



BE Computer Laboratory Practice IV(STQA)

Computer Engineering (Savitribai Phule Pune University)



Laboratory Practice IV

Elective IV 410245 (D): Software Testing and Quality Assurance

Assignment No.: - 1

Write TEST Scenario for Gmail Login Page

Test Cases – Login Page

Following is the possible list of functional and non-functional test cases for a login page:

Functional Test Cases:

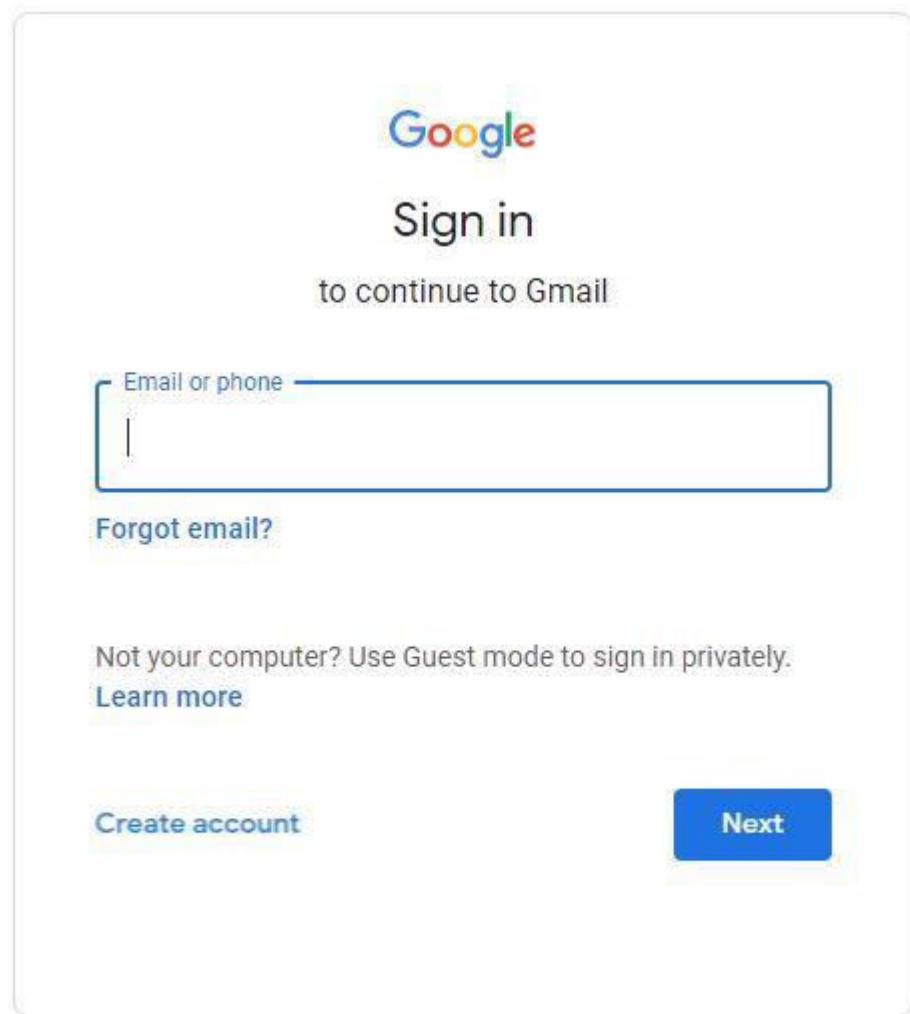
Sr. No.	Functional Test Cases	Type- Negative/ Positive Test Case
1	Verify if a user will be able to login with a valid username and valid password.	Positive
2	Verify if a user cannot login with a valid username and an invalid password.	Negative
3	Verify the login page for both, when the field is blank and Submit button is clicked.	Negative
4	Verify the ‘Forgot Password’ functionality.	Positive
5	Verify the messages for invalid login.	Positive
6	Verify the ‘Remember Me’ functionality.	Positive
7	Verify if the data in password field is either visible as asterisk or bullet signs.	Positive
8	Verify if a user is able to login with a new password only after he/she has changed the password.	Positive
9	Verify if the login page allows to log in simultaneously with different credentials in a different browser.	Positive
10	Verify if the ‘Enter’ key of the keyboard is working correctly on the login page.	Positive
	Other Test Cases	
11	Verify the time taken to log in with a valid username and password.	Performance & Positive Testing
12	Verify if the font, text color, and color coding of the Login page is as per the standard.	UI Testing & Positive Testing
13	Verify if there is a ‘Cancel’ button available to erase the entered text.	Usability Testing
14	Verify the login page and all its controls in different browsers	Browser Compatibility & Positive Testing.

Non-functional Security Test Cases:

Sr. No.	Security test cases	Type- Negative/ Positive Test Case
1	Verify if a user cannot enter the characters more than the specified range in each field (Username and Password).	Negative
2	Verify if a user cannot enter the characters more than the specified range in each field (Username and Password).	Positive
3	Verify the login page by pressing ‘Back button’ of the browser. It should not allow you to enter into the system once you log out.	Negative
4	Verify the timeout functionality of the login session.	Positive
5	Verify if a user should not be allowed to log in with different credentials from the same browser at the same time.	Negative
6	Verify if a user should be able to login with the same credentials in different browsers at the same time.	Positive
7	Verify the Login page against SQL injection attack.	Negative
8	Verify the implementation of SSL certificate.	Positive

We can take an Example of Gmail Login page. Here is the image of it.

Test Cases for Gmail Login page



Sr. No.	Test Scenarios
1	Enter the valid email address & click next. Verify if the user gets an option to enter the password.
2	Don't enter an email address or phone number & just click the Next button. Verify if the user will get the correct message or if the blank field will get highlighted.
3	Enter the invalid email address & click the Next button. Verify if the user will get the correct message.
4	Enter an invalid phone number & click the Next button. Verify if the user will get the correct message.
5	Verify if a user can log in with a valid email address and password.
6	Verify if a user can log in with a valid phone number and password.

Sr. No.	Test Scenarios
7	Verify if a user cannot log in with a valid phone number and an invalid password.
8	Verify if a user cannot log in with a valid email address and a wrong password.
9	Verify the 'Forgot email' functionality.
10	Verify the 'Forgot password' functionality.

Test Scenarios for the Sign-up page

The screenshot shows the 'Create your Google Account' page. At the top, there's a 'Google' logo and the text 'Create your Google Account to continue to Gmail'. Below this, there are input fields for 'First name' (with a placeholder 'John') and 'Last name' (with a placeholder 'Doe'). There's also a 'Username' field containing '@gmail.com' and a note below it saying 'You can use letters, numbers & periods'. Below the username is a 'Password' field and a 'Confirm' field. A note below the password says 'Use 8 or more characters with a mix of letters, numbers & symbols'. There's a checkbox for 'Show password'. At the bottom left is a 'Sign in instead' link, and at the bottom right is a large blue 'Next' button. To the right of the form, there's a graphic of a blue hexagon containing a white person icon, with a laptop, smartphone, and tablet showing Google apps (YouTube, GMail, Google Maps) at its base. Below the graphic is the text 'One account. All of Google working for you.'

English (United States) ▾

Help

Privacy

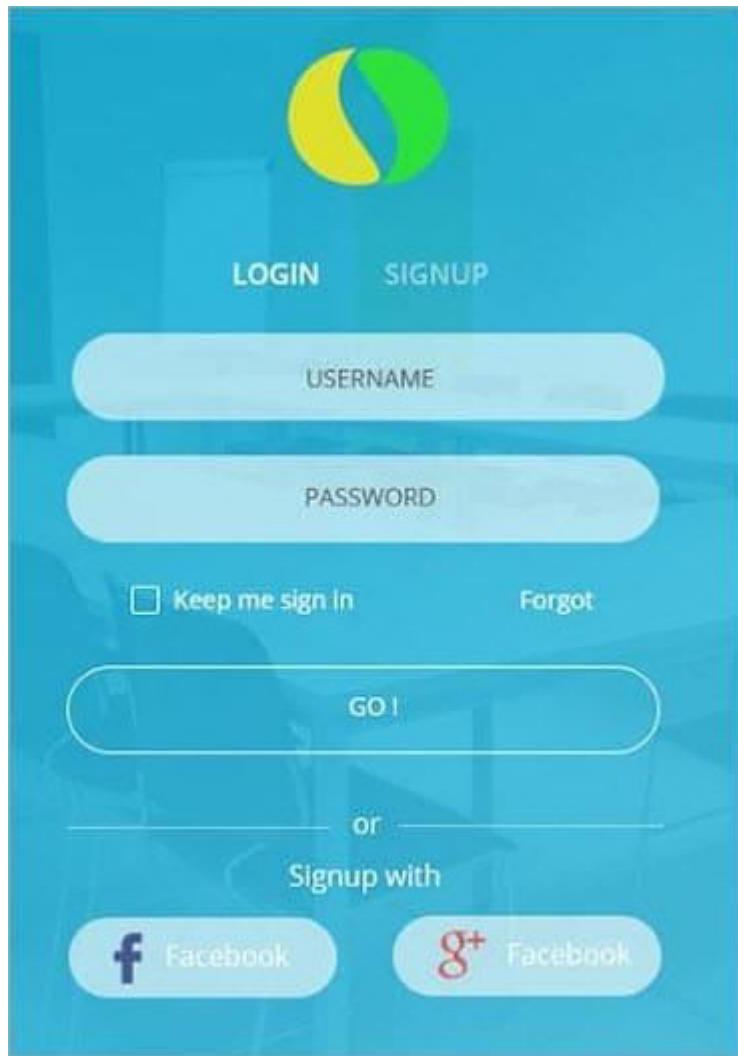
Terms

Test Scenarios for the Sign-up page

- 1) Verify the messages for each mandatory field.

- 2) Verify if the user cannot proceed without filling all the mandatory fields.
- 3) Verify the age of the user when the DOB is selected.
- 4) Verify if the numbers and special characters are not allowed in the First and Last name.
- 5) Verify if a user can sign-up successfully with all the mandatory details.
- 6) Verify if a user can log in with the valid details.
- 7) Verify if the Password and Confirm Password fields are accepting similar strings only.
- 8) Verify if the Password field will prompt you for the weak passwords.
- 9) Verify if duplicate email address will not get assigned.
- 10) Verify that hints are provided for each field on the form, for the ease of use.

Test Scenarios for the Login page of Mobile Application



- 1) Verify if a user can log in with a valid username and password.

- 2) Verify if a user cannot log in with an invalid username or password. Check permutation and combinations of this.
- 3) Verify the ‘Keep me Sign In’ option. If this check box is selected, then the user should not get logged out even after exiting the app.
- 4) Verify if this check box is not selected by default.
- 5) If the user has signed up with Facebook or social media, verify that the user can log in with those credentials or not.
- 6) Verify the Forgot password functionality.
- 7) Verify if the login page fits the mobile screen. The user should not have to scroll the screen.

Conclusion

While writing test cases for login or sign-up page write the test cases for all the fields. There should be a combination of both positive and negative test cases. Try to cover the performance, security, and functional scenarios.

The login page is the page with fewer controls, so even though it is looking simple for testing, it should not be considered as an easy task.

Also many a time it is the first impression of an application, so it should be perfect for user interface and usability.

Assignment No.: - 2

Test Scenario for Gmail – Inbox Functionality

Test Case for Gmail – Inbox Functionality

- 1) Verify that a newly received email is displayed as highlighted in the Inbox section.
- 2) Verify that a newly received email has correctly displayed sender email Id or name, mail subject and mail body(trimmed to a single line).
- 3) Verify that on clicking the newly received email, the user is navigated to email content.
- 4) Verify that the email contents are correctly displayed with the desired source formattting.
- 5) Verify that any attachments are attached to the email and are downloadable.
- 6) Verify that the attachments are scanned for viruses before download.
- 7) Verify that all the emails marked as read are not highlighted.
- 8) Verify that all the emails read as well as unread have a mail read time appended at the end on the email list displayed in the inbox section.
- 9) Verify that count of unread emails is displayed alongside ‘Inbox’ text in the left sidebar of Gmail.
- 10) Verify that unread email count increases by one on receiving a new email.
- 11) Verify that unread email count decreases by one on reading an email (marking an email as read).
- 12) Verify that email recipients in cc are visible to all users.
- 13) Verify that email recipients in bcc are not visible to the user.
- 14) Verify that all received emails get piled up in the ‘Inbox’ section and get deleted in cyclic fashion based on the size availability.
- 15) Verify that email can be received from non-Gmail email Ids like – yahoo, Hotmail etc.

Test Cases for GMail – Compose Mail Functionality

- 1) Verify that on clicking ‘Compose’ button, a frame to compose a mail gets displayed.
- 2) Verify that user can enter email Ids in ‘To’, ‘cc’ and ‘bcc’ sections and also user will get suggestions while typing the emailIds based on the existing emailIds in user’s email list.
- 3) Verify that the user can enter multiple comma-separated emailIds in ‘To’, ‘cc’ and ‘bcc’ sections.
- 4) Verify that the user can type Subject line in the ‘Subject’ textbox.
- 5) Verify that the user can type the email in the email-body section.
- 6) Verify that users can format mail using editor-options provided like choosing font-family, font-size, bold-italic-underline, etc.
- 7) Verify that the user can attach file as an attachment to the email.
- 8) Verify that the user can add images in the email and select the size for the same.
- 9) Verify that after entering emailIds in either of the ‘To’, ‘cc’ and ‘bcc’ sections, entering Subject line and mail body and clicking ‘Send’ button, mail gets delivered to intended receivers.
- 10) Verify that sent mails can be found in ‘Sent Mail’ sections of the sender.
- 11) Verify that mail can be sent to non-gmail emailIds also.
- 12) Verify that all sent emails get piled up in the ‘Sent Mail’ section and get deleted in cyclic fashion based on the size availability.
- 13) Verify that the emails composed but not sent remain in the draft section.
- 14) Verify the maximum number of email recipients that can be entered in ‘To’, ‘cc’ and ‘bcc’ sections.

- 15) Verify the maximum length of text that can be entered in the ‘Subject’ textbox.
- 16) Verify the content limit of text/images that can be entered and successfully delivered as mail body.
- 17) Verify the maximum size and number of attachment that can be attached with an email.
- 18) Verify that only the allowed specifications of the attachment can be attached with an email/
- 19) Verify that if the email is sent without Subject, a pop-up is generated warning user about no subject line.
Also,

20) Verify that on accepting the pop-up message, the user is able to send the email.

Assignment No.: - 3

Write Test cases in excel sheet for Social Media application or website

Sample Test Case Template With Test Case Examples

Every day I keep on getting several requests for a Test Case Template. I'm surprised that many testers are still documenting test cases with Word docs or Excel files.

Most of them prefer excel spreadsheets because they can easily group test cases by test types and most importantly they can easily get test metrics with Excel formulas. But I'm sure that as the volume of your tests goes on increasing, you will find it extremely difficult to manage.

If you are not using any Test case management tool, then I would strongly recommend you to use an open-source tool to manage and execute your test cases.

Test case formats may vary from one organization to another. However, using a standard test case format for writing test cases is one step closer to setting up a testing process for your project.

It also minimizes Ad-hoc testing that is done without proper test case documentation. But even if you use standard templates, you need to set up test cases writing, review & approve, test execution and most importantly test report preparation process, etc. by using manual methods.

Also, if you have a process to review the test cases by the business team, then you must format these test cases in a template that is agreed by both the parties.

Recommended Tools

Before continuing with the Test case writing process, we recommend downloading these Test case management tools. This will ease your test plan and test case writing process mentioned in this tutorial.

1) TestRail

TestRail is a web-based tool for test cases and test management. It helps QA and development teams with the efficient management of test cases, plans, and runs. It gives centralized test management, powerful reports & metrics, and increased productivity. It is a scalable and customizable solution. It can be used by small as well as large teams.

Features:

- 1) TestRail makes tracking test results easier.
- 2) It seamlessly gets integrated with bug trackers, automated tests, etc.
- 3) Personalized to-do lists, filters, and email notifications will help with boosting productivity.
- 4) Dashboards and activity reports are for easy tracking and following the status of individual tests, milestones, and projects.

2) Katalon Studio

Katalon Studio is an all-in-one, simple automation tool for web, API, mobile, and desktop trusted by over 850,000 users.

It simplifies automation for those without a coding background to create automation test cases from manual tests' steps, a rich library of project templates, record & playback, and a friendly UI.

3) Testiny

Testiny – a new, straightforward test management tool, but much more than just a slimmed-down app.

Testiny is a fast-growing web application built on the latest technologies and aims to make manual testing and QA management as seamless as possible. It is designed to be extremely easy to use. It helps testers perform tests without adding bulky overhead to the testing process.

Don't just take our word for it, take a look at Testiny yourself. Testiny is perfect for small to mid-sized QA teams looking to integrate manual and automated testing into their development process.

Features:

- 1) Free for open-source projects and small teams with up to 3 people.
- 2) Intuitive and simple out of the box.
- 3) Easily create and handle your test cases, test runs, etc.
- 4) Powerful integrations (e.g. Jira, ...)
- 5) Seamless integration in the development process (linking requirements and defects)
- 6) Instant updates – all browser sessions stay in sync.
- 7) Immediately see if a colleague has made changes, completed a test, etc.
- 8) Powerful REST API.
- 9) Organize your tests in a tree structure – intuitive and easy.

Standard Fields of a Sample Test Case Template

There are certain standard fields that need to be considered while preparing a Test case template.

Project Name:	
Test Case Template	
Test Case ID: Fun_10	Test Designed by: <Name>
Test Priority (Low/Medium/High): Med	Test Designed date: <Date>
Module Name: Google login screen	Test Executed by: <Name>
Test Title: Verify login with valid username and	Test Execution date: <Date>

password	
Description: Test the Google login page	
Pre-conditions: User has valid username and password	
Dependencies:	

Step	Test Steps	Test Data	Expected Result	Actual Result	Status (Pass/Fail)	Notes
1	Navigate to login page	User= example@gmail.com	User should be able to login	User is navigated to dashboard with successful login	Pass	
2	Provide valid username	Password: 1234				
3	Provide valid password			login		
4	Click on Login button					

Post-conditions:

User is validated with database and successfully login to account. The account session details are logged in database.

Several standard fields for a sample Test Case template are listed below.

- 1) Test case ID: Unique ID is required for each test case. Follow some conventions to indicate the types of the test. For Example, ‘TC_UI_1’ indicating ‘user interface test case #1’.

