOKE MY FRAMEWORK

//DATABASE testing

//manual i sql developer for producing sql queries

//FOR AUTOMATION ;I  use JDBC library to integrate java by  getting a CONNECTION from oracle database

//then creating STATEMENTS using SQL queries and then storing the data into a RESULTSET object.

//I use java data structures to use store data inside and compare them

//and since im using DATA DRIVEN and CUCUMBER BDD framework, all of these tests are stored inside feature files

//i have RUNNER classes that helps generate codes from FEATURE FILE and implement them into a file called STEP DEFINITION

//also have HOOK class that implements my codes that run before and after all my tests - this is where i invoke my TAKESCREENSHOT interface which triggers when i use scenario interface(when scenario fails)

//take a picture when youre are on the step that failed

//S.D - this is where i stored my codes that based on gherkin language

//for DDT

//if the im working with small amounts of test data im going to operate with scenario outlines, this where i create examples and store datas using pipeline

//if there large amount of test data its usually in a external file (excel) so i use Apache POI to INVOKE DDT EXCEL AUTOMATION and read from excel file and store the data

//into java data structure

//i also have a logging tool called log4j to log my codes that are basically high risk

//and lastly for my reports,, in my framework i use Rerun.txt code in cucumber "rerun:target/rerun.txt" generated by cucumber sandwich library

//this will store my failed cucumber feature files

//then i also have failedScenario runner class which has the location of failed scenarios (rerun.txt)

//i create a failedScenario xml file

//so whenever i have failed feature files i use mvn command ; mvn -Drunner=failedScenarios xml file  to run my failed tests

//reporting - i used html report that's located in target folder which is called cucumber-reports  -"html:target/cucumber-report"

//and lastly for continuous integration (jenkins)

//devops takes care of configuration

//but the tool is invoked my a mvn command that is provided by the tester - xml file

//for reports each build will have a cucumber report that give graphical information of test and screenshot

1. Page Object Model
   1. Reduces code redundancy and organizes code
   2. Helps identify elements and store it as a page object variable
   3. You can link it to where it was stored
   4. Added PageFactory design pattern
2. Selenium WebDriver as my  automation tool
   1. Manual test it first by:
      1. Front end
         1. Functional testing
      2. Back-end
         1. Database- SQL
         2. API - Postman
   2. Integrate Selenium with:
      1. Maven
         1. Test package
         2. Utility package
            1. UI
            2. DB
            3. API
         3. Configuration file
            1. Properties
         4. Driver class
            1. Singleton design pattern

Have a private constructor

* + 1. Cucumber BDD
       1. Facilitate the collaboration during the BDD process
       2. Enables explaining the story and the acceptance criteria in easy language.
    2. Git -  source control
    3. Jenkins
    4. Java
       1. Collections Framework
       2. Apache POI
       3. JDBC
       4. Rest-Assured

1. Java for writing code
2. Behavior Driven Development
   1. Developing together with the customer to ensure it meets the right standards for the customer
3. Data Driven Development
   1. Executing same test case against different sets of data
   2. Test flow should not change based on data
4. Cucumber reporting
   1. Target folder
   2. Jenkins

**Waterfall Methodology**

What is Waterfall?

The drawbacks of Waterfall?

1. Communication is problem
   1. Hierarchy
      1. Bad communication channel flow
2. Once you move down to next phase, cant go back up

Benefits of Waterfall

1. More predictability

**Agile**

Agile Framework

* Role
  + Product Owner
  + Scrum Master
  + Team
* Ceremonies
  + Sprint Planning
  + Sprint review
  + Sprint Retro
  + Daily Scrum
  + Grooming session
* Artifacts
  + Product backlog
  + Sprint backlog
  + Burnout Chart
    - Chart that shows

What is Agile

* A methodology based on developing software in short iterations
  + Scrum
    - Team plans for amount of work for the next sprint
  + Kanban
    - No sprint planning, stories are picked up as is but you still have everything else

What are the components of Agile?

* Product Backlog
  + Lists requirements + technical tasks
  + W.e the product owner wants. Requirements
  + User stories that should done
  + Unaccomplished Tasks
* Sprint
  + Time duration
    - 2 -4 weeks
* Sprint Backlog
  + List of stories that we selected for this sprint
    - Stories that will be worked on during the sprint
    - Should be done by end of sprint
* Sprint Planning
  + We go to Product Backlog and see the stories
  + Choosing story based on velocity and capacity
    - Velocity
      * Number of story points delivered/demo in a sprint
      * For example: if team planned 30 story points (Business value) worth of user stories in a sprint and able to deliver as planned then team’s velocity is 30
    - Capacity
      * Total number of available hours for a sprint is Team’s capacity.
      * Calculates holiday and pto hours
* Daily Scrum
  + Everyday we inform the team about what we did last day, what we are going to do, any blockers?
    - No more than 15 mins
* Sprint Demo/Review
  + Just a demo
  + Show customer what we build sprint
  + Product owner can put feedback
* Sprint Retrospective
  + Team will analyze the last sprint
  + Discuss problems + their causes
  + Decision will be based on team discussion
    - No boss
* Shippable product/increment
  + The piece of the product is made and it keeps getting added functionality form each sprint
  + The increment must align to the development team’s Definition of Done
  + The increment must be acceptable by the P.O-
* Sprint Grooming session
  + Happens before sprint planning
  + Team, Scrum master, and P.o get together to ensure work items are relevant and useful
    - Re-define acceptance criteria
    - Writing new stories
    - Breaking epics into user stories

What is Definition of Done?

* When the product increment is delivered,  it needs to meet “Definition of Done”
* Acceptance criteria is fulfilled
* Product owner accepts the user stories

What is Verification and Validation?

* Verification happens during developing
  + When you're building your checking if you're building the right thing
* Validation
  + After it is done, you are validating, it does what it suppose to do after developing it.
* Testers /Dev - verification
* Testers  -validation

What is Definition of Ready?

* Acceptance Criteria is cleared/reviewed
* Point/hours are given

What is BurnDown Chart?

* Graphic representation of the rate at which work is completed and how much work remains to be done

What is User Story?

* “As a customer..I want to….So that…..

What is Epic?

* A lot of user stories

What is Acceptance criteria?

* Statements of requirements that are described from the point of view of the user to determine when a story is”done” and working as expected
* 3 parts examples
  + Input - valid email address
  + Process - marking messaging
  + Outcome - marketing message design matches the specs provided by marketing

What is sprint workflow?

* How a story moves from to do to done and lifecycles - what happens when something is blocked, etc.

What types of Test cases?

1. You cover different scenarios
   1. Positive
   2. Negative
   3. Boundary Value Analysis

How many Test cases do you usually complete in a week?

* 10 small test cases
* 7-8 medium
* 2-3 large

What are the steps you take to automate?