- 2) Test priority (Low/Medium/High): This is very useful during test execution. Test priorities for business rules and functional test cases can be medium or higher, whereas minor user interface cases can be of a low priority. Testing priorities should always be set by the reviewer.
 - 3) Module Name: Mention the name of the main module or the sub-module.
 - 4) Test Designed By: Name of the Tester.
 - 5) Test Designed Date: Date when it was written.
 - 6) Test Executed By Name of the Tester who executed this test. To be filled only after test execution.
 - 7) Test Execution Date: Date when the test was executed.
 - 8) Test Title/Name: Test case title. For example, verify the login page with a valid username and password.
 - 9) Test Summary/Description: Describe the test objective in brief.
 - 10) Pre-conditions: Any prerequisite that must be fulfilled before the execution of this test case. List all the pre-conditions in order to execute this test case successfully.
 - 11) Dependencies: Mention any dependencies on other test cases or test requirements.
- 12) Test Steps: List all the test execution steps in detail. Write test steps in the order in which they should be executed. Make sure to provide as many details as you can.
- 13) Test Data: Use of test data as an input for this test case. You can provide different data sets with exact values to be used as an input.
- 14) Expected Result: What should be the system output after test execution? Describe the expected result in detail including the message/error that should be displayed on the screen.
- 15) Post-condition: What should be the state of the system after executing this test case?
- 16) Actual result: The actual test result should be filled after test execution. Describe the system behavior after test execution.
- 17) Status (Pass/Fail): If the actual result is not as per the expected result, then mark this test as failed. Otherwise, update it as passed.
- 18) Notes/Comments/Questions: If there are any special conditions to support the above fields, which can't be described above or if there are any questions related to expected or actual results then mention them here.
- Add the following fields if necessary:**
- 1) Defect ID/Link: If the test status fails, then include the link to the defect log or mention the defect number.
 - 2) Test Type/Keywords: This field can be used to classify tests based on test types. For Example, functional, usability, business rules, etc.

- 3) Requirements: Requirements for which this test case is being written for. Preferably the exact section number in the requirement doc.
- 4) Attachments/References: This field is useful for complex test scenarios in order to explain the test steps or expected results using a Visio diagram as a reference. Provide a link or location to the actual path of the diagram or document.
- 5) Automation? (Yes/No): Whether this test case is automated or not. It is useful to track automation status when test cases are automated.

One More Test Case Format (#2)

The test cases will differ depending upon the functionality of the software that it is intended for. However, given below is a template that you can always use to document the test cases without bothering about what your application is doing?

Test Scenario ID			Test Case ID				
Test Case Description		I	Test Priority				
Pre-Requisite			Post-Requisite				
Test Execution Steps:							
S.No	Action	Inputs	Expected Output	Actual Output	Test Browser	Test Result	Test Comments

Sample Test Cases

Based on the above template, below is an example that showcases the concept in a much understandable way. Let's assume that you are testing the login functionality of any web application, say Facebook.

An ideal test case template

Below is a template which you can always use for documenting the test cases without bothering with what your application is doing.

Test Scenario ID			Test Case ID				
Test Case Description			Test Priority				
Pre-Requisite			Post-Requisite				
Test Execution Steps:							
S.No	Action	Inputs	Expected Output	Actual Output	Test Browser	Test Result	Test Comments

Example Scenario

Based on the above template, below is an example that showcases the concepts in a more understandable way.

Suppose you are testing the login functionality of any web application, say Facebook. Below are the test cases for the same:

Test Scenario ID	Login-1	Test Case ID	Login-1A
Test Case Description	Login – Positive test case	Test Priority	High
Pre-Requisite	A valid user account	Post-Requisite	NA

Test Execution Steps:

S.N o	Action	Inputs	Expected Output	Actual Output	Test Browser	Test Result	Test Comments
1	Launch application	https://www.facebook.com/	Facebook home	Facebook home	IE -11	Pass	[Priya 12/17/2016 11:44 AM]: Launch successful
2	Enter correct Email & Password and hit login button	Email id : test@xyz.com Password: *****	Login success	Login success	IE -11	Pass	[Priya 12/17/2016 11:45 AM]: Login successful

Test Scenario ID	Login-1	Test Case ID	Login-1B
Test Case Description	Login – Negative test case	Test Priority	High
Pre-Requisite	NA	Post-Requisite	NA

Test Execution Steps:

S.No	Action	Inputs	Expected Output	Actual Output	Test Browser	Test Result	Test Comments
1	Launch	https://www.facebook.com/	Facebook	Faceboo	IE -11	Pass	[Priya 12/17/2016

	application	ok.com/	home	k home			11:44 AM]: Launch successful
2	Enter invalid Email & any Password and hit login button	Email id : invalid@xyz.com Password: *****	The email address or phone number that you've entered doesn't match any account. Sign up for an account.	The email address or phone number that you've entered doesn't match any account. Sign up for an account.	IE -11	Pass	[Priya 12/17/2016 11:45 AM]: Invalid login attempt stopped
3	Enter valid Email & incorrect Password and hit login button	Email id : valid@xyz.com Password: *****	The password that you've entered is incorrect. Forgotten password ?	The password that you've entered is incorrect . Forgotten password?	IE -11	Pass	[Priya 12/17/2016 11:46 AM]: Invalid login attempt stopped

Samples from a Live Project

Below is examples from a live project that demonstrates how all the above listed tips and tricks are actually implemented:

1	Test Scenario Group	Test Case Id	Test Case Description	Test Env	Test Input	Expected Result	Actual Result	Test Browser	Executed Date	Test Results	Executed Date	Test Results	Defect Status
2	Search	Search-1	Search for Patient only in Copia										
3	Search	Search-2	Search for Patient only in IMS										
4	Search	Search-3	Search for Patient in both Copia & IMS										
5	Search	Search-4	Search by first name										
6	Search	Search-5	Search by last name										
7	Search	Search-6	Search by patient id										
8	Search	Search-7	Search with partial name										
9	Search	Search-8	Search with partial patient id										
10	Search	Search-9	Update Patient profile a) address flow from HRA to IMS										
11	Search	Search-10	Search recent history										
12	Search	Search 11	Search on different first name & lastname gives lastname										
13	HRA	HRA-1	Edit patient profile on search page										
14		HRA-2	Verify all HRA data flowed to IMS										
15													
16													
17													

Summary Bugs IMS-Search Interaction Quick Actions HRA Personal Health History ... + : 4 |

1	Timestamp	Description	Which Page?	Issue Type	Screenshot	Urgency	Browser	Re-test Date	Testing Comments
2	2/7/13 17:08	Clicking on enter after entering data closes the modal Steps: a) Click on 'Create New Patient' b) Enter patient name and click enter c) Create patient modal is closed	Login	Error or Bug	None	Medium	Firefox	2/21/2013	Pending
3									
4									
5									
6									
7									
8									
9									
10									
11									
12									
13									
14									
15									
16									
17									
18									
19									
20									
21									
22									
23									

Summary Bugs IMS-Search Interaction Quick Actions HRA Personal Health History ... + : 4 |

1	Test Scenario Group	Test Case Id	Test Case Description	Test Input	Expected Result	Actual Result	Test Browser	Executed Date	Test Results
2	Health records								
3	Personal								
4	Health History	PH 1	High Cholesterol:	a) Yes and on medication b) Yes but not on medication	how old were you at time of dx? how old were you at time of dx?	how old were you at time of dx? how old were you at time of dx?	Chrome,IE, Firefox Chrome,IE, Firefox		
5		PH 2	High Blood Pressure:	a) Yes and on medication b) Yes but not on medication	what does your blood pressure range, on average? what does your blood pressure range, on average?	what does your blood pressure range, on average? what does your blood pressure range, on average?	Chrome,IE, Firefox Chrome,IE, Firefox		
6				a) Yes and on medication b) Yes but not on medication	what does your blood pressure range, on average? what does your blood pressure range, on average?	what does your blood pressure range, on average? what does your blood pressure range, on average?	Chrome,IE, Firefox Chrome,IE, Firefox		
7				a) Yes and on medication b) Yes but not on medication	how old were you at time of dx? how old were you at time of dx?	how old were you at time of dx? how old were you at time of dx?	Chrome,IE, Firefox Chrome,IE, Firefox		
8				a) Yes and on medication b) Yes but not on medication	how old were you at time of dx? how old were you at time of dx?	how old were you at time of dx? how old were you at time of dx?	Chrome,IE, Firefox Chrome,IE, Firefox		
9		PH 3	Diabetes:	a) Yes and on medication b) Yes but not on medication	how old were you at time of dx? how old were you at time of dx?	how old were you at time of dx? how old were you at time of dx?	Chrome,Firefox Chrome,Firefox		
10				a) Yes and on medication b) Yes but not on medication	what type of dm do you have? what type of dm do you have?	what type of dm do you have? what type of dm do you have?	Chrome,Firefox Chrome,Firefox		
11							Chrome,Firefox		
12									

Assignment No.: - 4

Create Defect Report for Any application or web application

Sample Bug Report

The Sample, Bug/Defect Report given below will give you an exact idea of how to report a Bug in the Bug Tracking Tool?

Here is an Example scenario that caused a Bug:

Let's assume that in your application under test you want to create a new user with user information, for that you need to login into the application and navigate to the USERS menu -> New User, then enter all the details in the 'User form' like, First Name, Last Name, Age, Address, Phone etc.

Once you enter all this information, you need to click on the 'SAVE' button in order to save the user. Now you can see a successful message saying, "New User has been created successfully".

But when you entered into your application by logging in and you have navigated to the USERS menu -> New user, entered all the required information to create the new user and clicked on SAVE button.

BANG! The application crashed and you got one error page on the screen. (Capture this error message window and save it as a Microsoft paint file)

Now, this is a Bug scenario and you would like to report this as a BUG in your Bug-Tracking Tool.

How Will You Report This Bug Effectively?

Sample Bug Report

Here is a sample Bug Report for the above-mentioned example:

(Note that some 'Bug Report' fields might differ depending on your bug tracking system)

SAMPLE BUG REPORT

Bug Name: Application crashes upon clicking the SAVE button while creating a new user.

Bug ID: (It will be automatically created by the BUG Tracking tool once you save this bug).

Area Path: USERS menu -> New Users

Build Number: Version Number 5.0.1

Severity: HIGH (High/Medium/Low) or 1

Priority: HIGH (High/Medium/Low) or 1

Assigned to: Developer-X

Reported By: Your Name

Reported On: Date

Reason: Defect

Status: New/Open/Active (Depends on the Tool you are using)

Environment: Windows 2003/SQL Server 2005

Description: Application crashes upon clicking the SAVE button while creating a new user, hence unable to create a new user in the application.

Steps to Reproduce:

- 1) Login into the Application.
- 2) Navigate to the Users Menu -> New User
- 3) Filled out all the user information fields.
- 4) Clicked on the ‘Save’ button.
- 5) Seen an error page “ORA1090 Exception: Insert values Error...”
- 6) See the attached logs for more information (Attach more logs related to the bug..IF any)
- 7) Also see the attached screenshot of the error page.

Expected Result: On clicking the SAVE button, you should be prompted to a successful message “New User has been created successfully”.

(Attach ‘application crash’ screenshot. IF any)

Save the Defect/Bug in the BUG TRACKING TOOL. You will get a Bug ID that you can use for further bug reference.

Default ‘New Bug’ mail will go to the respective developer and the default module owner (Team leader or manager) for further action.

How To Write A Good Bug Report? Tips And Tricks

Why a good Bug Report?

If your Bug report is effective, then its chances of getting fixed are higher. So fixing a bug depends upon how effectively you report it. Reporting a bug is nothing but a skill and in this tutorial we will explain how to achieve this skill.

“The point of writing a problem report (bug report) is to get bugs fixed” – By Cem Kaner. If a tester is not reporting a bug correctly, then the programmer will most likely reject this bug stating it as irreproducible. This can hurt the tester’s morals and sometimes the ego too. (I suggest not to keep any type of ego. ego’s like “I have reported the bug correctly”, “I can reproduce it”, “Why has he/she rejected the bug?”, “It’s not my fault” etc.,).

Qualities of a Good Software Bug Report

Anyone can write a Bug report. But not everyone can write an effective Bug report. You should be able to distinguish between an average bug report and a good bug report.

How to distinguish between a good and bad Bug Report? It's very simple, apply the following characteristics and techniques to report a bug.

Characteristics and Techniques

#1) Having a clearly specified Bug Number: Always assign a unique number to each bug report. This, in turn, will help you identify the bug record. If you are using any automated bug-reporting tool then this unique number will be generated automatically each time you report a bug.

Note the number and a brief description of each bug that you reported.

#2) Reproducible: If your bug is not reproducible, then it will never get fixed.

You should clearly mention the steps to reproduce the bug. Do not assume or skip any reproducing steps. The bug which is described Step by step is easy to reproduce and fix.

#3) Be Specific: Do not write an essay about the problem.

Be Specific and to the point. Try to summarize the problem in minimum words yet in an effective way. Do not combine multiple problems even if they seem to be similar. Write different reports for each problem.

Effective Bug Reporting

Bug reporting is an important aspect of Software Testing. Effective Bug reports communicate well with the development team to avoid confusion or miscommunication.

Good Bug report should be **clear and concise** without any missing key points. Any lack of clarity leads to misunderstanding and slows down the development process as well. Defect writing and reporting is one of the most important but neglected areas in the testing life cycle.

Good writing is very important for filing a bug. The most important point that a tester should keep in mind is **not to use a commanding tone** in the report. This breaks morale and creates an unhealthy work relationship. Use a suggestive tone.

Don't assume that the developer has made a mistake and hence you can use harsh words. Before reporting, it is equally important to check if the same bug has been reported or not.

A **duplicate bug** is a burden in the testing cycle. Check out the whole list of known bugs. At times, the developers may be aware of the issue and ignore it for future releases. Tools like Bugzilla, which automatically searches for duplicate bugs, can also be used. However, it is best to manually search for any duplicate bug.

The import information that a bug report must communicate is **“How?” and “Where?”** The report should clearly answer exactly how the test was performed and where the defect occurred. The reader should easily reproduce the bug and find out where the bug is.

Keep in mind that the **objective of writing a Bug report** is to enable the developer to visualize the problem. He/She should clearly understand the defect from the Bug report. Remember to provide all the relevant information that the developer is seeking.

Also, bear in mind that a bug report would be preserved for future use and should be well written with the required information. **Use meaningful sentences and simple words** to describe your bugs. Don't use confusing statements that waste the time of the reviewer.

Report each bug as a separate issue. In case of multiple issues in a single Bug report, you can't close it unless all the issues are resolved.

Hence, it is best to **split the issues into separate bugs**. This ensures that each bug can be handled separately. A well-written bug report helps a developer to reproduce the bug at their terminal. This will help them diagnose the issue as well.

How To Report A Bug?

Use the following simple Bug report template:

This is a simple Bug report format. It may vary depending upon the Bug report tool that you are using. If you are writing a bug report manually then some fields need to be mentioned specifically like the Bug number – which should be assigned manually.

Reporter: Your name and email address.

Product: In which product you found this bug.

Version: The product version, if any.

Component: These are the major sub-modules of the product.

Platform: Mention the hardware platform where you found this bug. The various platforms like 'PC', 'MAC', 'HP', 'Sun' etc.

Operating system: Mention all the operating systems where you found the bug. Operating systems like Windows, Linux, Unix, SunOS, and Mac OS. Also, mention the different OS versions like Windows NT, Windows 2000, Windows XP etc, if applicable.

Priority: When should a bug be fixed? Priority is generally set from P1 to P5. P1 as "fix the bug with the highest priority" and P5 as "Fix when time permits".

Severity: This describes the impact of the bug.

Types of Severity:

- **Blocker:** No further testing work can be done.
- **Critical:** Application crash, Loss of data.
- **Major:** Major loss of function.
- **Minor:** Minor loss of function.
- **Trivial:** Some UI enhancements.
- **Enhancement:** Request for a new feature or some enhancement in the existing one.

Status: When you are logging the bug into any bug tracking system then by default the bug status will be 'New'.

Later on, the bug goes through various stages like Fixed, Verified, Reopen, Won't Fix, etc.

Assign To: If you know which developer is responsible for that particular module in which the bug occurred, then you can specify the email address of that developer. Else keep it blank as this will assign the bug to the module owner, if not the Manager will assign the bug to the developer. Possibly add the manager's email address to the CC list.

URL: The page URL on which the bug occurred.

Summary: A brief summary of the bug, mostly within 60 words or below. Make sure your summary is reflecting on what the problem is and where it is.

Description: A detailed description of the bug.

Use the following fields for the description field:

- **Reproduce steps:** Clearly, mention the steps to reproduce the bug.
- **Expected result:** How the application should behave on the above-mentioned steps.
- **Actual result:** What is the actual result of running the above steps i.e. the bug behavior.

These are the important steps in the bug report. You can also add "Report Type" as one more field which will describe the bug type.

Report Types include:

- 1) Coding error
- 2) Design error
- 3) New Suggestion
- 4) Documentation issue
- 5) Hardware problem

Important Features in Your Bug Report

Given below are the important features in the Bug report:

#1) Bug Number/id

A Bug number or an identification number (like swb001) makes bug reporting and the process of referring to bugs much easier. The developer can easily check if a particular bug has been fixed or not. It makes the whole testing and retesting process smoother and easier.

#2) Bug Title

Bug titles are read more often than any other part of the bug report. This should explain all about what comes in the bug. The Bug title should be suggestive enough that the reader can understand it. A clear bug title makes it easy to understand and the reader can know if the bug has been reported earlier or has been fixed.

#3) Priority

Based on the severity of the bug, a priority can be set for it. A bug can be a Blocker, Critical, Major, Minor, Trivial, or a suggestion. Bug priorities can be given from P1 to P5 so that the important ones are viewed first.

#4) Platform/Environment

OS and browser configuration is necessary for a clear bug report. It is the best way to communicate how the bug can be reproduced.

Without the exact platform or environment, the application may behave differently and the bug at the tester's end may not replicate on the developer's end. So it is best to clearly mention the environment in which the bug was detected.

#5) Description

Bug description helps the developer to understand the bug. It describes the problem encountered. A poor description will create confusion and waste the time of the developers as well as testers.

It is necessary to communicate clearly about the effect of the description. It's always helpful to use complete sentences. It is a good practice to describe each problem separately instead of crumpling them altogether. Don't use terms like "I think" or "I believe".

#6) Steps to Reproduce

A good Bug report should clearly mention the steps to reproduce. These steps should include actions that may cause the bug. Don't make generic statements. Be specific on the steps to follow.

A good example of a well-written procedure is given below

Steps:

- Select product Abc01.
- Click on Add to cart.
- Click Remove to remove the product from the cart.

#7) Expected and Actual Result

A Bug description is incomplete without the Expected and Actual results. It is necessary to outline what the outcome of the test is and what the user should expect. The reader should know what the correct outcome of the test is. Clearly, mention what happened during the test and what the outcome was.

#8) Screenshot

A picture is worth a thousand words. Take a Screenshot of the instance of failure with proper captioning to highlight the defect. Highlight unexpected error messages with light red color. This draws attention to the required area.

Some Bonus Tips To Write A Good Bug Report

Given below are some additional tips on how to write a good Bug report:

#1) Report the problem immediately

If you find any bugs while testing, then you do not need to wait to write a detailed bug report later. Instead, write a bug report immediately. This will ensure a good and reproducible Bug report. If you decide to write the Bug report later on then there is a higher chance to miss the important steps in your report.

#2) Reproduce the bug three times before writing a Bug report

Your bug should be reproducible. Make sure that your steps are robust enough to reproduce the bug without any ambiguity. If your bug is not reproducible every time, then you can still file a bug mentioning the periodic nature of the bug.

#3) Test the same bug occurrence on other similar modules

Sometimes the developer uses the same code for different similar modules. So there is a higher chance for the bug in one module to occur in other similar modules as well. You can even try to find the more severe version of the bug you found.

#4) Write a good bug summary

Bug summary will help the developers to quickly analyze the bug's nature. A poor quality report will unnecessarily increase development and testing time. Communicate well with your bug report summary. Keep in mind that the bug summary can be used as a reference to search for the bug in the bug inventory.

#5) Read the Bug report before hitting the Submit button

Read all the sentences, wordings and steps that are used in the bug report. See if any sentence is creating ambiguity that can lead to misinterpretation. Misleading words or sentences should be avoided in order to have a clear bug report.

#6) Do not use abusive language.

It's nice that you did a good work and found a bug but do not use this credit for criticizing the developer or to attack any individual.

Sample Bug Reports For Web And Product Applications

Bug report sample 1: Web Project bug report

Summary: In CTR (Click through ratio) 'Total' row calculation is wrong

Product: Example product

Version: 1.0

Platform: PC

URL: (Provide url of page where bug occurs)

OS/Version: Windows 2000

Status: NEW

Severity: Major

Priority: P1

Component: Publisher stats

Assigned To: developer@example.com

Reported By: tester@example.com

CC: manager@example.com

Bug Description:**Reproduce steps:**

- 1) Go to page: (Provide URL of page where bug occurs)
- 2) Click on ‘Publisher stats’ link to view publisher’s revenue detail stats date wise.
- 3) On page (Provide URL of page where bug occurs) check CTR value in ‘Total’ row of CTR stats table.
Actual result: Calculation of ‘Total’ row in CTR table is wrong. Also Individual row CTR for each publisher is not truncated to 2 digits after decimal point. It’s showing CTR like 0.042556767
Expected result: Total CTR= (Total clicks/Total searches)*100

[Attach bug screenshot if any]

Please fix the bug.

Sample bug report 2: Application product Bug report sample**Application testing scenario:**

Lets assume in your application you want to create a new user with his/her information, for that you need to logon into the application and navigate to USERS menu > New User, then enter all the details in the User form like, First Name, Last Name, Age, Address, Phone etc. Once you enter all these need to click on SAVE button in order to save the user and you can see a success message saying, “New User has been created successfully”. Now you entered into your application by logging in and navigate to USERS menu > New user, entered all the information and clicked on SAVE button and now the application crashed and you can see one error page on the screen, now you would like to report this BUG.

Now here is how we can report bug for above scenario:

Bug Name: Application crash on clicking the SAVE button while creating a new user.

Bug ID: The BUG Tracking tool will automatically create it once you save this.

Area Path: USERS menu > New Users

Build Number:/Version Number 5.0.1

Severity: HIGH (High/Medium/Low)

Priority: HIGH (High/Medium/Low)

Assigned to: Developer-X

Created By: Your Name

Created On: Date

Reason: Defect

Status: New/Open/Active – Depends on the Tool you are using

Environment: Windows 2003/SQL Server 2005

Description:

Application crash on clicking the SAVE button while creating a new user, hence unable to create a new user in the application.

Steps To Reproduce:

- 1) Logon into the application
- 2) Navigate to the Users Menu > New User
- 3) Filled all the fields
- 4) Clicked on ‘Save’ button
- 5) Seen an error page “ORA1090 Exception: Insert values Error...”
- 6) See the attached logs for more information
- 7) And also see the attached screenshot of the error page.

Expected: On clicking SAVE button should be prompted to a success message “New User has been created successfully”.

Save the defect/bug in the BUG TRACKING TOOL.

Assignment No.: - 5

Installation of Selenium grid and selenium Web driver java eclipse (automation tools).

Managing user experience is pivotal for software development. Test automation enables user preferences and convenience to remain at the center of the development process while saving time and effort. That is why comprehensive automation testing has become necessary to retain customers and meet their expectations. With significantly shorter time frames for development, Selenium Testing, in particular, has become an integral part of the development to facilitate automated testing of web applications.

Selenium is the most popular automated tool in existence today. 59.5% of people consider Selenium for Cross Browser Testing because of the robustness and flexibility it offers by supporting multiple languages like Java, C#, Python, Perl, Ruby, etc. However, a majority (67%) of the Selenium users prefer Java as their language for Selenium Testing.

This article discusses how to configure Selenium in Eclipse to use Selenium for Java.

Table of Contents

- Prerequisites for configuring Selenium in Eclipse
- How to configure Selenium in Eclipse
- Conclusion

Prerequisites for configuring Selenium in Eclipse

Install Java
Download Java SE Development Kit 16.0.2 according to the Windows, Linux, or macOS platform being used.

Java SE Development Kit 16.0.2

This software is licensed under the [Oracle Technology Network License Agreement for Oracle Java SE](#)

Product / File Description	File Size	Download
Linux ARM 64 RPM Package	144.87 MB	jdk-16.0.2_linux-aarch64_bin.rpm
Linux ARM 64 Compressed Archive	160.73 MB	jdk-16.0.2_linux-aarch64_bin.tar.gz
Linux x64 Debian Package	146.17 MB	jdk-16.0.2_linux-x64_bin.deb
Linux x64 RPM Package	153.01 MB	jdk-16.0.2_linux-x64_bin.rpm
Linux x64 Compressed Archive	170.04 MB	jdk-16.0.2_linux-x64_bin.tar.gz
macOS Installer	166.6 MB	jdk-16.0.2_osx-x64_bin.dmg
macOS Compressed Archive	167.21 MB	jdk-16.0.2_osx-x64_bin.tar.gz
Windows x64 Installer	150.58 MB	jdk-16.0.2_windows-x64_bin.exe
Windows x64 Compressed Archive	168.8 MB	jdk-16.0.2_windows-x64_bin.zip

Source

Run the JDK Installer by double-clicking on the file name in the download location and following the instructions on the instruction wizard. Alternatively, silently install JDK by entering the following command:

```
jdk.exe /s
```

Install Eclipse IDE

The Eclipse Installer 2021-06 R now includes a JRE for macOS, Windows and Linux.



Get Eclipse IDE 2021-06

Install your favorite desktop IDE packages.

Download x86_64

[Download Packages](#) | [Need Help?](#)

Tool Platforms



Eclipse Che

Eclipse Che is a developer workspace server and cloud IDE.



A modern, open source software development environment that runs in the cloud.

Install Selenium

Download and Install Selenium to be set up in Eclipse.

Install Browser Driver

For Cross Browser Testing, download the relevant Browser Driver – ChromeDriver (for Chrome), GeckoDriver (for Firefox), SafariDriver(for Safari), and InternetExplorerDriver and MSEdgeDriver (IE and Edge respectively). Place these Browser Driver files in a directory that is part of the environment PATH. This will allow a command-line call to the programs to execute them irrespective of the working directory.

Install Java Language Bindings

Version 3.141.59 (2018)

Changelog

API Docs

The screenshot shows the Selenium website's language bindings section. It features five cards, each representing a programming language:

- C#**: Shows the C# logo (a purple hexagon with a white 'C#' symbol). Below it, it says "Stable: 3.14.0 (August 02, 2018)" and "Beta: 4.0.0-beta4 (June 07, 2021)". Buttons for "Changelog" and "API Docs" are present.
- Ruby**: Shows the Ruby logo (a red gem-like icon). Below it, it says "Stable: 3.142.6 (October 04, 2019)" and "Beta: 4.0.0beta4 (June 07, 2021)". Buttons for "Changelog" and "API Docs" are present.
- Java**: Shows the Java logo (a stylized flame icon). Below it, it says "Stable: 3.141.59 (November 14, 2018)" and "Beta: 4.0.0-beta-4 (June 07, 2021)". Buttons for "Changelog" and "API Docs" are present.
- Python**: Shows the Python logo (a blue and yellow snake icon). Below it, it says "Stable: 3.141.0 (November 01, 2018)" and "Beta: 4.0.0.b4 (June 07, 2021)". Buttons for "Changelog" and "API Docs" are present.
- JavaScript**: Shows the JS logo (a yellow square with the letters 'JS' in black). Below it, it says "Stable: 3.6.0 (October 06, 2017)" and "Beta: 4.0.0-beta.4 (June 07, 2021)". Buttons for "Changelog" and "API Docs" are present.

How to configure Selenium in Eclipse

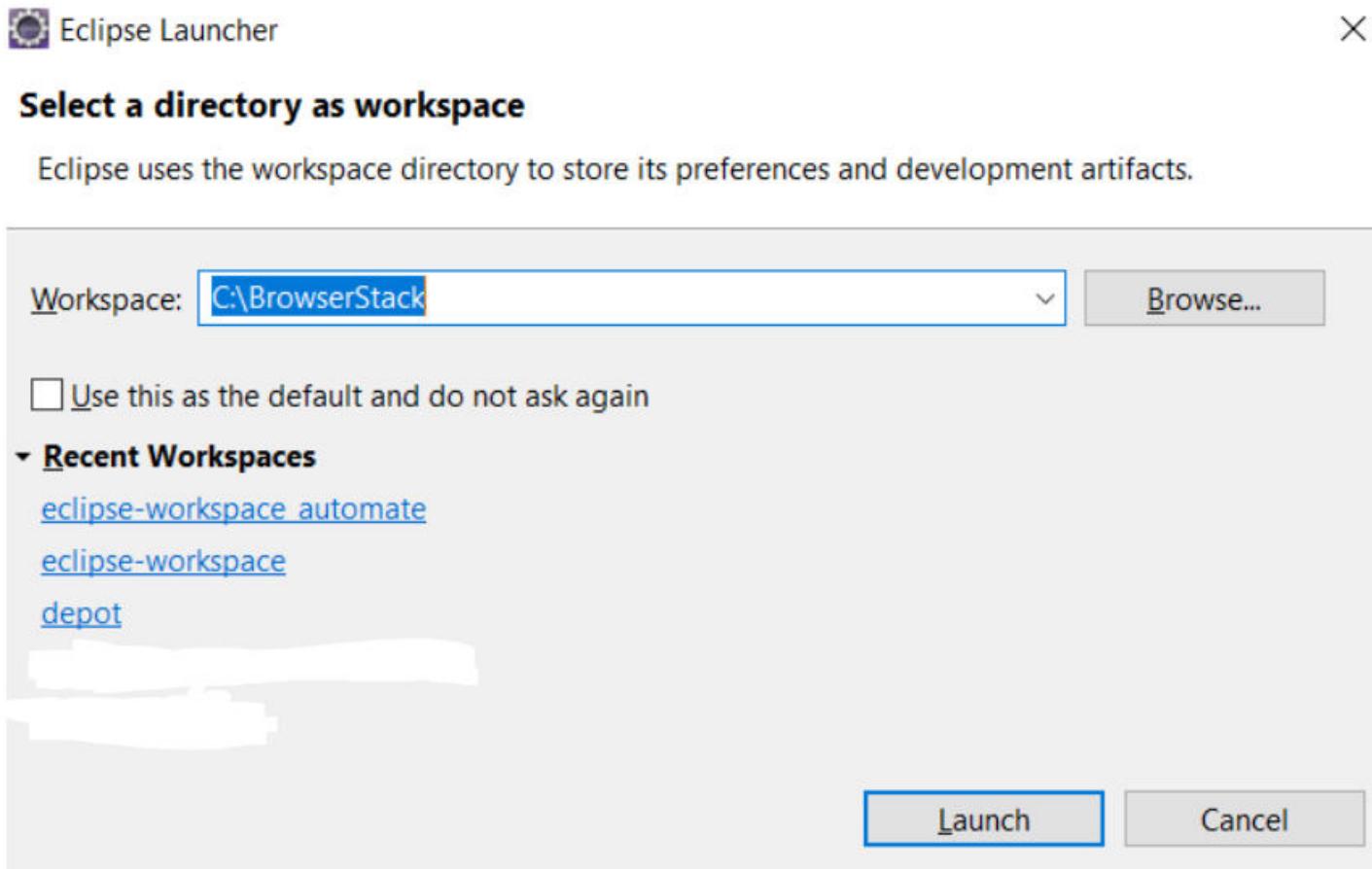
Here are the steps to configure Selenium Webdriver with Eclipse:

Step 1: Launch Eclipse

To launch Eclipse double click on the eclipse.exe file in the download location.

Step 2: Create Workspace in Eclipse

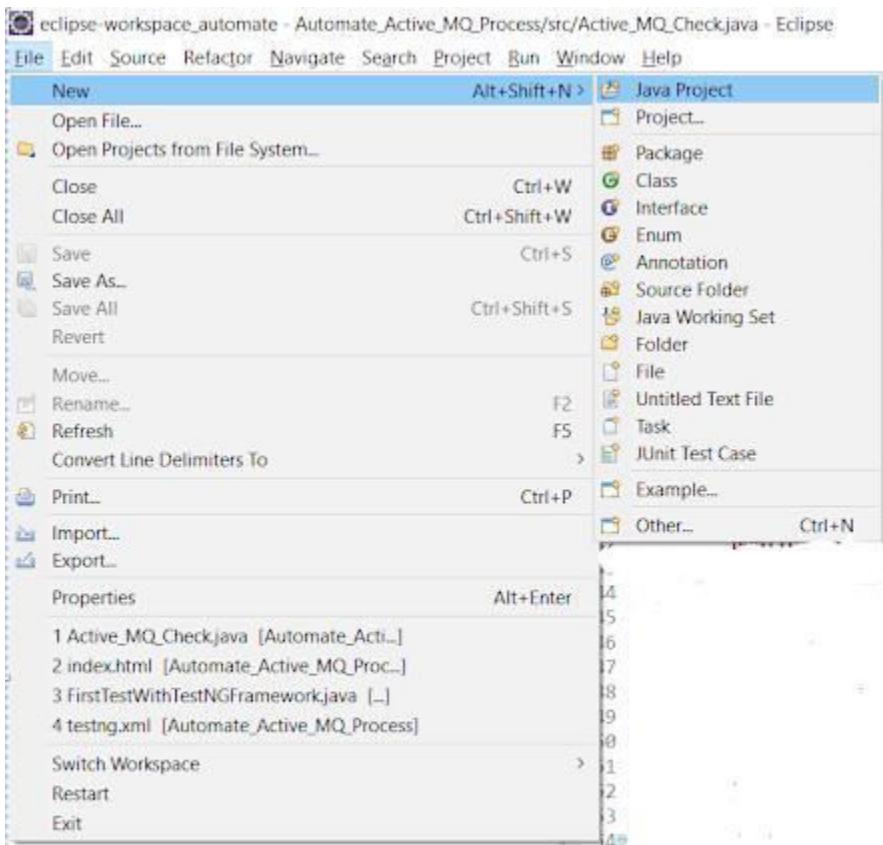
This workspace named “C:\BrowserStack” is like any other folder, which will store all the test scripts. Launch the BrowserStack workspace.



Creating Workspace in Eclipse

Step 3: Create New Java Project in the BrowserStack Workspace

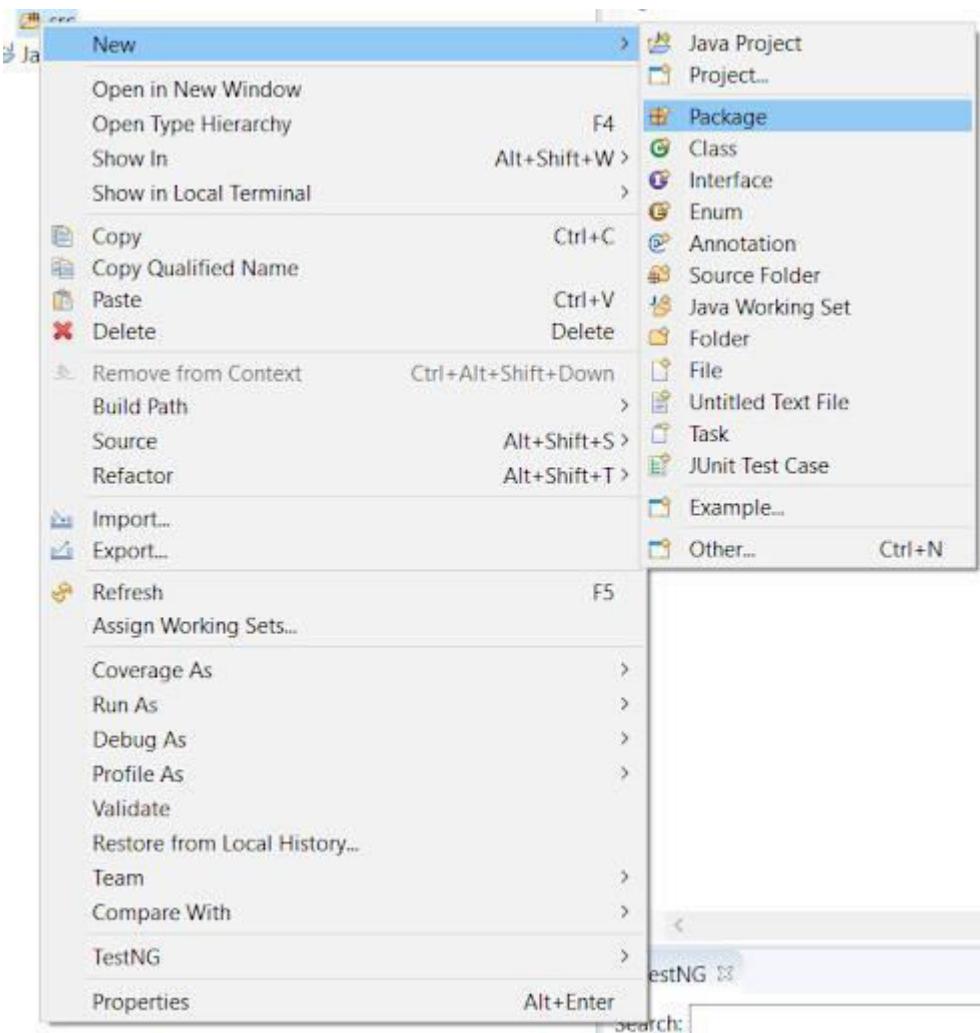
Create a new Java Project by clicking on File > New > Java Project and name it.