1. Learn the functionality
   1. Reading requirements
   2. Knowledge transfer session with B.A
   3. Ask teammates
2. Manually test it
   1. Making sure you understand each step properly
   2. Understand expected results
3. Automate it
   1. Create POM pages
      1. Add necessary elements/methods you are going to use and add PageFactory design pattern
      2. Create a driver class with Singleton pattern
   2. Validate the tests using TestNG Assertions

**JUnit**

* Annotations
  + @BeforeClass
    - Run once before any of the test methods in the class
  + @AfterClass
    - Run once after all the tests in the class have been run
  + @Before
    - Runs before @Test
  + @After
    - Runs after @Test
  + @Test
    - Test method to run
  + @Ignores
    - Used if you want to ignore some statements during test execution

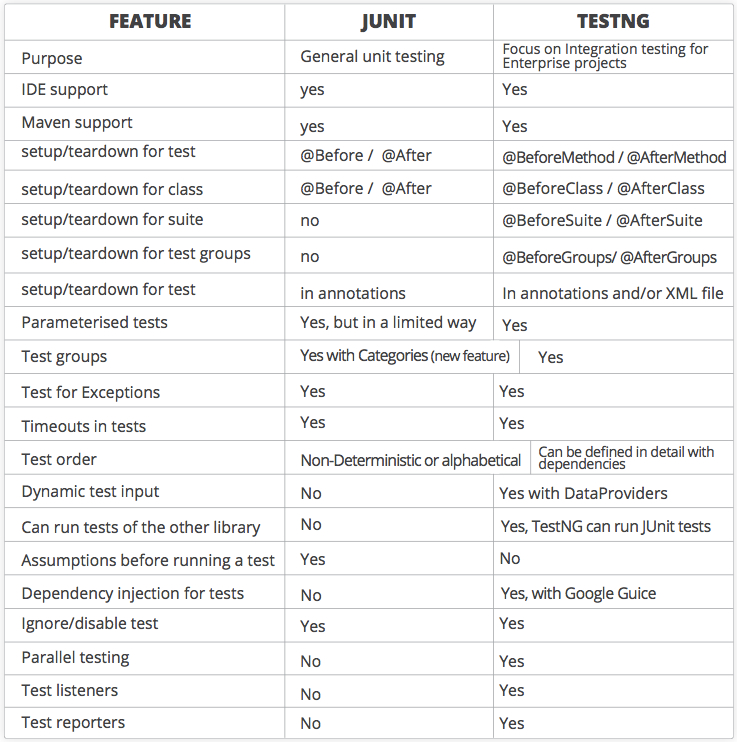
**TestNG**

* Annotations
  + Priority
    - Doesn't matter what number you start or if its consecutive
    - Ex: @Test(priority=0)
  + DependsOnMethods=”test method name”
    - Can add multiple test names
    - If the first one fails, the 2nd test won't run at all
    - If the first method failed, your report will show that the 2nd test will be skipped
      * **If the 2 methods depend on each other, why not combine into one single test?**
        + B.c in each test method, we are testing different functionality
        + We want to test the smallest piece possible in one test

Functional testing

* + Enabled
    - @Test(priority=0, enabled=false)
      * This skips a test
      * It will be picked up by testNG and will be on the report
  + @BeforeClass vs @BeforeMethod
    - BM - will run every time you have a test
    - BC - will run before everything else, even before @BeforeMethod
  + Groups
    - Ex: @Test(priority=0, groups=”smoke”)
    - If you add groups, sometimes @Before and @After dont work,so put AlwaysRun=true in the before and after
    - Can be added in xml file
  + Parameter annotation
  + @Optional annotation
    - Lets you run a specific test w.o invoking the xml
  + Parallel execution in testng
    - In xml file write;
    - parallel=”tests” thread-count=”4”
      * Thread-count is how many browser do you want to open same time
    - Batch running
      * In xml file you can add .\* to run everything
      * Ex: <package name=”.\*”></package>
  + Testng has it own reports
    - When you run xml, it gives you the report in test-output folder
      * Contains the test report in html

**TestNG vs JUnit**

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**GitHub**

What is GitHub?

* Version control system
* Keeps track of new/old version of documents
* Manages/stores set of files

What is a Repository?

* Folder where files are saved
* May contain single, collections of files, or single projects

What is Remote Repository?

* Host on server(GITHUB)
* Our changes go from local to remote repo

What is local Repository?

* Typically on your computer
* Our changes are done here consist of Working Directory, index and HEAD

What are Git commands?

* Add - add to staging area
* Commit - add from working directory and local repo
* Push - add to remote repo
* Pull - take changes from remote to working directory

How do I use Git in terminal?

* To create a new repo;
  + echo "# SqlMentor" >> README.md  
    git init  
    git add README.md  
    git commit -m "first commit"  
    git remote add origin https://github.com/Andylam224/SqlMentor.git  
    git push -u origin master
* Push an existing repo
* git remote add origin https://github.com/Andylam224/SqlMentor.git  
  git push -u origin master

**Jira**

What is Jira?

* Project management tool and helps tracks defects
  + Allows for planning and time management
  + Tracks due dates/assignment
* What are the Jira terms?
  + Issue
    - W.e you need to do and fix
  + Types of Issue
    - Story
    - Task
    - Bug
    - Epic
* What's the difference epic and tickets
  + Epic are written by B.A
  + Tickets are created by testers
  + Description box
    - Example reporting a bug
    - You write in the box
      * What is the bug about
      * What functionality is breaking
      * What are the steps of recreating the bug
        + With necessary data
      * Attach report and screenshot of bug
      * Expected results
      * Actual results

How do you automate User Stories from JIRA?

1. Look at description - Agile story
2. Create feature file and save file as jira story.feature
   1. Add scenario located in Acceptance criteria
3. Run cukesRunner with dryRun=true
4. Implement the methods
5. **BEFORE AUTOMATING THE TEST CASES IN JIRA ALWAYS MANUAL TEST IT FIRST**

What is SPA?

* Single Page Application
  + Page loads once and no more
  + Some parts of the page loads but whole web page doesn't reload/change
  + Example is AJAX
    - When client adds/save something on the page, the page uses AJAX to communicate to server then server send JSON back to the page and the items are updated

**HTML**

**How to get all the preceding siblings of Apple**

**Xpath: "//ul/li[contains(text(),'Apple Mobiles')]/preceding-sibling::li"**

**This will give "Samsung Mobiles"**

**How to get all the following  siblings of Apple**

**Xpath:  "//ul/li[contains(text(),'Apple Mobiles')]/following-sibling::li"**

**This will give all the preceding siblings ( Nokia Mobiles, HTC Mobiles, Sony Mobiles, Micromax mobiles)**

**How do you use CSS?**

* **Name me some methods you used in your project**

**How do you find a text in a webpage?**

**//tagname[contains(text(),’text’)] - contains certain test**

**//tagname[.=’text’] - contains exact text - sometimes doesnt work**

**Selenium**

* **How to handle WebTables?**
  + Table - tag used for table - data is arranged in a grid format
  + th -tag for  column name
    - Example - <tr>

<th>Firstname</th> - column names on the very top row

<th>Lastname</th>

<th>Age</th>

   </tr>

* + tr -tag used to indicate a row, applies to whole column
  + td- tag to indicate a column in a row
    - Example - <tr>

<td>Danny</td> - actual data on the very first row

<td>Smith</td>

<td>29</td>

   </tr>

* Some tables have tbody
  + Used to indicate the data of the table, usually does not include column names (th)
* How to handle staleElementReferenceException? (interview question)
  + First you get this exception when after initially finding the element, page or element was refreshed and selenium cannot work with the original element anymore
  + public boolean retryingFindClick(By by) { boolean result = false; int attempts = 0; while(attempts < 2) { try { driver.findElement(by).click(); result = true; break; } catch(StaleElementException e) { } attempts++; } return result; }
* FindElement vs FindElements
  + F.E returns single element
  + FES returns a list of webelements
  + If multiple elements are found;
    - F.e returns first element
    - FES returns whole list of elements
  + If no element is found;
    - F.e throws NOSUCHELEMENT exception
    - FES returns a empty array list
* Driver.close vs Driver.quit?
  + Driver.close - only closes the current tab, **Does not make driver object null**
  + Driver.quit - closes the browser with all tabs, **makes object NULL**
* How do you handle dynamic id?
  + Find the static part of the id and write a locator(xpath or css)
  + And then use Startswith, contains, EndsWith
  + //E[ends-with(@A,’t’)]
  + //E[starts-with(@A,’t’)]
  + //E[contains(@A,’t’)]
* How to handle dropdowns?
  + I find the select tag and create a object from it
  + Ex; Webelement element=driver.findElement(by.id(“blah”);
  + ex;Select list=new Select(element)
  + I can use 3 methods
    - SelectByVisibleText() - select option based on test displayed. Takes String param
    - SelectByIndex() -selects option based on the count.Takes int param
    - SelectByValue() - selects option based on the value of the value attribute.Takes string param
    - getFirstSelectedOption() - returns option that is selected
    - getAllSelectedOption() - returns all the options which are selected (multiple selected options are possible)
    - getOptions()
      * Returns all options in a list of webelements
  + What if there's no select tag?
    - You have to select the label for the dropdown separately as a webelement.
    - Then manually use click method
  + What if there is a dynamic popups that comes up randomly
    - Use try/catch with alert
* How to maximize a webpage?
  + driver.manage().window().maximize();
* What is the key class in Selenium?
  + Gives us option for pressing keys from keyboard
  + Key.ENTER
  + MUST BE PASSED TO SendKeys() method
  + Ex; .sendkeys(“charger” + keys.ENTER)
* What is Thread.sleep()?
  + Slows down selenium to catch up
  + Throws exception so must handle it or throw it
* How did you use overloaded Methods in Selenium?
  + When asserting if two values are equal I use Assert.assertEquals(actual,Expected) from TestNG
    - You can put in the parameters String, Objects, int, boolean values
* How to handle frames in Selenium?
  + Frames - used to embed a html page into another
  + Steps