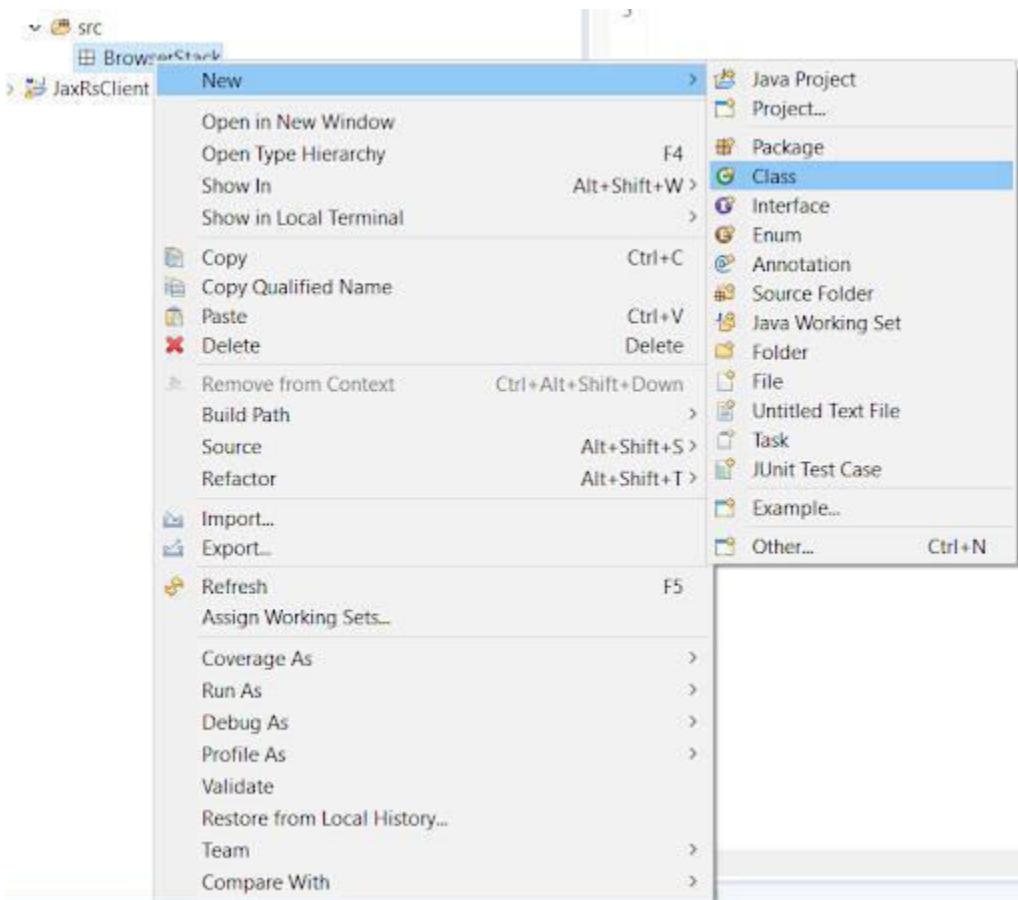
Creating a new Java Project

Step 4: Create Package and Class under the Java Project

By clicking on the src folder (which is the source folder), create a new package and name it (BrowserStack). Then right-click on the package name and create a class.



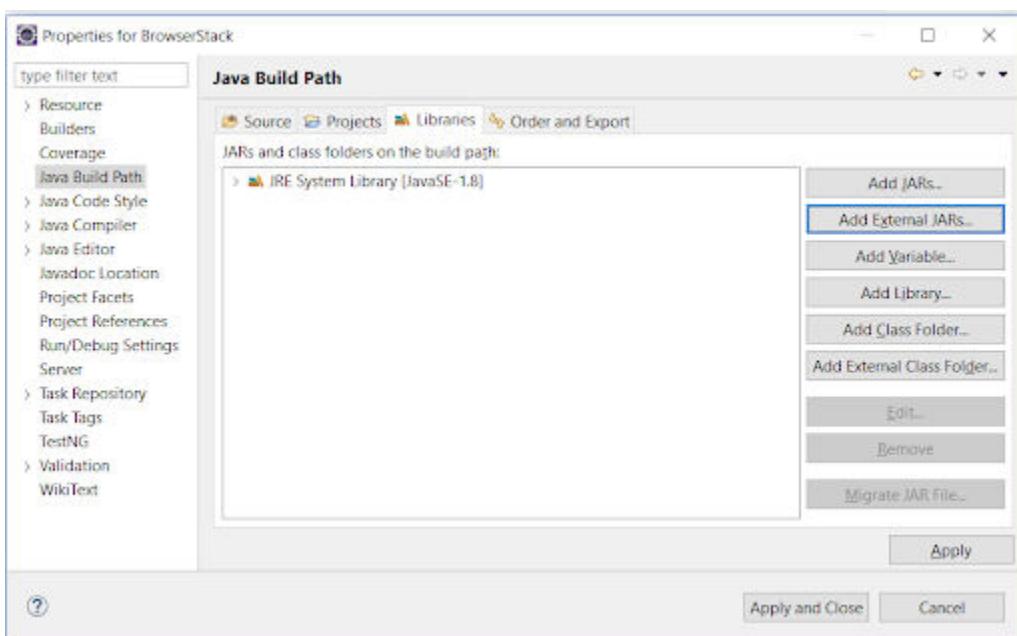
Creating Package in the Java Project



Creating Class in the BrowserStack Package

Step 5: Add Selenium JARs to the Java Project in Eclipse

To add the Selenium Jars to the BrowserStack Java right click on the BrowserStack Project folder and select the Properties option. In the properties window, click on the Java Build Path and Add External JARs. Browse and add the downloaded Selenium JARs i.e. Client Combined JAR and all the JARs under the Libs folder, then click Apply and Close.



Adding Selenium JARs in the BrowserStack Project

This configures Selenium with Eclipse, making it ready to execute the first test script.

Conclusion

Automation testing using Selenium with Java has simplified software development. Being an open-source tool, it provides an opportunity to speed up the time of execution and remove errors for a better user experience.

Java is quite popular among the developers, given the extensive support being available, making it a preferred choice as a Selenium Client Language Binding. Selenium with Java has proved helpful in optimizing regression testing and cross browser testing. With the support of Continuous Integration tools like Jenkins, Selenium with Java can be used in continuous delivery models.

However, to make testing more efficient and get accurate results every time, all Selenium tests must be run on real browsers and devices for accurate results. Start running tests on 2000+ real browsers and devices on BrowserStack's real device cloud. Run parallel tests on its Cloud Selenium Grid to get faster results without compromising on accuracy. Identify all bugs and offer a high-end UX/UI to the users by running automated tests in real user conditions with BrowserStack Automate.

STQA Mini Project No. 1

1.1 Title

Mini-Project 1: Create a small application by selecting relevant system environment/platform and programming languages. Narrate concise Test Plan consisting features to be tested and bug taxonomy. Prepare Test Cases inclusive of Test Procedures for identified Test Scenarios. Perform selective Black-box and White-box testing covering Unit and Integration test by using suitable Testing tools. Prepare Test Reports based on Test Pass/Fail Criteria and judge the acceptance of application developed.

1.2 Problem Definition:

Perform Desktop Application testing using Automation Tool like JUnit generate Test Report by Using tool like Apache Maven.

1.3 Prerequisite:

Knowledge of Core Java, Basic Concepts of Unit Testing, Test Cases Writing using Junit etc tool

1.4 Software Requirements:

JDK 1.8, Eclipse java photon-R version, TestNG

1.5 Hardware Requirement:

PIV, 2GB RAM, 500 GB HDD, Lenovo A13-4089Model.

1.6 Learning Objectives:

We are going to learn how to Prepare Test Cases inclusive of Test Procedures for identified Test Scenarios.

Perform selective Black-box and White-box testing covering Unit and Integration test by using suitable Testing tools. also Prepare Test Reports based on Test Pass/Fail Criteria

1.7 Outcomes:

You are able to understand Unit and Integration testing with Tool with Test Report.

1.8 Theory Concepts:

1.8.1 What is Unit Testing?

Unit Testing of software applications is done during the development (coding) of an application.

The objective of Unit Testing is to isolate a section of code and verify its correctness. In procedural programming a unit may be an individual function or procedure

The goal of Unit Testing is to isolate each part of the program and show that the individual parts are correct. Unit Testing is usually performed by the developer.

1.8.2 Unit Testing Tools

There are several automated tools available to assist with unit testing. We will provide a few examples below:

1. [**Jtest**](#): Parasoft Jtest is an IDE plugin that leverages open-source frameworks (JUnit, Mockito, PowerMock, and Spring) with guided and easy one-click actions for creating, scaling, and maintaining unit tests. By automating these time-consuming aspects of unit testing, it frees the

developer to focus on business logic and create more meaningful test suites.

2. [JUnit](#): JUnit is a free to use testing tool used for Java programming language. It provides assertions to identify test method. This tool test data first and then inserted in the piece of code.
3. [NUnit](#): NUnit is widely used unit-testing framework use for all .net languages. It is open source tool which allows writing scripts manually. It supports data-driven tests which can run in parallel.
4. [JMockit](#): JMockit is open source Unit testing tool. It is code coverage tool with line and path metrics. It allows mocking API with recording and verification syntax. This tool offers Line coverage, Path Coverage, and Data Coverage.
5. [EMMA](#): EMMA is an open-source toolkit for analyzing and reporting code written in Java language. Emma support coverage types like method, line, basic block. It is Java-based so it is without external library dependencies and can access to the source code.
6. [PHPUnit](#): PHPUnit is a unit testing tool for PHP programmer. It takes small portions of code which is called units and test each of them separately. The tool also allows developers to use pre-define assertion methods to assert that system behave in a certain manner.

Those are just a few of the available unit testing tools. There are lots more, especially for C languages and Java, but you are sure to find a unit testing tool for your programming needs regardless of the language you use.

1.8.3 Extreme Programming & Unit Testing

Unit testing in Extreme Programming involves the extensive use of testing frameworks. A unit test framework is used in order to create automated unit tests. Unit testing frameworks are not unique to extreme programming, but they are essential to it. Below we look at some of what extreme programming brings to the world of unit testing:

- Tests are written before the code
- Rely heavily on testing frameworks
- All classes in the applications are tested
- Quick and easy integration is made possible

1.8.4 Bug taxonomy

Bug taxonomies help in providing fast and effective feedback so that they can easily identify possible reasons for failure of the software. Using bug taxonomy, a large number of potential bugs can be grouped into few categories.

Whenever a new bug is reported, using bug taxonomy, a tester can easily analyse and put that bug into any of these categories.

At the end of testing, Testers can understand the type of categories of bugs that frequently occurred and thereby in successive rounds of testing he can focus on writing more test cases that would help to detect such bugs. In addition, test leaders can guide their testers to focus on such frequently occurring bugs.

The summary of the Bug Taxonomy is given below,

- Requirements, Features, and Functionality Bugs
- Structural Bugs
- Data Bugs
- Coding Bugs
- Interface, Integration, and System Bugs
- Test and Test Design Bugs
- Testing and Design Style

1.8.5 What is Integration Testing?

In integration Testing, individual software modules are integrated logically and tested as a group. A typical software project consists of multiple software modules, coded by different programmers. integration Testing focuses on checking data communication amongst these modules. Hence it is also termed as 'I & T' (Integration and Testing), 'String Testing' and sometimes 'Thread Testing

Integration Test Case:

Integration [Test Case](#) differs from other test cases in the sense it **focuses mainly on the interfaces & flow of data/information between the modules**. Here priority is to be given for the **integrating links** rather than the unit functions which are already tested.

Sample Integration Test Cases for the following scenario: Application has 3 modules say 'Login Page', 'Mail box' and 'Delete mails' and each of them are integrated logically.

Here do not concentrate much on the Login Page testing as it's already been done in [Unit Testing](#). But check how it's linked to the Mail Box Page.

Similarly Mail Box: Check its integration to the Delete Mails Module.

Test Case ID	Test Case Objective	Test Case Description	Expected Result
1	Check the interface link between the Login and Mailbox module	Enter login credentials and click on the Login button	To be directed to the Mail Box
2	Check the interface link between the Mailbox and Delete Mails Module	From Mail box select the an email and click delete button	Selected email should appear in the Deleted/Trash folder

1.8.6 Desktop Application Testing by Using Junit Tool

What is Junit?

JUnit is a framework for implementing testing in Java.

It provides a simple way to explicitly test specific areas of a Java program, it is extensible and can be employed to test a hierarchy of program code either singularly or as multiple units.

Why use a testing framework? Using a testing framework is beneficial because it forces you to explicitly declare the expected results of specific program execution routes. When debugging it is possible to write a

test which expresses the result you are trying to achieve and then debug until the test comes out positive. By having a set of tests that test all the core components of the project it is possible to modify specific areas of the project and immediately see the effect the modifications have on the other areas by the results of the test, hence, side-effects can be quickly realized.

JUnit promotes the idea of first testing then coding, in that it is possible to setup test data for a unit which defines what the expected output is and then code until the tests pass. It is believed by some that this practice of "test a little, code a little, test a little, code a little..." increases programmer productivity and stability of program code whilst reducing programmer stress and the time spent debugging.

JUnit is a simple open source Java testing framework used to write and run repeatable automated tests. It is an instance of the xUnit architecture for unit testing framework. Eclipse supports creating test cases and running test suites, so it is easy to use for your Java applications.

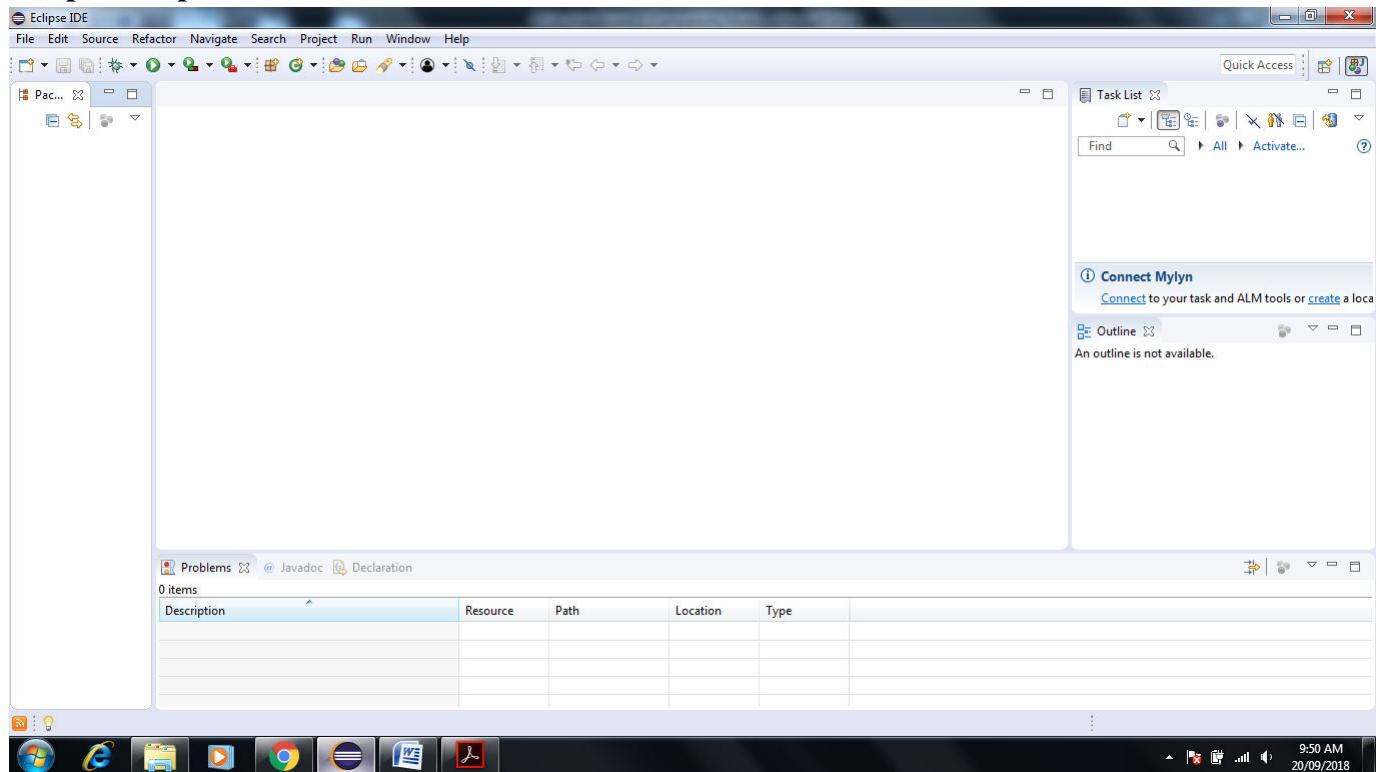
JUnit features include:

- Assertions for testing expected results
- Test fixtures for sharing common test data
- Test suites for easily organizing and running tests
- Graphical and textual test runners

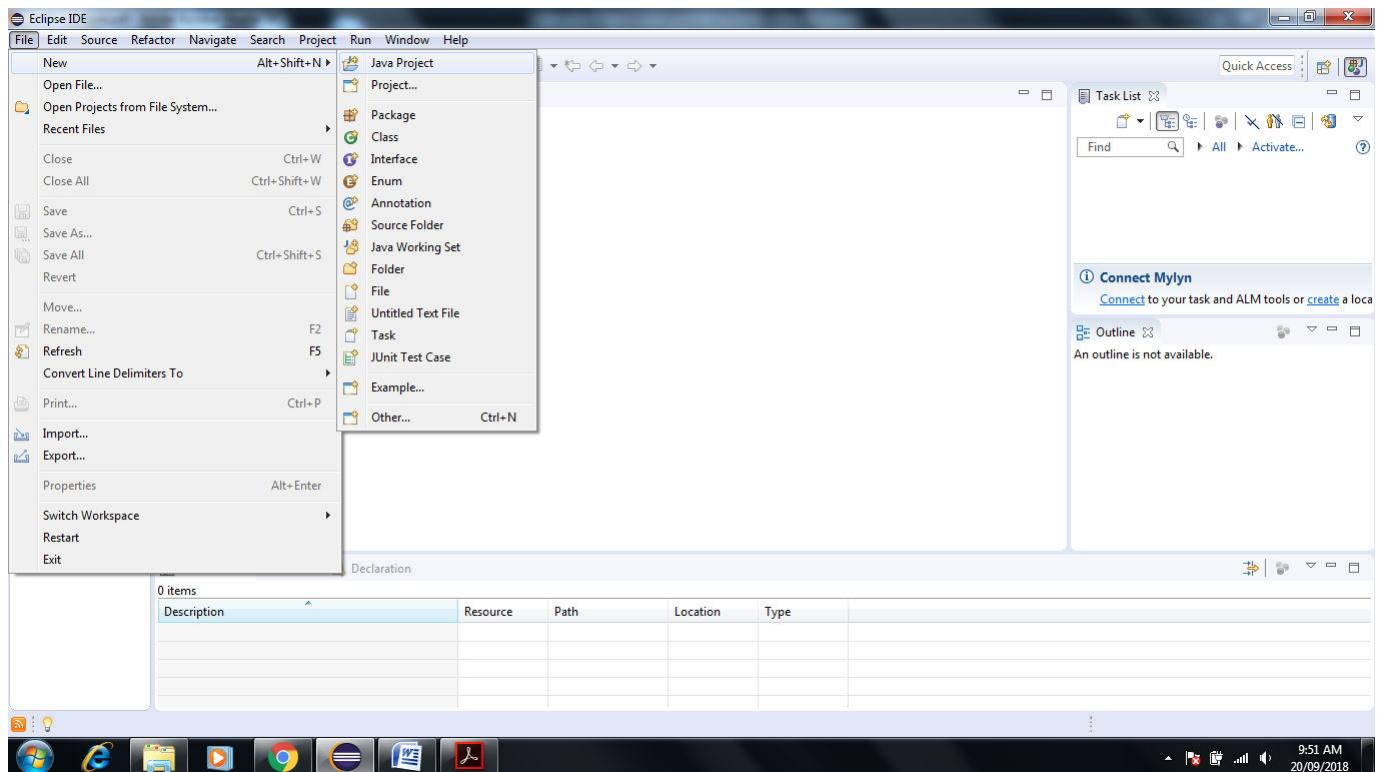
1.8.7 How to Create Simple Junit Test in Eclipse IDE