1. Locate the iframe
2. Switch to another iframe
   1. driver.switchTo().frame();
      1. .frame() - takes string, Integer, webElement, name or id directly as parameter
      2. driver.switchTo().frame(webElement);
      3. driver.switchTo().frame();
         1. Now you are in the 2nd frame, if you want to find an element outside of the 2nd frame (that youre currently on) - throws **NosuchElementException**
         2. Need to switch back to previous frame
            1. driver.switchTo().parentFrame()

Goes one level up

* + - * 1. driver.switchTo().defaultcontent()

Goes to the very top

* + - 1. Can switch using count
         1. driver.switchTo(0)

**Counts anything that is not the default frame**

* + 1. These methods might give you different results based on what browser you are using

Why we get NoSuchElementException?

* Check if locator is correct
* Check if timing is correct
* Check if element is hidden inside an iframe

How to handle multiple frames?

* If there are 4 frames, you have to go through each from consecutively to reach certain frame. Cant jump to the 3rd frame from 1st frame.

How to handle Headless browser

* Example is htmlunitdriver -from selenium
  + WebDriver=new htmlunitdriver()
  + Not very stable
* Phamtonjsbrowser
  + More stable
  + browser=new phantomjsbrowser()

How to handle multiple windows/tabs?

* Selenium stays on one window
* If you open a window and then 5 tabs popped open, selenium is focused on the first window
* If you are on a new window and you tell selenium to print an element on the default window, it will still work even that user’s focus is on the new window
* **Must switch to new window**
  + 1. Use windowHandle()
    - Driver.getWindowHandle()
      * Everytime Selenium opens a browser, its going to give an index ID for the page - called Handles
      * Returns the handle/id of current page (as a string)
  + driver.switchTo().window(string handle)
  + driver.getWindowHandles() - for multple windows
    - Returns a **Set of window handles**
  + **Switch using titles**
    - for(string handle: driver.getWindowHandles()){
    - driver.switchTo().Window(handle)
    - if(driver.getTtitle().equals(targetTitle)
    - Break;
    - }

Difference between implicit wait and Explicit Wait?

* + implicit Wait
    - driver.manage().timeouts().implicitlyWait(3,TimeUnit..seconds)
      * Everytime you are looking for something, if you cannot find it, wait for 3 seconds and keep finding during those 3 seconds
        + Throws **NoSuchElementException** if cannot find element during the the time range
    - Only kicks in when we use **findElement** method
    - It is set only once (in the hooks class)
  + Explicit Wait
    - Use WebDriverWait
      * Class that lets you wait for certain actions/certain webelement/locator
        + Example - wait until element with id”id” becomes visible
      * WebDriverWait needs two things
        + Element or locator
        + Condition (what you are waiting for)
        + Ex: WebDriverWait  wait=new WebDriverWait(driver,5)

Time parameter is always in secs

wait.until(**ExpectedConditions.visibilityofElementLocated(By.cssSelector(“#fished”);**

wait.until() - starts wait actions

This method will find the element and see if its visible, then it will wait until the element is visible

If can't find it, throws **timeoutException**

Can also store boolean reference in wait.until for expectedcondition.invisibilityofElementLocated

ExpectedCondition.elementTobeClickable()

Does not always work as expected

Only 90% of time

* + - What is fluentWait?
      * Subtype of explicitwait but you **can override the conditions**
      * Wait<WebDriver>wait=new FluentWait<Webdriver>(driver).withTimout(5,timeUnit.seconds).pollingEvery(100,timeunit. milliseconds).ignoring(NoSuchElementException.class);

**When to use the 3 waits?**

**Implicit Wait:** During Implicit wait if the Webdriver cannot find it immediately because of its availability, it will keep polling (around 250 milliseconds) the DOM to get the element. If the element is not available within the specified Time an NoSuchElementException will be raised. The default setting is zero. Once we set a time, the Web Driver waits for the period of the WebDriver object instance.

**Explicit Wait:** There can be instance when a particular element takes more than a minute to load. In that case you definitely not like to set a huge time to Implicit wait, as if you do this your browser will going to wait for the same time for every element.

To avoid that situation you can simply put a separate time on the required element only. By following this your browser implicit wait time would be short for every element and it would be large for specific element.

**Fluent Wait:** Let’s say you have an element which sometime appears in just 1 second and some time it takes minutes to appear. In that case it is better to use fluent wait, as this will try to find element again and again until it find it or until the final timer runs out. Example is AJAX or JQuery

How to check if element is present/visible/enable/ and to check text present?

1. To check Element Present:
2. if(driver.findElements(By.xpath("value")).size() != 0){ System.out.println("Element is Present"); }else{ System.out.println("Element is Absent"); }
3. Or
4. if(driver.findElement(By.xpath("value"))!= null){ System.out.println("Element is Present"); }else{ System.out.println("Element is Absent"); }
5. To check Visible:
6. if( driver.findElement(By.cssSelector("a > font")).isDisplayed()){ System.out.println("Element is Visible"); }else{ System.out.println("Element is InVisible"); }
7. To check Enable:
8. if( driver.findElement(By.cssSelector("a > font")).isEnabled()){ System.out.println("Element is Enable"); }else{ System.out.println("Element is Disabled"); }
9. To check text present
10. if(driver.getPageSource().contains("Text to check")){ System.out.println("Text is present"); }else{ System.out.println("Text is absent"); }

Do you use JavaScriptExecutor?

This helps me write my own JavaScript

JavaScriptExecutor jsExecutor=(JavaScriptExecutor)driver;

* Using this class we can send JS commands to the browser
* executeScript(); performs the command
  + Inside the parameter is where you put JS code

jsExecutor.executeScript(“alert(‘WARNING: This is a useless message’);”

* This code will bring up a JS popup

You can also put 2 parameter is .executeScript(“js code”,element);

* Used for scrolling (selenium is not good with scrolling, you can say a challenge is when i was working on terms and condition page, where you have to read the page before clicking on continue.  When i tried using selenium and actions class it didn't work, so i used javaexecutor ) and clicking an element;

WebDriver driver = new FirefoxDriver(); JavascriptExecutor jse = (JavascriptExecutor)driver; jse.executeScript("window.scrollBy(0,250)", "");

JavaScript has way more control than selenium.

* How to use actions class?
  + Control the mouse
  + Class that provides methods for advanced user interactions
    - Hovering
    - Double clic
    - Right click
    - Scroll
    - Drag and drop
    - mix/match operators
  + Actions action=new Actions(driver)
  + Action methods
    - click()
    - hold()
    - build()
    - perform()
    - keydown()
    - moveToElement(element)
    - dragAndDrop(source,target).perform()
    - sendKeys() - different from the one we usually use
      * Lets you do the sendkeys operation on different elements
      * Regular sendkeys that comes from webelement will throw an exception on something that is not input text.
      * The long way is actions.moveToElement(source),clickAndHold().moveToElement(target).release().perform();
  + **Actions won't work unless perform() is used**
  + **If you are chaining methods you must use build() before perform()**
* File download and upload
  + Download
    - Selenium itself cannot verify file downloads,can click on download link but can't go outside the browser and open the downloaded file
    - Other tools need to be used for that - Robot and autoIT
  + Upload
    - Selenium handles the upload, but does it differently compared to actual user
    - Steps

1. Find the element that triggers the upload window
2. Find the path of the file you want to upload
   1. Store into a String
      1. Ex: String file=”C:\\Users\\Andy\\Desktop\\folder1\\file.key”;
      2. Then driver.findElement(upload button).sendkeys(file);

**Maven**

What is Maven?

* A build tool and command prompt tool that called POM xml file that calls my runner class and manages my dependencies
* Command Prompt - mvn archetype;generate
  + Creates project
* Choose a # - press enter
* Choose a # - press enter
* groupId; Com.nameOfProject
* artifactID; test-maven-project
* Version - enter
* Package - enter
* Y; enter

Explain me the maven lifecycle;

* **Commands can only run in the same directory where the specific pom xml file is located**

1. 3 built-in build lifecycles
   1. Default
      1. Handles your project deployment
   2. Clean
      1. Handles project cleaning
   3. Site
      1. Handles creation of project’s site documentation
2. A build lifecycle is made up of phases
   1. Validate
      1. Validate the project is correct and all necessary information is available
   2. Compile
      1. Compile the source code of the project
      2. Target folder is created
         1. Reports will be stored here
   3. Test
      1. Test the compiled source code using a suitable unit testing framework.
      2. Should not require the code to be packaged or deployed
      3. Mvn -D(VariableName)=testname
         1. Run specific tests based on the parameter
   4. Package
      1. Take the compiled code and package it in a distributed format, like JAR
   5. Verify
      1. Runs any checks on results of integration tests to ensure quality criteria are met
   6. Install
      1. Install the package into local repo, for use as dependency
   7. Deploy
      1. Done in the build environment, copies the final package to the remote repository for sharing with other devs and projects

What is GroupID? Name of package

What is ArtifactID? Name of project

How do you convert maven project to eclipse project?

* Mvn eclipse

How java projects are made?

1. Create folders/packages
2. Add libraries/dependencies
3. Create class files
4. Compile
5. Run tests
6. Deploy

Where do you find your dependencies/libraries?

* Mvnrepository.com
* Update project if maven not working
  + When you have dependencies inside your pom file and you use update, maven will pull the JAR files from internet and add it to your project

What is m2 folder?

* Where your jar files/repositories are saved in your computer

What is POM xml file?

* A file that manages the whole project
* When you run a maven command, everything should be done through the pom.xml

RestAssured Library release date: 2015

**Log4j**

* Used by any application
* Example: LOG4J2
  + From Apachel
* Records activity
* Dev will look at the logs,look at the time, go to the ip address and see what going on if there was a bug

Loggers are very important part of applications and it keeps each step/event happened with timestamp

Normally logs are written programmatically into .log file

There are ready tools/libraries to add to any framework or application.

In java, the most famous logging library/framework is LOG4J  from apache

Purpose of logs:

* Help us debug the issues that you may have with application.

Sometimes when a bug is found in application, developers firstly check the logs.  In order to see which steps the user was taking and application did not behave as expected.

Logs MAY help you find the source of the problem (in application perspective, not testing)

LOG4J in Java

What is the role of logs in Test automation?

We are looking at console or html report to see the status of our test runs. If anything fails, we find from there.

If we implement logging into our framework, it will be another way of looking at automation execution steps and will help us find the problem whenever our test fails.

**Cucumber BDD**

What are the components of Cucumber BDD framework?

1. Feature files
2. Cukes Runner
3. Step definition

What is feature file?

* Consists of scenarios that test a certain feature or functionality
* Feature is main story while scenarios are the test cases to the story(feature)

What is Cukes Runner (Runner class)

* A class that strictly runs the tests, generates codes for step definition

What is step definition class?

* A class that made of steps that starts with Gherkin language
* **Make sure the step definition is in the same package as cukes Runner, or child package (not parent or sibling)**

What is Gherkin?

* Language used by feature files
* Feature, Scenario,Given, Then, When, And, But, BackGround,Scenario Outline, Examples

What does @CucumberOptions do?

* Tag used to customized ther running of the cucumber tests
* Inside @CucumberOptions you can add:
  + dryRun
  + Plugin
    - “Pretty”
      * Adds more info in the console
        + Gives you tag, scenario, method info.
    - "html:target/cucumber-report"
      * Generates html report located in target/cucumber-report folder
    - “json:target/cucumber.json
  + Tags
    - Tags must be located in feature path
    - Can add multiple tags...tags= “@Dog,@Cat”
  + Features - location of where feature files are
  + Glue - where to look for step definition steps.**hook class is part of glue too.**

How to see your reports in cucumber?

* Go to target folder
* Open with system explorer
* Go to target>cucumber-report>index - shows the tests you ran

How to run Cucumber with JUnit?

* Add cucumber -junit dependency
* Adding @RunWith(Cucumber.class) on top of cukesRunner class

How to run Cucumber with Testng?

* Add cucumber -testng dependency
* Make CukesRunner extend to AbstractTestNGCucumberTests

What are Hooks in cucumber?

* Class that uses @Before - runs before each cucumber scenario
* @After - runs after each scenario
  + It will always run no matter if scenario passes or fails
* **Class must be in same package as stepdefinition**
* I implemented screenshots inside hook class
* **Hookclass will not run if dryRun=true**
* I use Scenario as a parameter in my before/after method

How do you take screenshots in cucumber?

* In my Aftermethod i use a code:
* I use TakeScreenShot interface
* You can store screenshot as a byte or file

@After

public void tearDown(Scenario scenario) {

if(scenario.isFailed()) {

//taking a screenshot

final byte[] screenshot = ((TakesScreenshot) Driver.getDriver()).getScreenshotAs(OutputType.BYTES);

//adding the screenshot to the report

scenario.embed(screenshot, "image/png");

}

What happens we you run your runner class with no tags?

* All the feature files will run from top to bottom but only the feature files that are located in the @CucumberOptions “features=”

How to run a Cucumber with DDT?

* I use Cucumber tables:
* |Home|
* |Emails|
* |Documents|
* |Projects|

You get a the method with (DataTable arg1)

* In the parameter DataTable you can change it to List<YourType>,List<List<E>>,List<Map<K,v>>,and Map<K,v>
* Prints in order for list
* No order for map

How do I limit the types of variables I can pass?

* In the gherkin parenthesis you can add (Collaboration|Sales|Marking,etc)
* Ex: @When("^I hover over the **(Collaboration|Sales|Marketing|Activities|Support|All)** menu$")
* public void i\_hover\_over\_the\_Collaboration\_menu(String menu) {
* switch(menu) {
* case "Sales":
* BrowserUtils.hover(dashboard.sales);
* break;
* case "Marketing":
* BrowserUtils.hover(dashboard.marketing);
* break;
* case "Support":
* BrowserUtils.hover(dashboard.support);
* break;
* case "Collaboration":
* BrowserUtils.hover(dashboard.collaboration);
* break;
* case "Activities":
* BrowserUtils.hover(dashboard.activities);
* break;
* case "All":
* BrowserUtils.hover(dashboard.all);
* break;
* }

What if you have a scenario that has two parameters (limiting parameter, table parameter)?