1. Download JDK 1.8 and Eclipse latest version here we are using [eclipse-java-photon-R-win32](#).

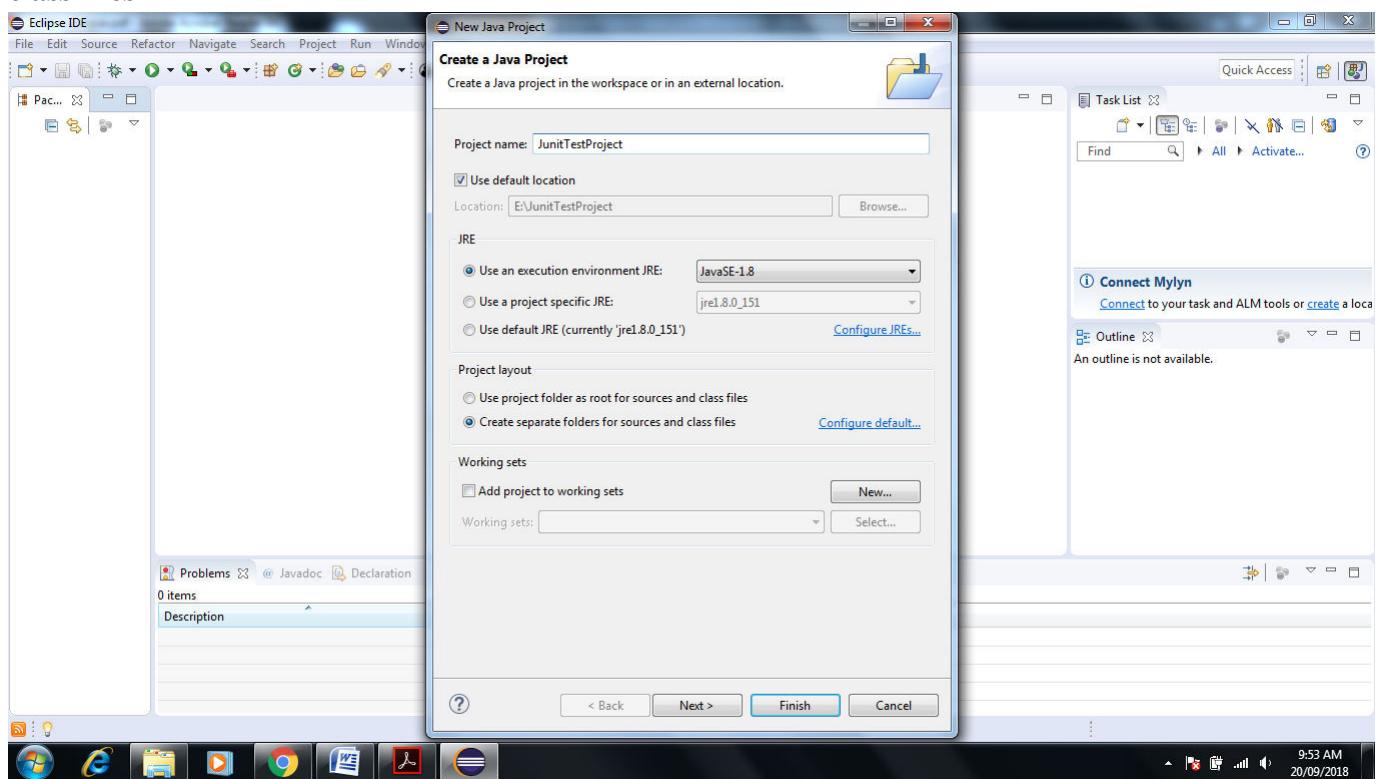
2. Open Eclipse IDE



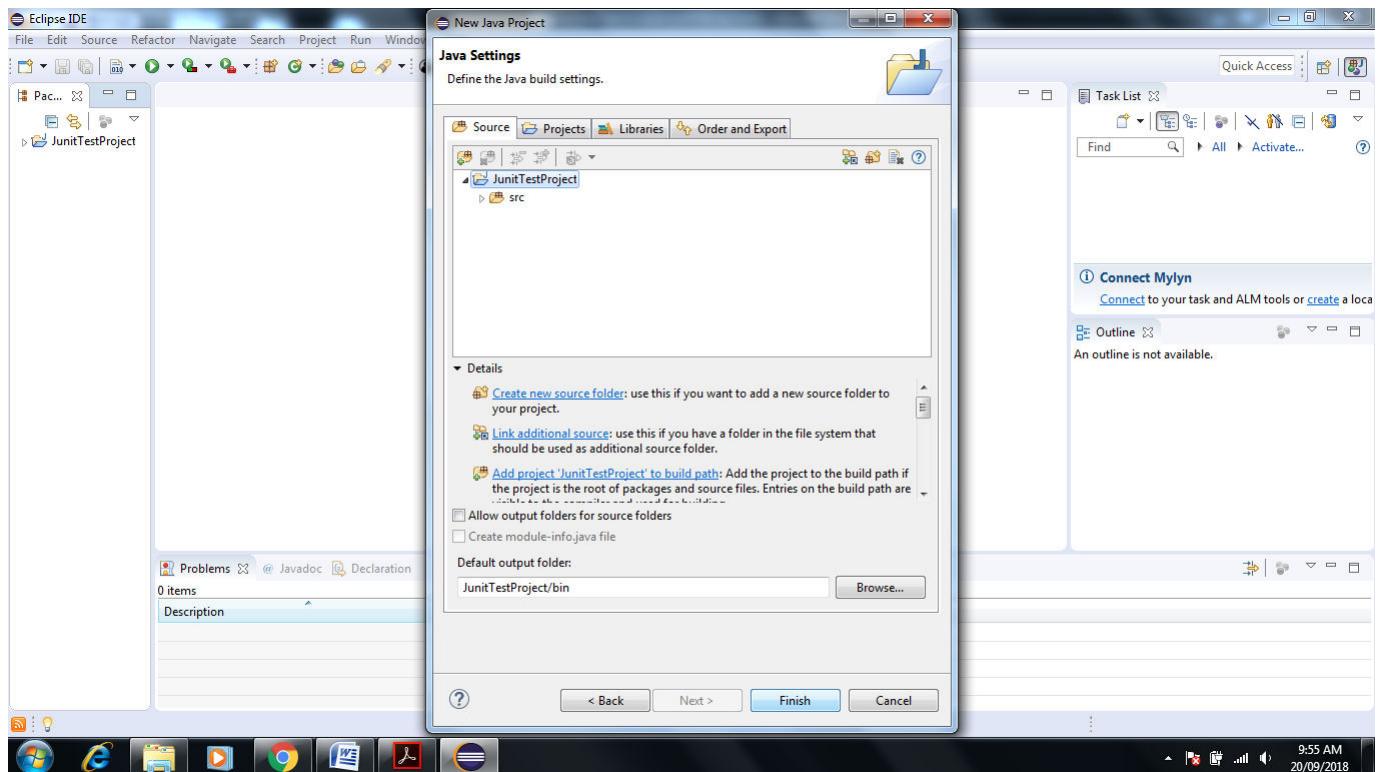
3. Go to File and Select New -> Create New Java Project



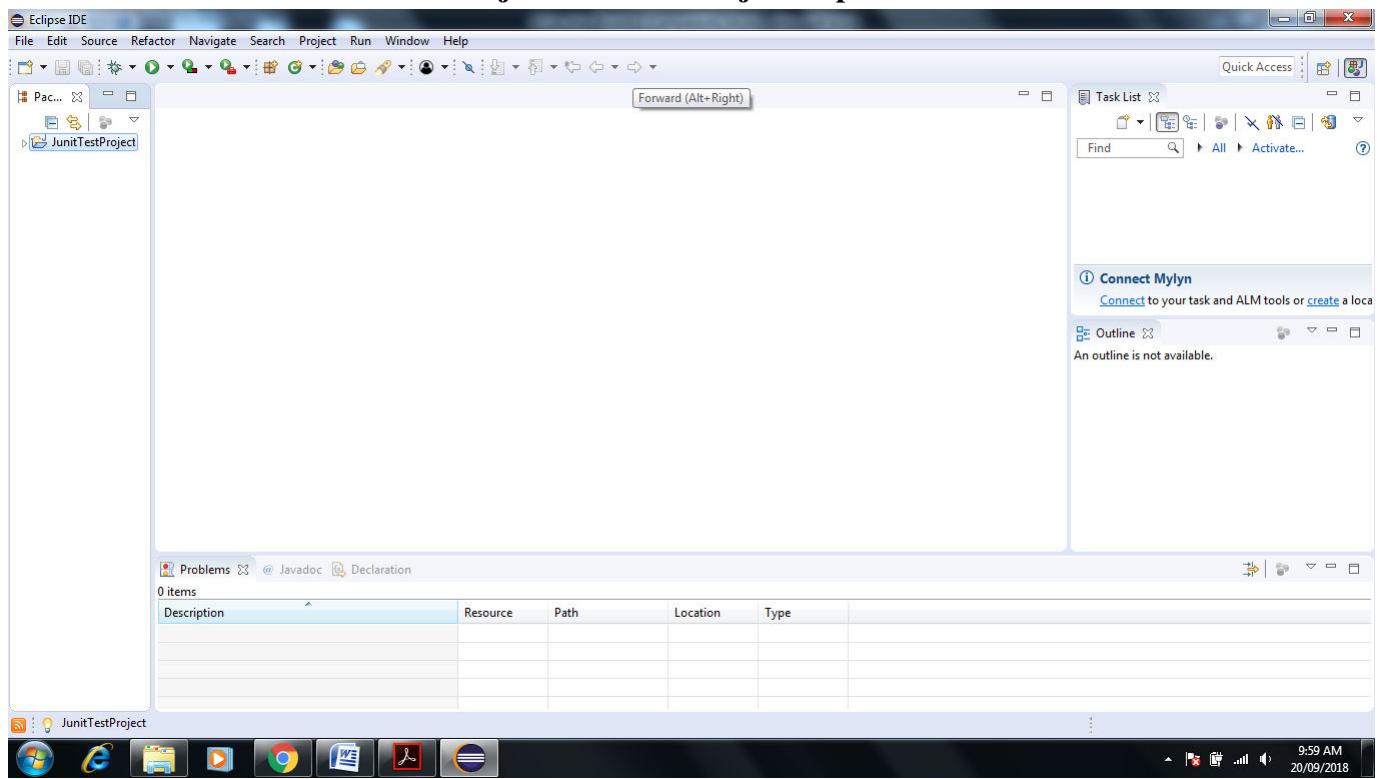
4. Give JunitTestProject name to the project and check use project folder as root for source and class files



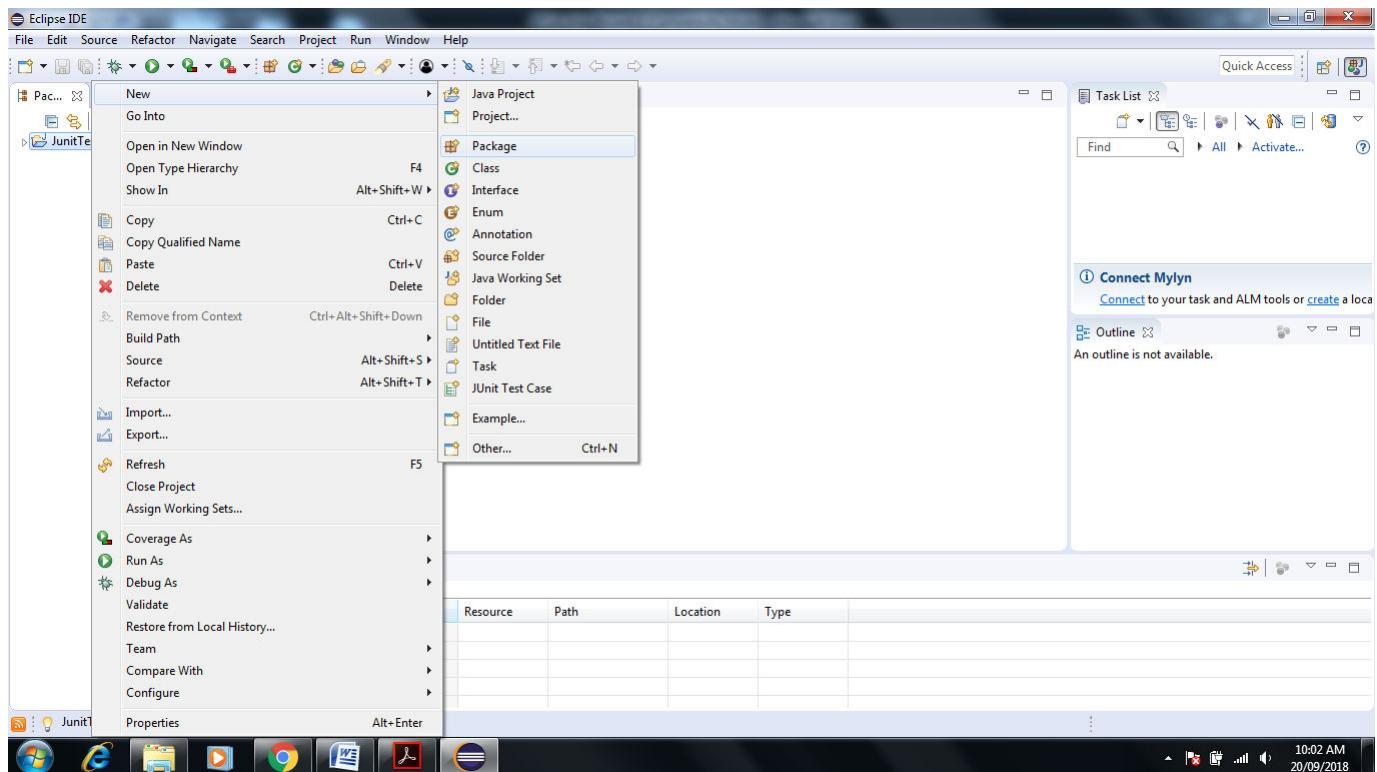
5. Click on Next-> Next Screen will Appear-> Click Finish



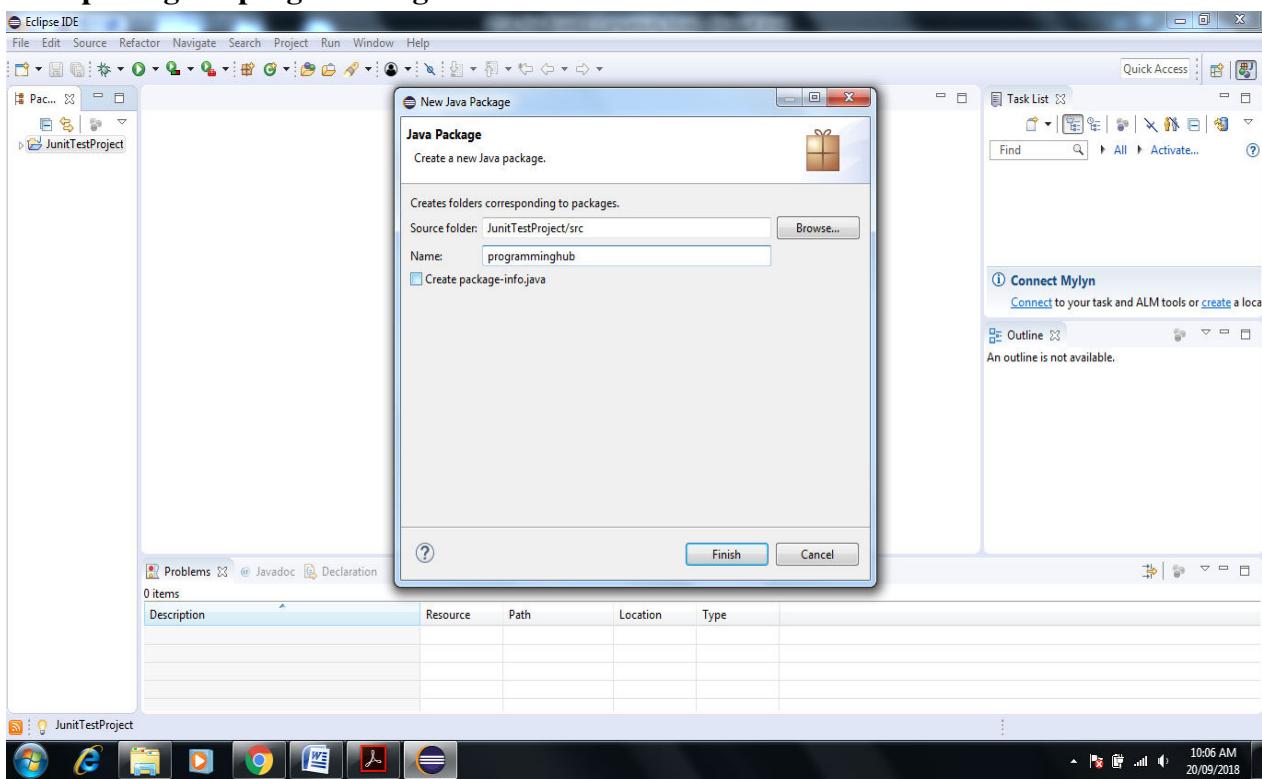
6. Next Screen Shown JunitTestProject Folder in Project Explorer