Example :

Scenario: Verify Collaboration menu options

Given I logged into suiteCRM

When I hover over the Collaboration menu

Then following menu options should be visible for Collaboration:

|Home|

|Emails|

|Documents|

|Projects|

In this scenario i have a table and I want to limit collaboration to the just collaboration and the  other menus categories

Solution:

@Then("^following menu options should be visible for (Collaboration|Sales|Marketing|Activities|Support|All):$")

public void following\_menu\_options\_should\_be\_visisble\_for\_Collaboration**(String menu,List<String> options**) {

* **String menu** represents the 5 menu options ((Collaboration|Sales|Marketing|Activities|Support|Al)
* **List<String>options** represents the tables;

|Home|

* |Emails|
* |Documents|
* |Projects|

How do I use cucumber scenario for DDT?

* In my current project i use Scenario Outline with Examples
* In my scenario feature file, whenever im using a variable as a data driven i use “<variable>”
* Then in Examples:
* |variable| - column name
* |data 1| - row 1
* |data 2|- row 2
* |data 3| - row 3
* How this work is that each row will run the test and scenario will run based on how many row you have in Example

What is Scenario Outline?

* Used for data driven testing
* Have the same cucumber steps but we provide data after the scenario as a table using keyword examples

What is Background?

* Cucumber has their own before method
* The one in hooks is for java
* A step that runs BEFORE a scenario inside the feature file
* Can only put on top, before all scenarios
* Cannot put pipelines in backgrounds
  + Only in scenario outline

How to use Maps in cucumber

* **Using a nonScenario Outline**
* Scenario: Create contact using a map
* Given I logged into suiteCRM
* When I create a new contact:
* | first\_name | John         |
* | last\_name  | Smith  |
* | cell\_phone | 801-888-8889 |
* Then I should see contact information for "John Smith"

Left side is key and right is value - 2 columns only

* **Using a Scenario Outline**
* Scenario Outline: Create contact using a map
* Given I logged into suiteCRM
* When I create a new contact:
* | first\_name | <first\_name>  |
* | last\_name  | <lname> |
* | cell\_phone | <cell\_phone> |
* |office\_phone|<office\_phone>|
* Then I should see contact information for "<first\_name> <lname>"
* Examples:
* |first\_name|lname|cell\_phone|office\_phone|
* |Michael|Jackson|1234567890|2345678891|
* |Bonnie|Garcia|4569871234|4567890987|
* In step def i write;
* @When("^I create a new contact:$")
* public void i\_create\_a\_new\_contact(Map<String,String>contact) {
* // open the create contact dialog
* Works for both scenario

How to use POJO in cucumber?

* Create contactBean class
* Add all variables
* Add the getter/setters
* Create bean feature file
* Create a table with first row containing the variables in the contactBean class
* Add values under the table
* Implement method with parameter (List<ContactBean>contacts)

Scenario: Create contact

   Given I logged into suiteCRM

   When I save a new contact:

**| firstName | lastName | department | officePhone | cellPhone  | email |**

**| Steve     | Gates | IT         | 3456758888 | 1234329999 | SteveGates123@gmail.com |**

   Then I should see contact information for "Steve Gates"

**Java**

What is finalize()?

The finalize() method of an object is called by the Garbage Collector before it removes the object from memory (when there are no references to that object). You can write the object cleanup code in the finalize method.

protected void finalize() throws Throwable {}

* every class inherits the finalize() method from java.lang.Object
* **the method is called by the garbage collector when it determines no more references to the object exist**
* the Object finalize method performs no actions but it may be overridden by any class
* normally it should be overridden to clean-up non-Java resources ie closing a file
* if overridding finalize() it is good programming practice to use a try-catch-finally statement and to always call super.finalize(). This is a safety measure to ensure you do not inadvertently miss closing a resource used by the objects calling class
* protected void finalize() throws Throwable { try { close(); // close open files } finally { super.finalize(); } }
* any exception thrown by finalize() during garbage collection halts the finalization but is otherwise ignored
* finalize() is never run more than once on any object

For example;

class OpenAFile {  
    FileInputStream aFile = null;  
    OpenAFile(String filename) {  
        try {  
            aFile = new FileInputStream(filename);  
        } catch (java.io.FileNotFoundException e) {  
            System.err.println("Could not open file " + filename);  
        }  
    }  
}

To be well behaved, the OpenAFile class should close the file when it is finalized. Here's the finalize method for the OpenAFile class:

protected void finalize () throws Throwable {  
    if (aFile != null) {  
        aFile.close();  
        aFile = null;  
    }  
}

**The problem is that any code that you put into your finalize() method may NOT guaranteed to run so dont put an essential code inside it**

What is system.gc()?

* A request to JVM to run Garbage collector to free up memory
* Doesn't always work

**Java Collection Framework**

Collection

* Two types of Collection (Be careful not to mix them up)
* java.util.Collection - interface from Set and List extend (not implement)
* java.util.Collections - a class that holds static utility methods for use with collections
  + Includes add, remove, contains, size, and iterator, etc.
* Set(Unique things) - DOES NOT ALLOW DUPLICATES
  + Classes that Implement Set
    - HashSet
      * Use when you dont want any duplicates and you dont care about order when you iterate through
      * Unordered
      * Unsorted
    - LinkedHashSet
      * Ordered version of HashSet
      * Use over HashSet when you care about iteration order
    - SortedSet
      * TreeSet
        + Elements will be in ascending order, according to the natural order of the elements
        + Can also customize constructor to implement your own rules of the natural order
* List(list of things) - cares about the index
* Classes that implement List
  + LinkedList
    - Ordered by index position
    - Elements are doubly-linked to one another
    - Good choice for implementing stack and queue
    - Iterates more slowly than arraylist but fast insertion and deletion
  + Vector
    - Same as ArrayList BUT vector methods are synchronized (thread-safe)
  + ArrayList
    - Fast iteration
    - Fast random access
    - ordered(by index)
    - Unsorted (but can invoke Collections.sort() to sort it)

Map(things with unique ID)

* **Important:**none of the Map-related classes and interfaces extend form Collection
  + The implementation classes of Map are thought of “collections”, not Collection
* Classes that implement Map
* Hashtable
  + Same as HashMap BUT HashTable methods are synchronized (REMEMBER. ONLY METHODS ARE SYNCHRONIZED, NOT CLASSES OR VARIABLES)
  + Hashtable won't let you have anything NULL(NO NULLS AT ALL)
* LinkedHashMap
  + Maintains insertion order(or optionally, access order)
  + Slower than Hashmap for adding/removing elements but FASTER ITERATION
* HashMap
  + Unsorted
  + Unordered
  + Allows one null KEY and multiple null values in a collection
* SortedMap
  + TreeMap

The implementation classes of Set,List, and Map can NEVER be both sorted but unordered, can be all other combinations.