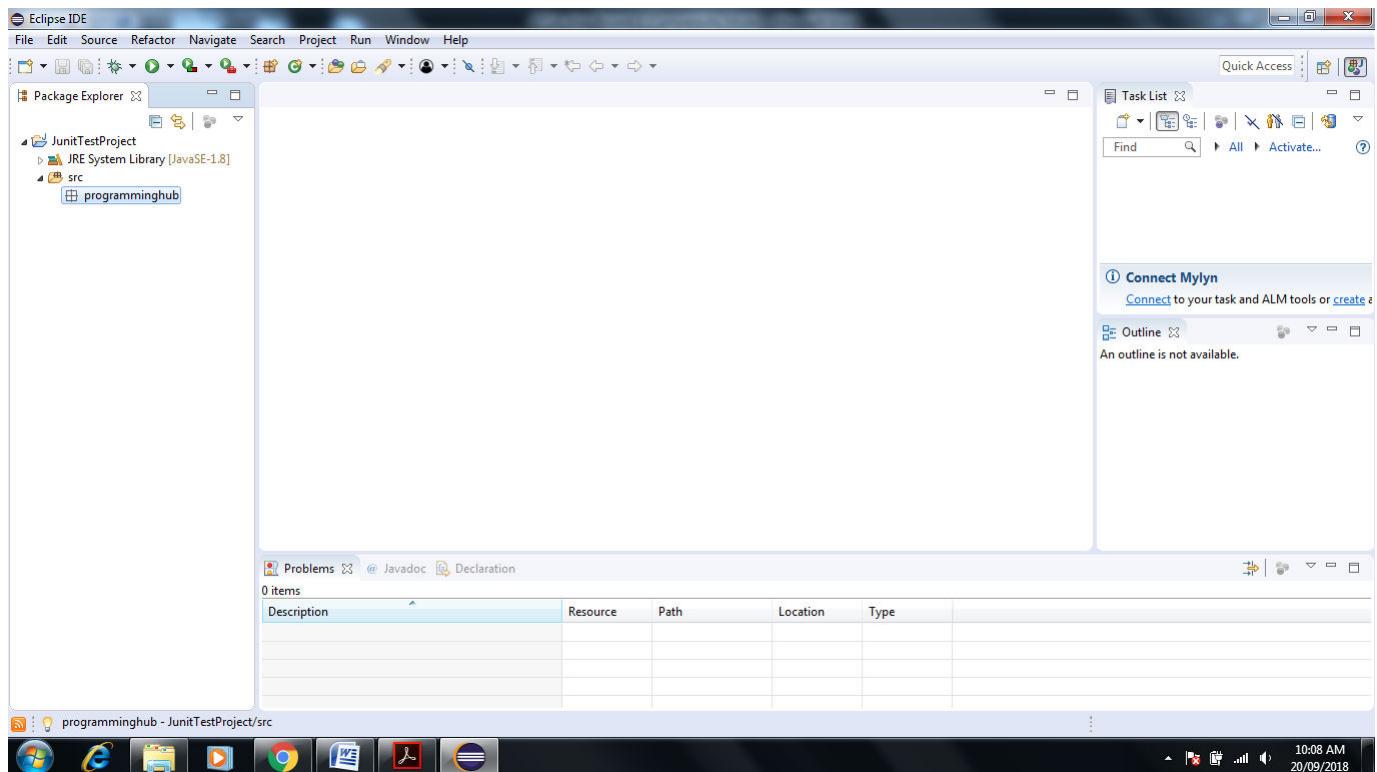
7. Right Click on Folder name JunitTestProject->New->Package



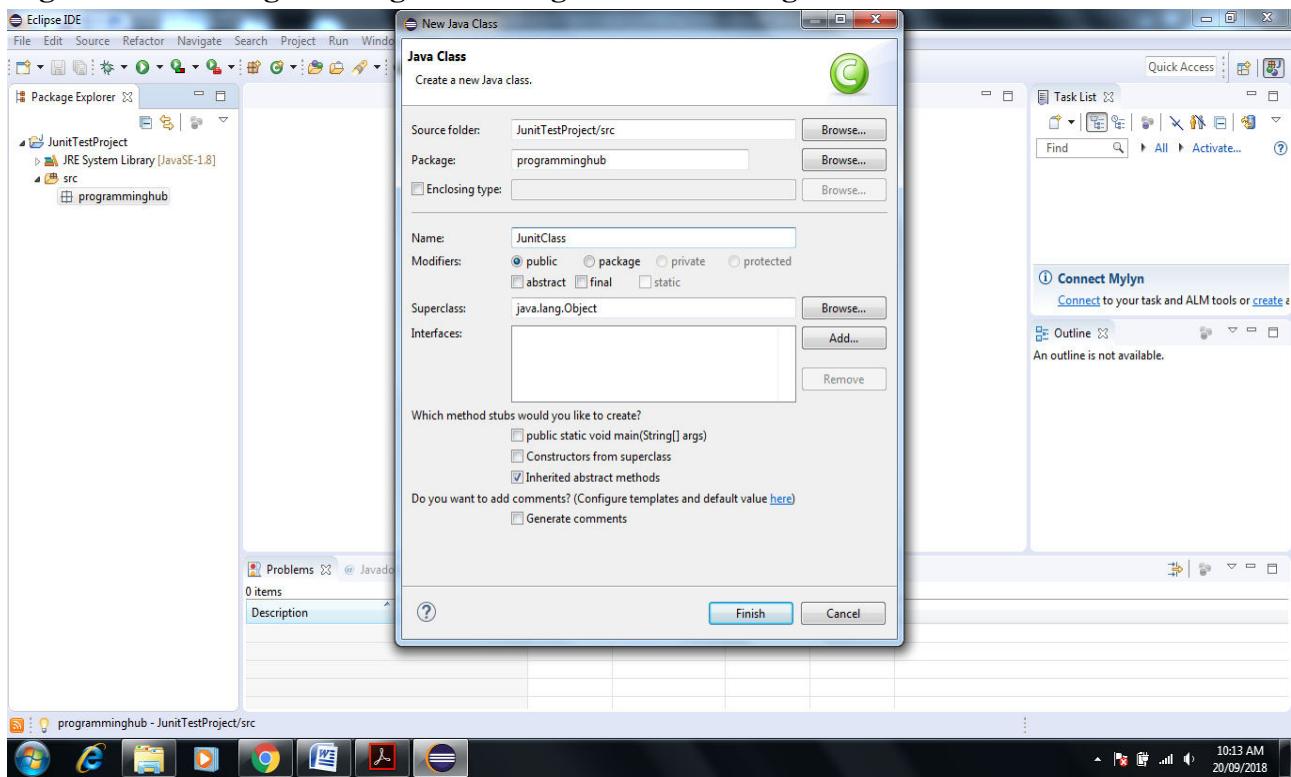
8. Name package as programming hub-> Click on Finish



9. See the Programming hub package see in project Explorer Screen of Eclipse



10. Right Click on Programminghub Package->New->Class give the name JunitClass->Click Finish.



11. Next screen will appear

JunitTestProject/src/programminghub/JunitClass.java - Eclipse IDE

File Edit Source Refactor Navigate Search Project Run Window Help

Package Explorer JunitClass.java

```
1 package programminghub;
2
3 public class JunitClass {
4
5 }
```

Task List

Find All Activate...

Outline

① Connect Mylyn

Connect to your task and ALM tools or [create a new one](#)

Problems @ Javadoc Declaration

0 items

Description	Resource	Path	Location	Type

Writable Smart Insert 6:1

Windows Taskbar: Internet Explorer, Google Chrome, Microsoft Word, Microsoft Paint, Eclipse, 10:13 AM, 20/09/2018

12 Write a small program with only two functions Add and Multiplication

JunitTestProject/src/programminghub/JunitClass.java - Eclipse IDE

File Edit Source Refactor Navigate Project Run Window Help

Package Explorer JunitClass.java

```
1 package programminghub;
2
3 public class JunitClass {
4
5     public int add(int a,int b) {
6         return a+b;
7     }
8     public int mul(int a,int b) {
9         return a*b;
10    }
11 }
```

Task List

Find All Activate...

Outline

① Connect Mylyn

Connect to your task and ALM tools or [create a new one](#)

Problems @ Javadoc Declaration

0 items

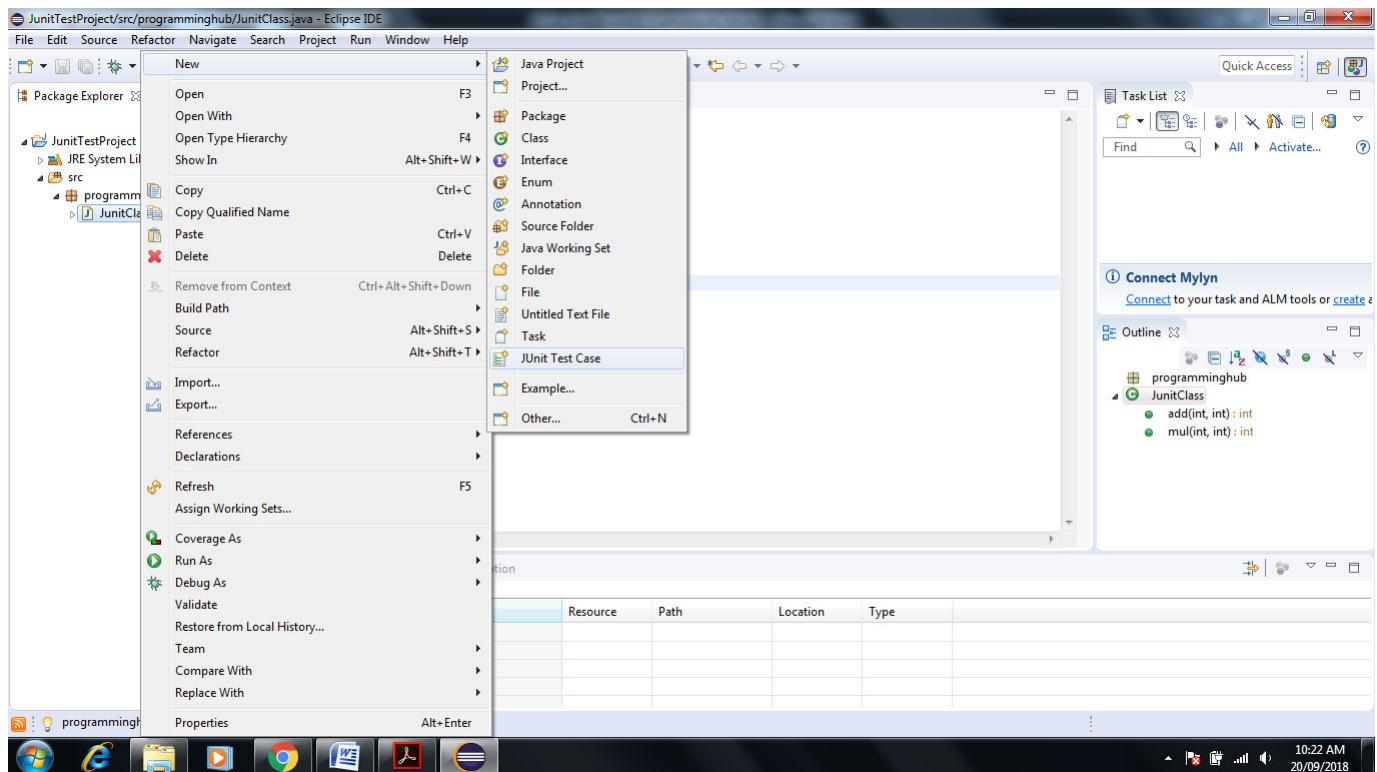
Description	Resource	Path	Location	Type

Writable Smart Insert 12:1

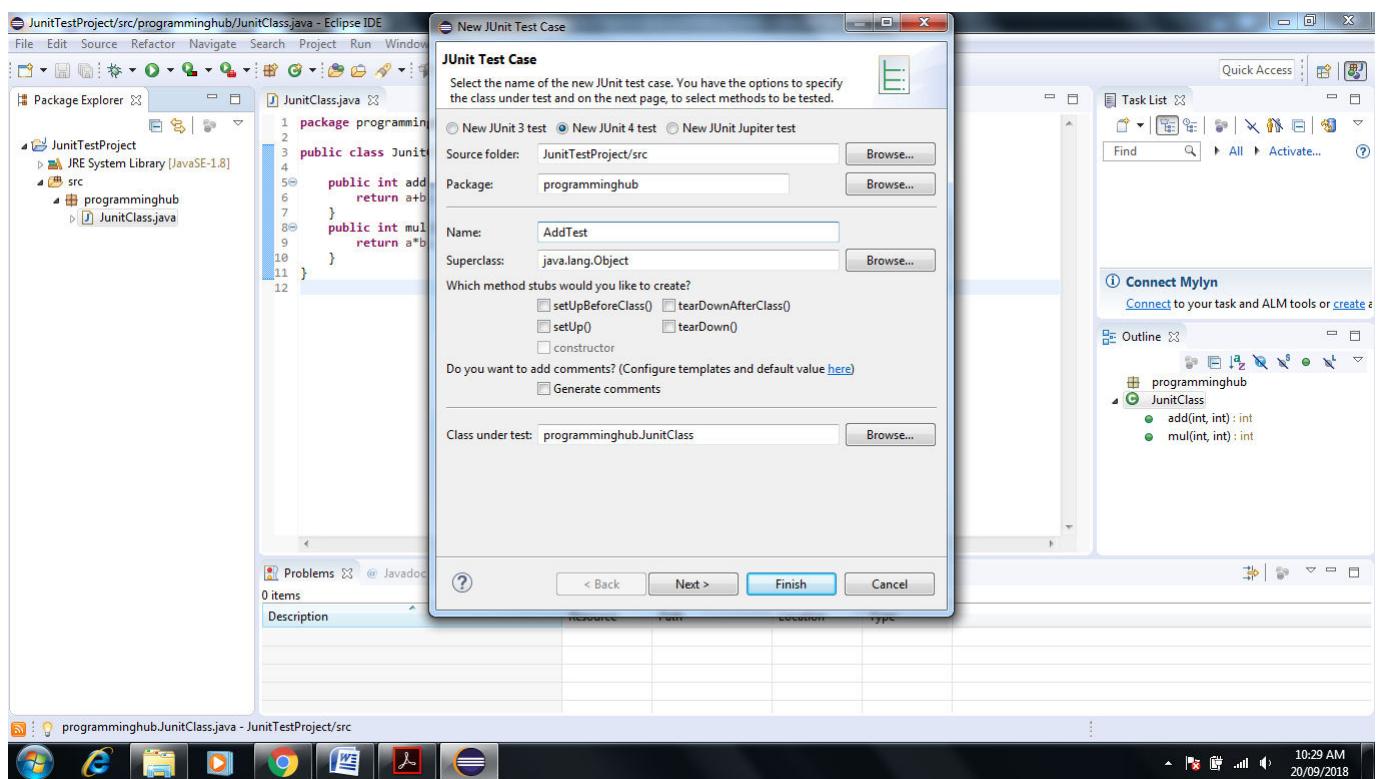
Windows Taskbar: Internet Explorer, Google Chrome, Microsoft Word, Microsoft Paint, Eclipse, 10:19 AM, 20/09/2018

13. Write Test Cases for Java Program

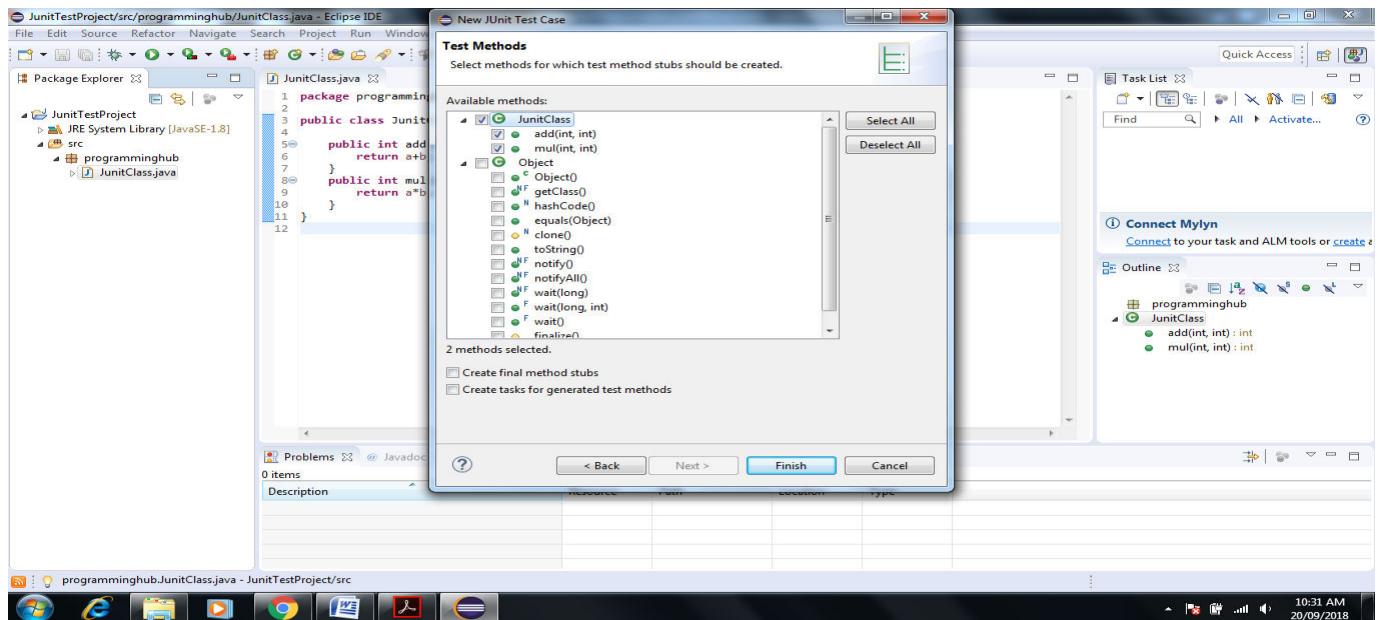
Right click on Junitclass-> New-> Click on Junit Test Cases



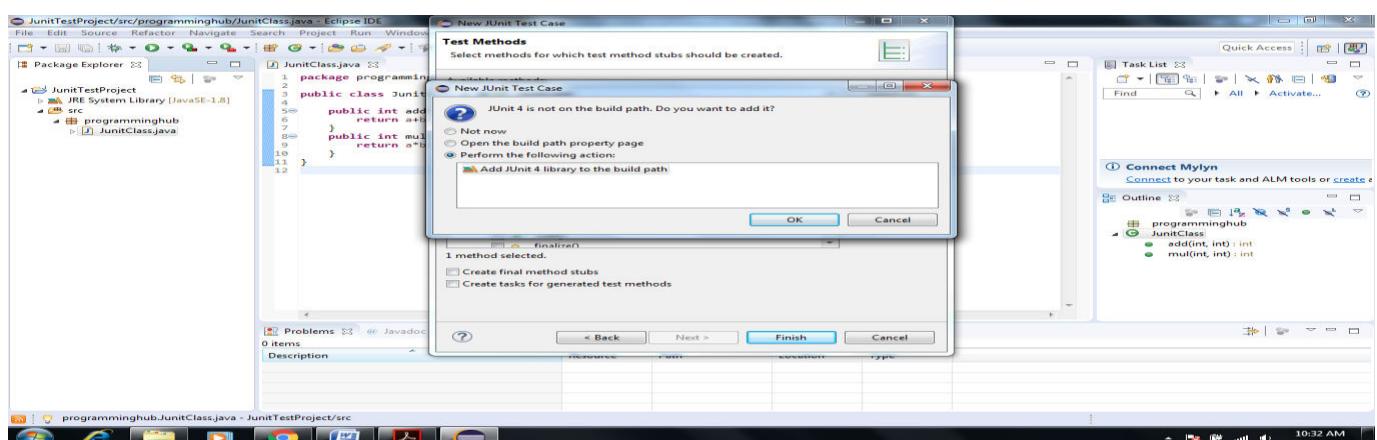
14. Name test suite as AddTest and choose New Junit4 test



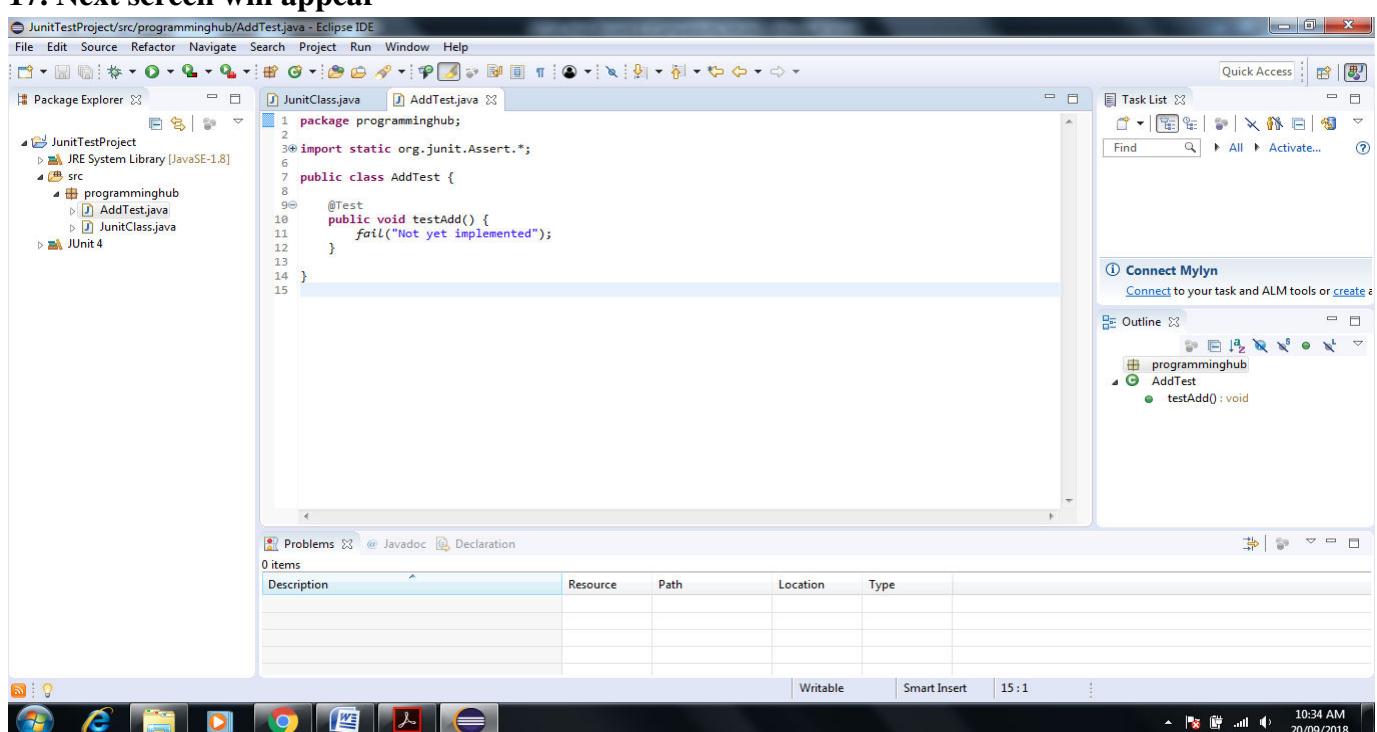
15. Click on add Checkbox



16. Click on Next-> Ok



17. Next screen will appear



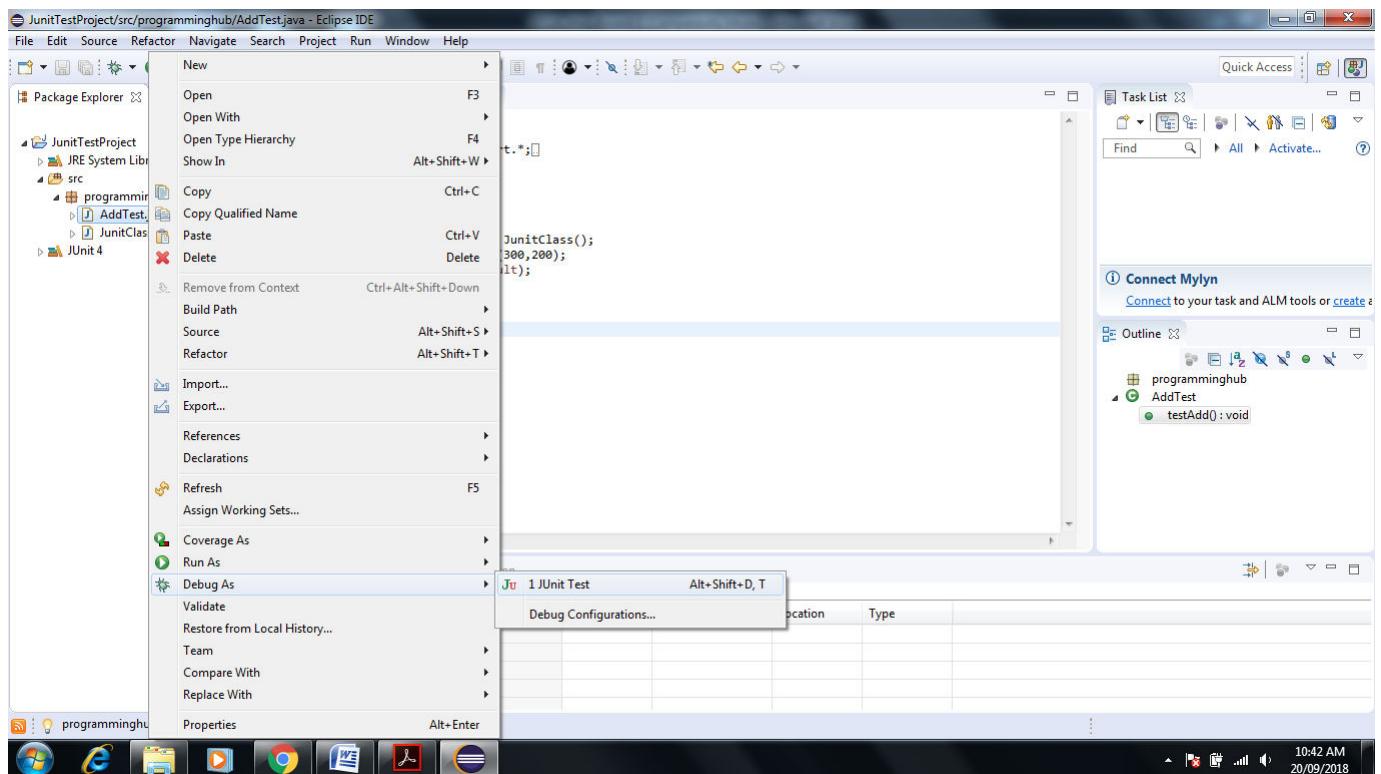
18. Write a code for Test case addition of two number inside AddTest

The screenshot shows the Eclipse IDE interface with the following details:

- Title Bar:** JunitTestProject/src/programminghub/AddTest.java - Eclipse IDE
- Menu Bar:** File, Edit, Source, Refactor, Navigate, Search, Project, Run, Window, Help
- Toolbars:** Standard toolbar with icons for New, Open, Save, Cut, Copy, Paste, Find, etc.
- Left Sidebar:** Package Explorer showing JunitTestProject, src folder containing programminghub (with AddTest.java and JunitClass.java), and JUnit 4.
- Central Editor:** AddTest.java code editor with the following content:

```
1 package programminghub;
2
3 import static org.junit.Assert.*;
4
5 public class AddTest {
6
7     @Test
8     public void testAdd() {
9         JunitClass junit=new JunitClass();
10        int result=junit.add(300,200);
11        assertEquals(500,result);
12    }
13
14 }
15
16 }
```
- Right Sidebar:** Task List, Outline, Problems (empty), and Javadoc/Declaration tabs.
- Bottom Status Bar:** Shows the date and time: 10:39 AM 20/09/2018.

19. Let us run AddTest test case. Right click AddTest-> Debug As->JUnit Test



20. Result of test case is as follows. It shows 0 error and 0 failure and green color test bar which means that test case has run successfully(Green Color Bar Indicate)

The screenshot shows the Eclipse IDE interface with the following details:

- Title Bar:** JunitTestProject/src/programminghub/AddTest.java - Eclipse IDE
- Toolbar:** Standard Eclipse toolbar with icons for file operations, search, and project navigation.
- Package Explorer:** Shows the project structure with AddTest.java selected.
- JUnit View:** Displays "Finished after 0.631 seconds" with 1 Run, 0 Errors, and 0 Failures. A green bar indicates success.
- Code Editor:** Shows the Java code for AddTest.java:

```
1 package programminghub;
2
3 import static org.junit.Assert.*;
4
5 public class AddTest {
6
7     @Test
8     public void testAdd() {
9         JunitClass junit=new JunitClass();
10        int result=junit.add(300,200);
11        assertEquals(500,result);
12    }
13
14 }
15
16 }
```
- Task List:** Empty.
- Outline:** Shows the class AddTest and its method testAdd().
- Problems:** Empty table with columns: Description, Resource, Path, Location, Type.
- Failure Trace:** Empty.
- Bottom Bar:** Windows taskbar with icons for Start, Internet Explorer, File Explorer, and others. The date and time are 20/09/2018, 10:44 AM.

21. Let us purposely give wrong input in assertEquals method or unexpected result here we write 501 instead of 500 indicate wrong addition result

The screenshot shows the Eclipse IDE interface with the following details:

- Title Bar:** JunitTestProject/src/programminghub/AddTest.java - Eclipse IDE
- Toolbar:** Standard Eclipse toolbar with icons for file operations, search, and project navigation.
- Package Explorer:** Shows the project structure with AddTest.java selected.
- JUnit View:** Displays "Finished after 0.631 seconds" with 1 Run, 0 Errors, and 1 Failure. A brown bar indicates failure.
- Code Editor:** Shows the Java code for AddTest.java, identical to the previous screenshot.
- Task List:** Empty.
- Outline:** Shows the class AddTest and its method testAdd().
- Problems:** Empty table with columns: Description, Resource, Path, Location, Type.
- Failure Trace:** Empty.
- Bottom Bar:** Windows taskbar with icons for Start, Internet Explorer, File Explorer, and others. The date and time are 20/09/2018, 10:46 AM.

22. Now test case should fail.(Brown Color Bar Indicate) So again run AddTest as follows

The screenshot shows the Eclipse IDE interface with the following details:

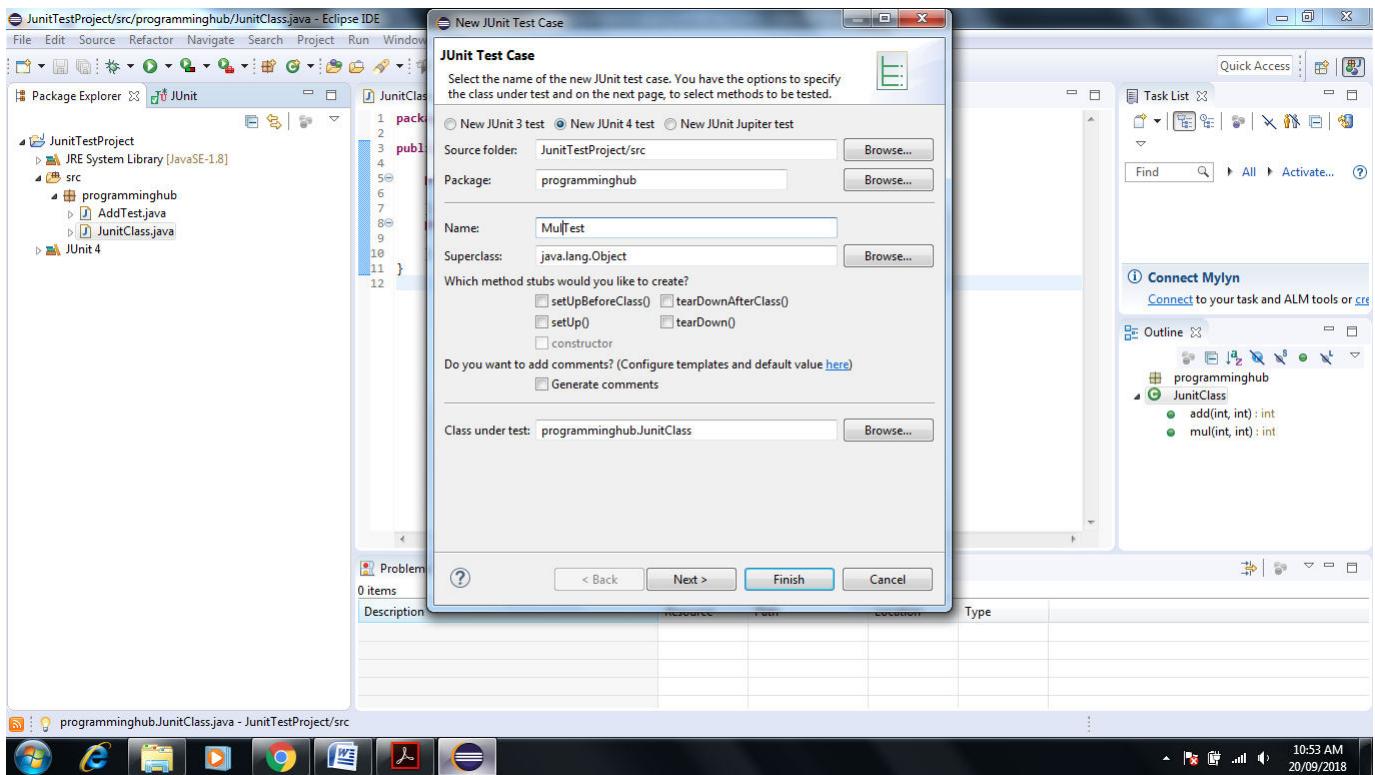
- Title Bar:** JUnitTestProject/src/programminghub/AddTest.java - Eclipse IDE
- Menu Bar:** File, Edit, Source, Refactor, Navigate, Search, Project, Run, Window, Help
- Toolbar:** Standard Eclipse toolbar icons.
- Left Sidebar:** Package Explorer (showing AddTest.java), JUnit (showing 1/1 run successful), and Failure Trace (showing a java.lang.AssertionError).
- Central Area:** JUnit Class View showing JUnitClass.java and AddTest.java. The code for AddTest.java is as follows:

```
1 package programminghub;
2
3 import static org.junit.Assert.*;
4
5 public class AddTest {
6
7     @Test
8     public void testAdd() {
9         JUnitClass junit=new JUnitClass();
10        int result=junit.add(300,200);
11        assertEquals(501,result);
12    }
13
14 }
15
16 }
17 }
```

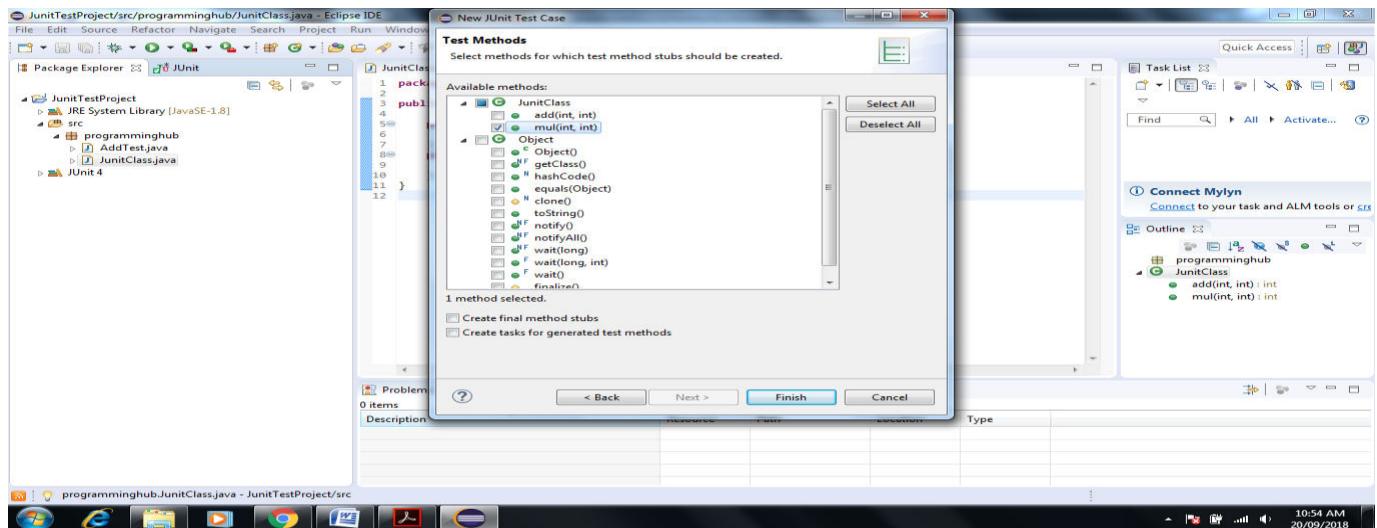
- Bottom Area:** Problems view showing 0 items.
- Right Sidebar:** Task List, Connect Mylyn (with a link to connect to tools like ALM), and Outline view showing the project structure and the test method.

23. Similarly you can Create Test case for Multiplication Function

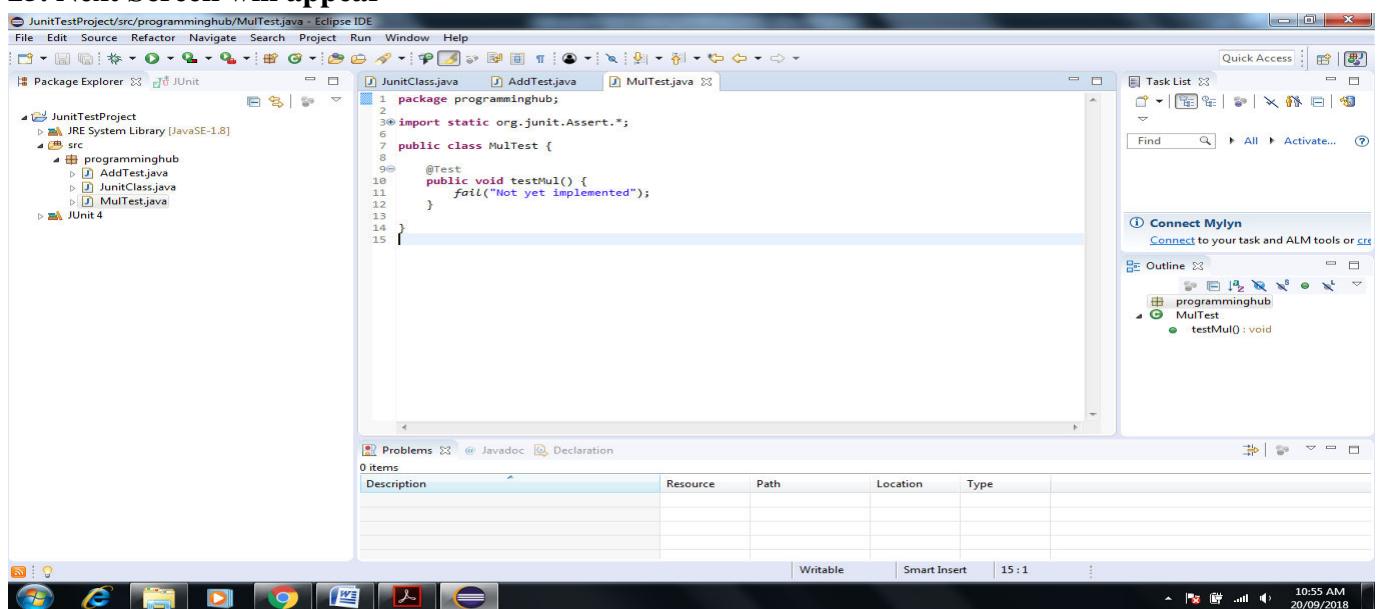
Click on Project Explorer Screen-> Right Click on JunitClass->New->JUnit Test Case-> Give name MulTest.