HashMap

* KeySet()
* Map.keySet() - returns a set of Keys
* Map.keySet().size - return # of keys

**Version and Release dates of Tools**

Cucumber BDD

* Release date = 2014

**Java**

* What's the difference between IS-A and HAS-A relationship?
* IS-A  is based on inheritance
  + This thing is a type of that thing
* HAS-A relationships are based on usage
  + Ex: class A HAS -A B if code in Class A has a reference to an instance of class B
  + Public Horse{
  + Private Halter myHalter;
  + Public void jump(){
  + Sysout”im jumping”
* You are calling a Halter instance variable to use jump method that is coming from horse class - what this does is that ithis means that Horse HAS-A Halter
* Horse class has a Halter, because Horse declares an instance variable of type Halter.  Wehn code invokes tie() on the Horse object’s Halter instance variable
  + }

Abstract class have constructors while interface dont have one

**SQL**

Relational Database terms

Tuple- a single row

Table - relation

Column - attribute

Field - found at the intersection or a row and a column

* A field with no value in it is called a null value

SQL - Structured query language

* Provide statements for a variety of tasks
  + Querying data
  + Inserting, updating ,deleting rows in a table
  + Creating, replacing, altering, and dropping objects
  + Controlling access to the database and its objects
  + Database consistency and integrity

DML - Data manipulation

* Select
* Insert
* Update
* Delete
* Merge

DDL - Data Definition language

* Create
* Alter
* Drop
* Rename
* Truncate
* Comment

DCL -

* Grant
* Revoke

Transaction Control

* Commit
* Rollback
* Savepoint

SQL Developer

* Development environment (manual testing the database using the queries)
* 2.1 -2009
* 3.0 - 2011
* Release 4.0 - 2013(latest)
* Has a Migration release(1.2)
  + provides users with a single point to browse data in third-party DB and to migrate from these DB to Oracle
* Supports Window, Linux and Mac OS x

SQL clause

* Select
* from

**Writing SQL Statements**

* Statements are not case-sensitive
* Clauses are usually placed on separate lines

Executing SQL statements

* Run Script (f5)

Arithmetic Expressions

* You use the operators in any clause (except the From clause)
* With Date and Timestamp - can only use addition and subtraction
* Add (+)
* Subtract (-)
* Multiply (\*)
* Divide (/)

Null value

* A value that is unavailable, unassigned, unknown, or inapplicable
* Null is not the same as zero or a blank space
  + Zero is a number
  + Blank space is a character
* column s of any data type can contain nulls **but some constraints (not null and primary key) prevents nulls from being used in the column.**
* If any column value in an arithmetic expression is null, the result is null. If you try to divide by 0, you get an error

Column Alias

* Renames a column heading
* The alias heading appear in all uppercase
* As keyword between column name and alias (only in the select clause for As keyword)
* If you are using spaces or special character, or case-sensitive **requires double quotation marks**

**Concatenation operator**

* Links columns or character strings to other columns
* Using ||
* Creates a resultant column that is a character expression
* Null values with concatenation operator
  + If you concatenate a null value with a character string, the result is a character string
    - LAST\_NAME || NULL results in LAST\_NAME.

Literal Character Strings

* Use single quotation with character
  + SELECT last\_name ||**' is a '**||job\_id AS "Employee Details" FROM employees;
* Number you don't need quotation

Alternative quote(q) operator

- • Specify your own quotation mark delimiter.

• Select any delimiter. •

Increase readability and usability.

SELECT department\_name || ' Department' || **q'['s Manager Id: ]'** || manager\_id AS "Department and Manager" FROM departments;

Distinct

* You can specify multiple columns after the DISTINCT qualifier. The DISTINCT qualifier affects all the selected columns, and the result is every distinct combination of the columns.

Describe

* Display the structure of a table
* Ex: DESCRIBE employees
* Null indicates that the values for this column may be unknown. NOT NULL indicates that a column must contain data. Type displays the data type for a column.
* NUMBER(p,s) Number value having a maximum number of digits p, with s digits to the right of the decimal point
* VARCHAR2(s) Variable-length character value of maximum size s
* DATE Date and time value between January 1, 4712 B.C. and December 31, A.D. 9999.
* CHAR(s) Fixed-length character value of size s

Where clause

* Condition (true/false/unknown value)
* The WHERE clause follows the FROM clause.
* The WHERE clause can compare values in columns, literal, arithmetic expressions, or functions.
* It consists of three elements: • Column name • Comparison condition • Column name, constant, or list of values
* You cannot use column alias in the WHERE clause.

Character String and dates

* • Character strings and date values are enclosed with single quotation marks. •
* Character values are case-sensitive and date values are format-sensitive. •
* The default date display format is DD-MON-RR.
* SELECT last\_name, job\_id, department\_id FROM employees WHERE last\_name = 'WHALEN';
* SELECT last\_name FROM employees WHERE hire\_date = '17-FEB-96' ;

Comparison operator

* These operator are used in conditions that compare one expression to another value or expression.
* Used in the where clause

=

>

>=

<

<=

<> -not equal (!= is same thing)

Between….And…

* SELECT last\_name, salary FROM employees WHERE salary BETWEEN 2500(lower limit) AND 3500(higher limit) ;
* MUST SPECIFY LOWER LIMIT FIRST

in(Set) (membership condition)

* Set of OR conditions
* Use the IN operator to test for values in a list:
* SELECT employee\_id, last\_name, salary, manager\_id FROM employees WHERE manager\_id IN (100, 101, 201) ;
* If characters or dates are used in the list, they must be enclosed with single quotation marks ('').

Like

* Operator that performs wildcard searches of valid search string values
* Search conditions can contain either literal characters or numbers:
  + % denotes zero or many characters
  + \_ denotes one character
  + SELECT first\_name FROM employees WHERE first\_name **LIKE 'S%'**
* Combining wildcard characters
  + You can combine the two wildcard characters (%,\_) with literal characters for pattern matching
  + Select last\_name
  + From employees
  + Where last\_name **like ‘\_o%’;**

Is null

* Operator and tests for nulls with the **Is Null** operator
* Select last\_name, manager\_id
* From employees
* Where manager\_id **is null;**

And

* Returns true if both component conditions

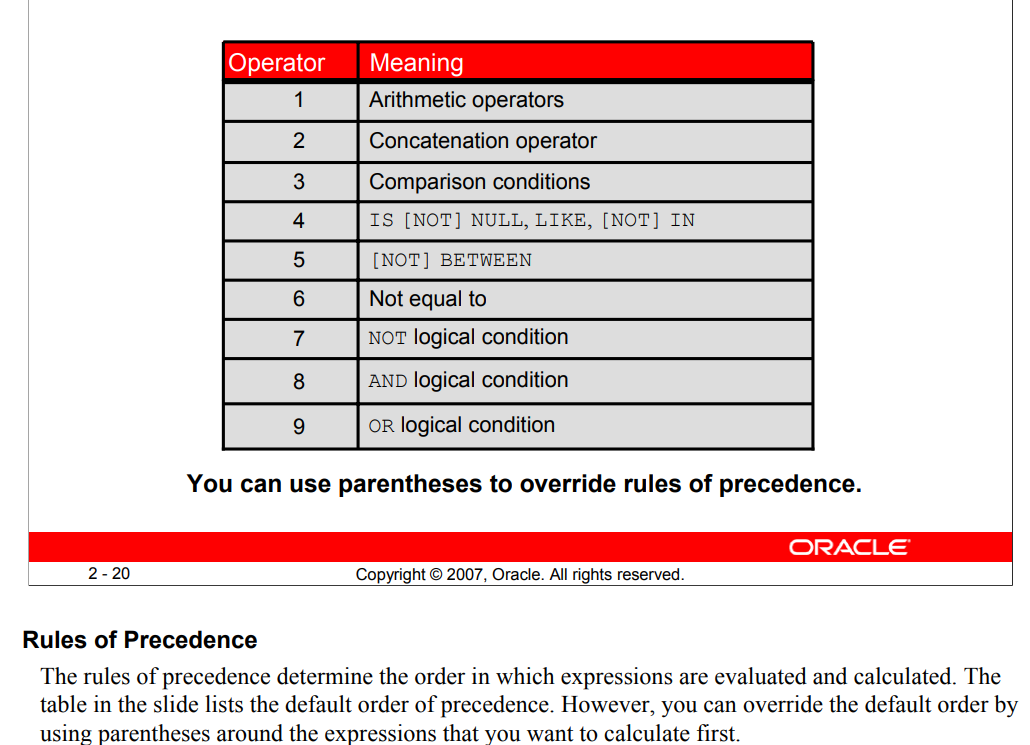
Or

* Returns True if either component condition is true

Not

* Returns true if the condition is false
* select employee\_id, last\_name, job\_id, salary
* from employees
* where job\_id **not** in ('IT\_PROG','FI\_ACCOUNT');

**Order of Precedence**



**API**

What is API?

* Application Programming Interface
  + A messenger that takes requests from one application(client side) (DB) and translate it to another application(server side)(Database)

What is WebServices?

* API going through internet
* Can be ran via internet or locally

What WebServices do you use in your project?

* I use Restful which is Representational State of Transfer and it communicates with XML and JSON but my current project uses JSON

What is JSON?

* It is JavaScript Object Notation
* Basically a lightweight version of XML
* In Key: Value format
* Key is always in double quotes and value if string its double quotes and if numbers no quotes
* It is purely based on http protocol - so it hits the link on the browser and see the results

How and where are you sending request?

* Since i am using Rest, it has endpoints.  My developers create public urls and requests are sent to that url

Do you use any non-web services API

* I use Selenium's API for browser, JDBC for database, and RestAssured for API

How do you test API in your project?

* In my current project we are testing not only our companies api but other external api. For example we use linkedIN api to easily transfer the authorized end user’s info to our database.  As a tester we send a API request and verify the status code, response body and checking the endpoints of the api url is working as expected
  + For example in my project, I also do Positive/Negative testing of API
  + Positive - i am sending valid requests, headers, parameters, and json body and verify that response is 200/201
  + Negative- i am sending invalid requests, headers, parameters, and body, expecting to the status to not be  200

Do you have API documentation website for your API?

* Yes we use swagger for our api documentation and this is where the description and guidelines of API endpoints are

Can All API endpoints use all of the Http protocols?

* It depends, My API developer decides if that url works with GET,POST,PUT, or DELETE requests

How do you manually test your API?

* I use Postman - it is  a REST API client tool that test the REST API URL

What are the types of Request in Rest API?

* There are Get,Post,Put, and Delete requests
* Get read data
* Post creates data
* Put updates data
* Delete deletes data

What are headers in REST API?

* I am using Accept.(ContentType.JSON) type - checks what I am receiving should be in JSON or XML format
* And ContentType.(Contentype.Json) - checks what i am sending should be in JSON format

What is RestAssured Library?

* A nonwebservice that checks

How are you using Enum in your project?

* I am using contentType to make sure that my response type is JSON format

What methods are you using to verify the size of the response data?

* I use Matchers from Hamcrest
  + hasitems()
  + equalTo()

What is JsonPath?

How would I write a method where I need parameter with limit of 100 and path parameter of employee id = 100?

* I would write ;
* .and().params("limit",100)
* .and().pathParams("employee\_id", 110)

How would I use Response interface?

**Reporting**

Mvn Verify will run tests even if it fails (it ignores the failure)

* Waits for all the test to finish
* It ignores failure b.c we have this in our build configuration <testFailureIgnore>true</testFailureIgnore>
* Verify is a Maven lifecycle that comes after test

Mvn test will stop running the test if something fails

The original html report we get is not that great, we need statistical data

Ex; "html:target/cucumber-report"

* Like how many test are pass/failing percentages

We going to use **Cucumber Sandwich (this is a dependency file in pom xml)** for more statistical data reporting

In cukesrunner add; "json:target/cucumber.json"

* It's a html report from a JSON file
  + How this report works is the Json file is used to generate the report
* Version 3.15 (from the vid)
* Add a new build xml in pom (its already in your pom file, the one called TestProject)
  + You will only get this json reporting(cucumber report with graphs and statistics. This report will be only local for YOU to see, not for Jenkins) ONLY if you execute MVN Verify
  + BUT YOU WILL ALWAYS GET A **JSON FILE(different from cucumber report)** AFTER RUNNING THE TEST, EVEN W.O VERIFY
    - This JSON file is very important for Jenkins - for the cucumber report plugin
* TestProject build:
* <id>execution</id>
* <phase>**verify**</phase> - this is why html (json) report will only generate when using verify
* <goals>
* <goal>generate</goal>

</goals>

* The report will also give you a json file
* To run tests using verify, right click pom file and click on maven build…
  + You can also add parameters (like runner variable and value which is the xml file)
* Type in goals: verify

To run this in the command line

* Go to location of pom file and type **mvn verify**
* Syntax is mvn<lifecycle/goal>

Order of Execution using mvn verify

1. Run against the pom file
2. Pom file runs the xml file
3. Xml runs the cukesrunner file
4. Cukesrunner runs the cucumber feature file/test

Does  json cucumber report show screenshot?

**Jenkins**

* Continuous Integration and Deployment tool
* 3 components of Jenkins

1. Code change
   1. Devs makes changes to the application code
2. Test
   1. CI tool automatically picks up the changes and tests the application
3. Deploy
   1. CI tool deploys the application with changes

What is Jenkins job

* Everything is done by creating a job
  + A task that Jenkins performs based on its schedule
  + Made of several steps
  + Can have a trigger that determines when it runs
  + Reports the results of the run automatically

What is continuous Integration?

* Every time the software’s code is changed, it is built and tested automatically

What is continuous deployment?

* Code changes are automatically built, tested, deployed, and prepared for a release to production

Do you maintain Jenkins?

* It is done by Special Team, environment team, architecture team
* But i provide them information of my tests and configuration info and also the emails to send notifications.
  + Git path
  + Mvn code ; goals - compile, or verify -drunner=xml, etc
  + Time schedule for certain tests

If you run your regression test on jenkins, how do you execute it if it automatically runs?

What goes in the regression test?

* Depends on the team, test plan, scope, and business value

How many jobs in Jenkins?

* I personally set up  2-3 jobs for automated tests
  + 1 for smoke
    - Smoke is running daily 2,3 times a day , making sure that all environments are up and running
  + Full regression (running manual and automated tests)?
    - Before each production release(after 3 sprints)
    - Only very stable test cases are stored in full regression
    - Updating functionality
  + Minor regression
    - Runs at the end of sprint
    - Tests that are related to certain modules and functionalities
    - I use tags to specify which module to run

How is code deployed to your environment?

* Devs write the code, test it then is deployed in jenkins from dev to test environment
* What if it doesn't?
  + Talk to your developer and ask them to deploy it

How do you search by tags?

* You can use ctrl-h to open search tool in Eclipse and put the tag name in there and what kind of file it is, like feature.file

**Selenium Grid**

* Gives you the ability to run your automated tests in different browsers(and their different versions) and platforms(basically Operating systems and their versions.Window, Linux, Mac)
* This tool is useful if you have lots of Tests (over 500)
* Instead of doing WebDriver driver=new Chromedriver()
  + Do **WebDriver driver=new RemoteWebDriver(url,capabilities)**
    - Contains 2 parameters in constructors
* How does Selenium Grid work?
  + Grid is a set up that consists of Hub and nodes
  + **Hub** is a central machine that all nodes connect to
    - All laptops are connected to it
    - Has IP address and port number, Then you link the Hub to Nodes
  + Has a main machine which is called a Hub and multiple nodes (the machines that run your actual tests)
  + The order of execution is;
    - Your code>remote driver>Selenium Hub>Selenium nodes (might be multiple ones)
* What are the challenges in multibrowser testing?
  + Something is not clicking
  + Not visible
  + Some items look different in one browser than another browser
* What browsers are you testing?
  + Chrome
  + FireFox
  + IE/Edge
  + Safari
  + Opera
* How do you automate multibrowser testing?

1. Change the browser to something else in my properties file in my framework
   * + When I want to run my tests in different browser
       - Ex; “Browser=chrome” to “Internet Explorer”
     + **This method works if your tests are less than 500 tests**

2. In my framework, I implemented Selenium Grid and I can run tests in different cloud machines using different browsers

How do you set up your selenium grid?

* Our hub and nodes will be set up in Amazon AWS Ec2 machines
* You can ask your hub to run tests and then the hub will find a node and run your test from there
* We can also have hub and multiple nodes in same machine or server
* Each node registers to the HUB with a certain configuration and HUB is aware of the browser available on the node
* When a request comes to the HUB for a specific browser(with Desired capabilities object), the HUB, if found a match for the requested browser, re-directs the call to \*that\* particular GRID Node and then a session is established bidirectionally and execution starts

Where are the cross browser/platform running?

* It is running in Amazon AWS machine where Jenkins is installed.  But normally, company jenkins is used by developers team, devops, deployment team, and QA automation team
  + It is not recommended there
* Ideally is Jenkins>Github>Maven>Runner class>Selenium Hub and run in one of the nodes that is configured in different server
  + In your hooks class, instead of having you webDriver point to a local driver,  change it to a **RemoteDriver();** and have it point to the cloud machine that has the hub

What to do with failed tests?

* Look at the automation execution report
* Find out the reason of failure
* Try to do steps manually, if manual is passing then automation issue
  + So you fix,re-run and see if its passing
* If its application issue
  + Create a defect
    - While the defect is being fixed, i am testing manually using **Ad-hoc test**
    - If the defect is not a **showstopper** then you run other tests and automate
      * If it is, you have to wait, cant do any further testing
    - When rerunning, i use @ReRun tag to test only the test you want to rerun

What is Ad-Hoc test?

* Performed without proper planning and documentation
* Defects found using this method are hard to replicate since there no test cases aligned for those scenarios
* Performed after formal test execution

**SauceLabs - cloud Grid service. Access to multiple Platforms with multiple browsers**

* Provides cloud machine so you can run a lot of
* Does parallel testing well

How to test with SauceLabs?

Usually, we do “WebDriver driver=new FireFoxDriver();

Now we going to do;

* DesiredCapabilities caps=DesiredCapabilities.firefox();

caps.setCapability(“platform”,”Windows 7”);

caps.setCapability(“version”,”38.0”);

WebDriver driver=new RemoteWebDriver(new URL(“<http://YOUR_USERNAME:YOUR_ACCESS_@ondemand.saucelabds.com:80/wd/hub>”,caps)

Steps to run your tests in saucelabs/Any ready selenium Grid

1. Create desiredCapabilities object and specify with type of OS, browser you want your tests to run. Used with selenium Grid.
   1. DesiredCapabilities caps=DesiredCapabilities.firefox();

caps.setCapability(“platform”,”Windows 7”);

caps.setCapability(“version”,”38.0”);

2.  Create RemoteWebDriver with **HUB url:**

WebDriver driver=new RemoteWebDriver(new URL(**URLOFHub),**caps);

3. Create sauceLabsDemo class

* In @BeforeTest
  + DesiredCapabilities(comes from Selenium) caps=DesiredCapabilities.firefox();(chooses which browser)

caps.setCapability(“platform”,”Windows 7”);

caps.setCapability(“version”,”38.0”);

String URL=”<http://YOUR_USERNAME:YOUR_ACCESS_@ondemand.saucelabds.com:80/wd/hub>”

* This is Selenium Hub address

URI= unified resource identifier

URL=unified resource locator

How do you report using SauceLabs?

* I link to my JIRA server

How do you set up Selenium Grid in AWS?

1. 2 cloud servers (Ec2)
   1. 1 will be HUB
   2. 1 will be node
2. In machine 1, download **Selenium StandAloneServer**
   1. It is needed in order to run Remote Selenium WebDriver
      1. A lot of configuration
      2. Use command line
         1. Set up HUB; java -jar selenium-server-standaline-3.5.3.jar - role hub
            1. <http://localhost:444/grid/console>
         2. Set up node1
            1. Java -jar selenium-server-standalone-3.5.3.jar -role node - hub <http://locahost:4444/grid/register>
         3. Node2
            1. Java -jar selenium-server-standaline-3.5.3.jar -role node -hub <http://localhost:4444/gird/register> -port 7777
3. You can also use Visgrid
   1. Download in machine 1
      1. Open jar file
         1. Set max session to 10
         2. Start hub
         3. Port 4444 (where your hub is. You can change it but remember it)
      2. Click Create node
         1. Choose a browser for the node
         2. Type in number of instances
         3. Click Add
            1. Open browser in ec2 machine
            2. Type: localhost:4444 (this is seleniumGrid hub) (Now we just powered up our HUB)
            3. Click on console
            4. Refresh the page
            5. Now it Show nodes ( all in the same machine)
            6. Add another node(now it will show 2 nodes)
      3. Now go to another machine and create nodes from there and link it to HUB
      4. Before going to machine 2
         1. Go to aws console
         2. Go to the instance that hold your hub
            1. Click on security groups = launch wizard
            2. Go to inbound

Add the port number of hub (which is 4444) and save it

* + 1. Go to machine 2
       1. Download same jar file of visgrid you used for 1st machine
       2. Download jdk ( in order to open the file)
       3. Open jar> start hub>create node>click Override HUB(we dont need this hub since we have another one on the first machine)>add machine 1 ip address and port number: 4444>add

How do you run your tests in multiple threads parallely?

* Thread is like one process or instance of application run
* 4 ways

1. We can create multiple cukesrunner with different tags
   1. Ex. cukerunner has tag “@Test”
   2. Smokerunner has @smoke
   3. Regression runner has @Regression
2. Create testng xml and add those runner class under one test
   1. Add all 3 runners in one xml
   2. Then next to verbose=2(on top of xml file) add “parallel=”classes” thread-count=”10”>
3. Then make sure our driver opens a remote WebDriver that is point to hub
   1. Add the code in driver class
4. Run the testng xml by itself or using maven.

**Linux Commands (case-sensitive)**

* **reboot** 
  + reboots system
* **man** 
  + Gives you instruction of the command
  + Ex: “**man reboot**”
* **mikdir**
  + Creates directory(folder)
* **cd** 
  + Change directory
* **ls**
  + List directory content
* **pwd**
  + Print name of the current working directory
  + Gives you exact location
  + Ex: /home/Andy/Desktop
* **ll**
  + Long list format
* **ls -la**
  + Prints files and hidden file
* **clear**
  + Clear screen
* **cd ..**
  + Goes to the parent file (not the root file)
* **cd /**
  + Goes to the parent root file
* **cd ~**
  + Goes to the home of the user file
* **grep**
  + Prints a line matching a pattern
* **df - h**
  + Prints the disk space usage
* **top**
  + Displays linux tasks (like task manager)
* How to create an account
  + User
    - **useradd Andy**
  + Group
    - **groupadd Cybertek**
* Adding a user into group
  + **useradd -G Cybertek Andy**

**- id Andy**

- prints details for this individual (shows it Andy has cybertek)

Configuration/changing the network

* **vi /etc/sysconfig/network**
* **crontab**
  + Sets a timer for your file to run (build schedule like jenkins)
* Setting permissions
  + **chmod**
    - Change file mode bits
    - Order is owner, group , others
      * If the file is folder, d is in the front
      * If not a folder there is no d
  + chmod 777
    - r- read
    - w-write
    - x-execute
    - rwxrwxrwx (777)
    - Gives access to owner,group, and others
    - Very dangerous
    - Do not use
  + Chmod 644
    - -rw-r--r--
    - Give access to owner (read and write),group(read only),others(read only)
    - Default access
    - Standard
  + How to find an file using grep (if you know the name of file)
    - grep ‘name of test failed file’ /home/Andy/Test1/TestScenario (location) > /home/Alex/AutomationFile
      * Now the file is inside this location; /home/Alex/AutomationFile
    - Find any file that has ‘ name’
    - **grep ‘fail scenario’ \***

**Robot**

**AutoIT**

**HP ALM**

**Swagger**

**TomCat**

**Zephyr**

**Xray**

**Sybase**