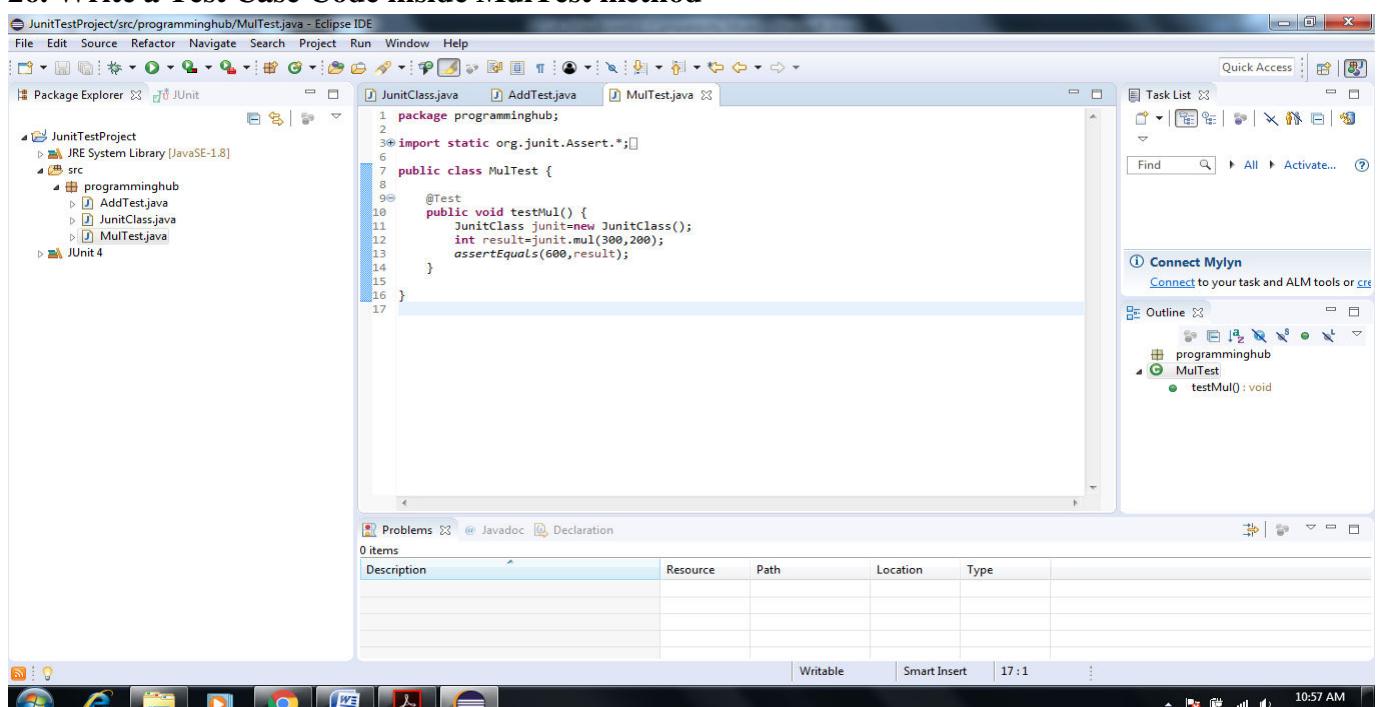
24. Click on Next ->Select Mul Check Box -> Click Finish



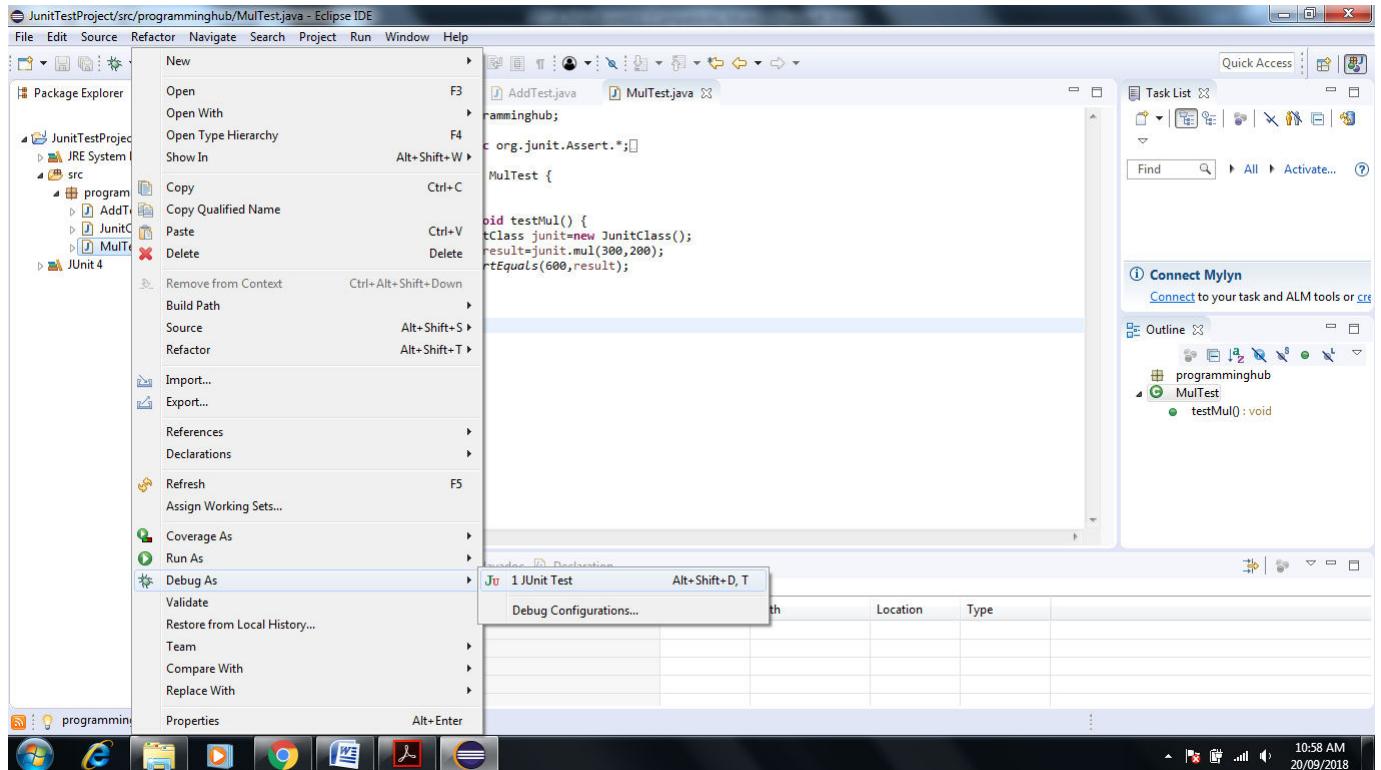
25. Next Screen will appear



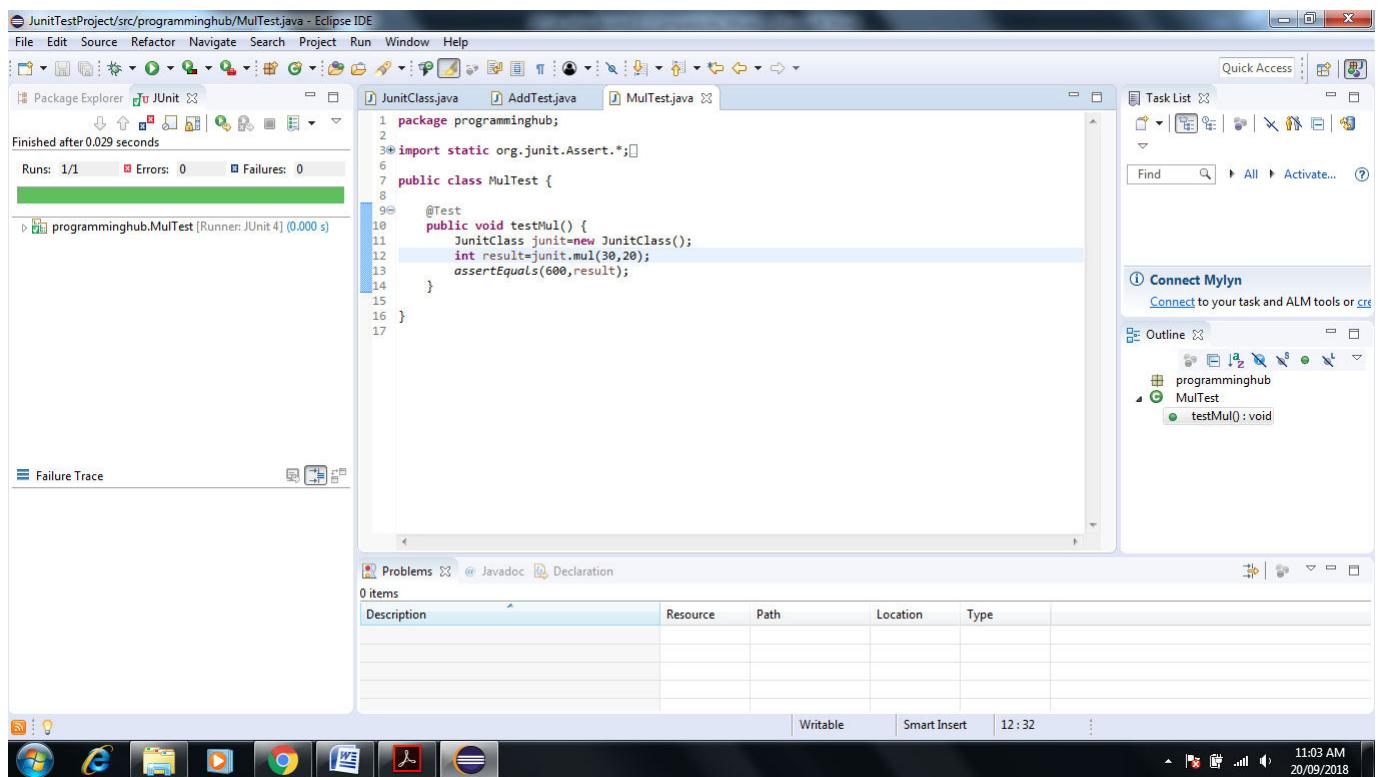
26. Write a Test Case Code inside MulTest method



27. Right Click on MulTest->Debug->JUnit Test

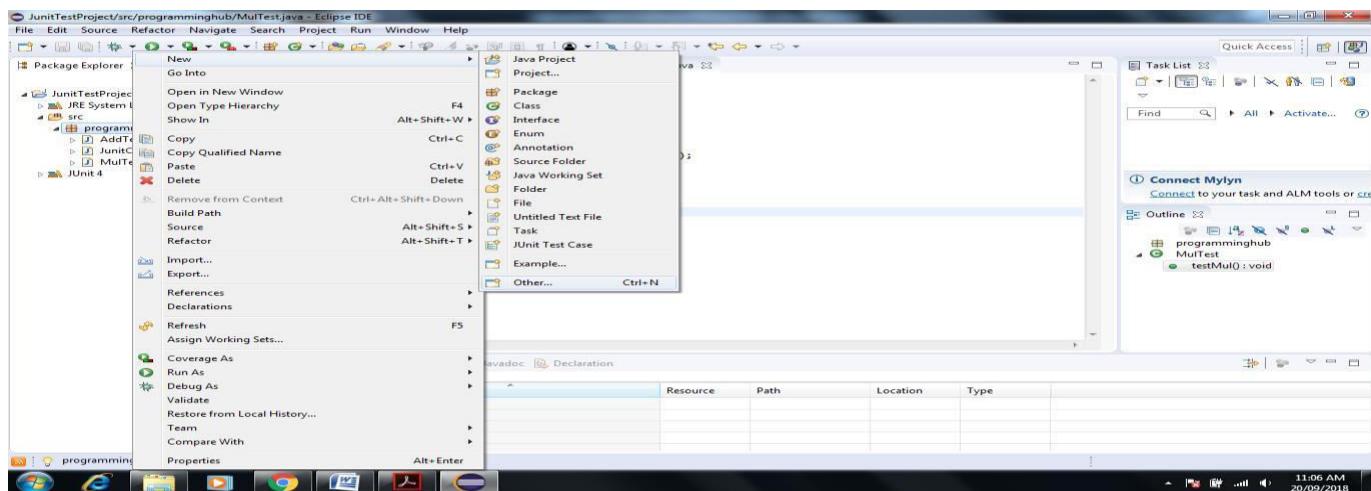


28. Execute Test

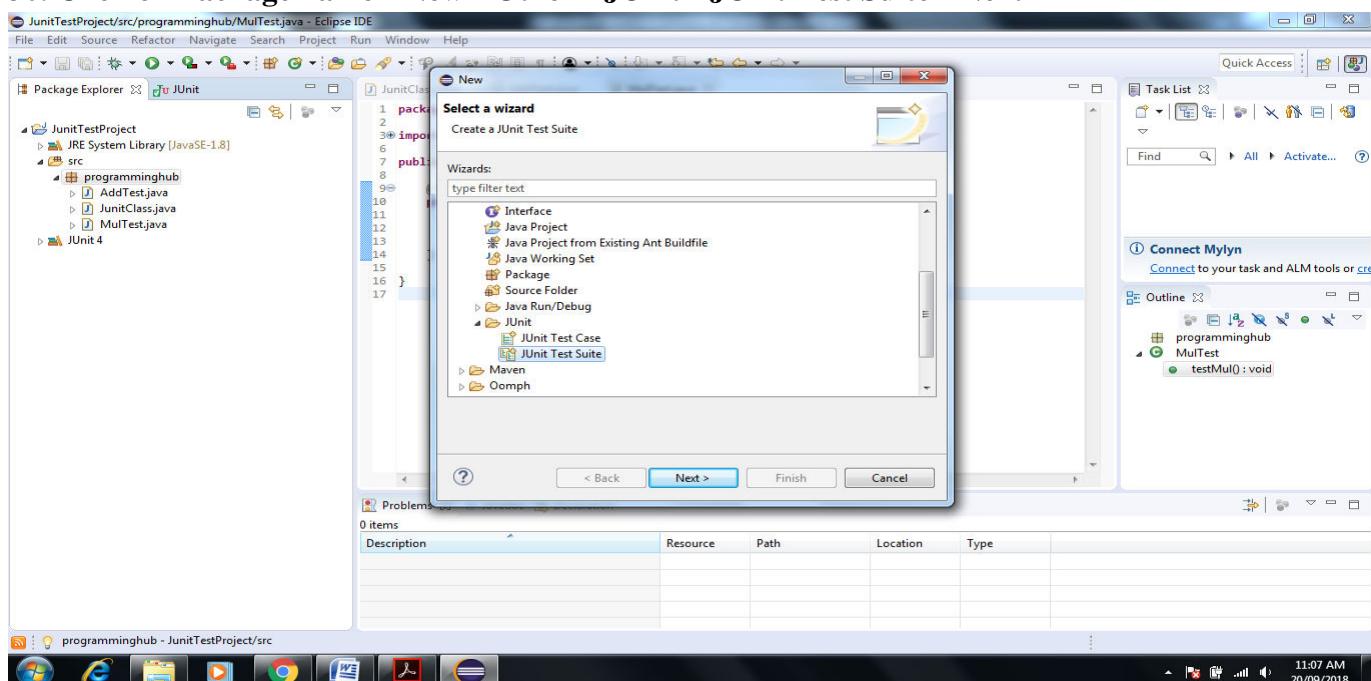


Test Suite – it is used to test multiple test cases at one time.

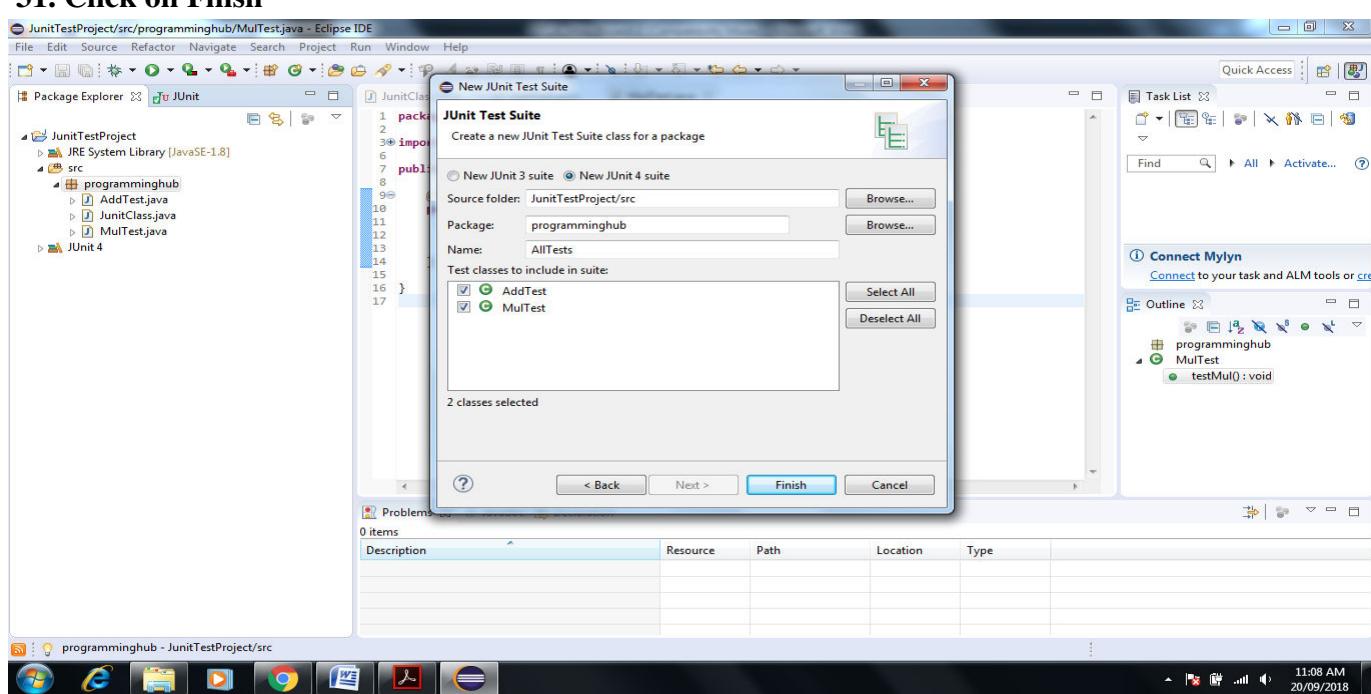
29. Now let us create Test Suite both add and mul test cases in one time



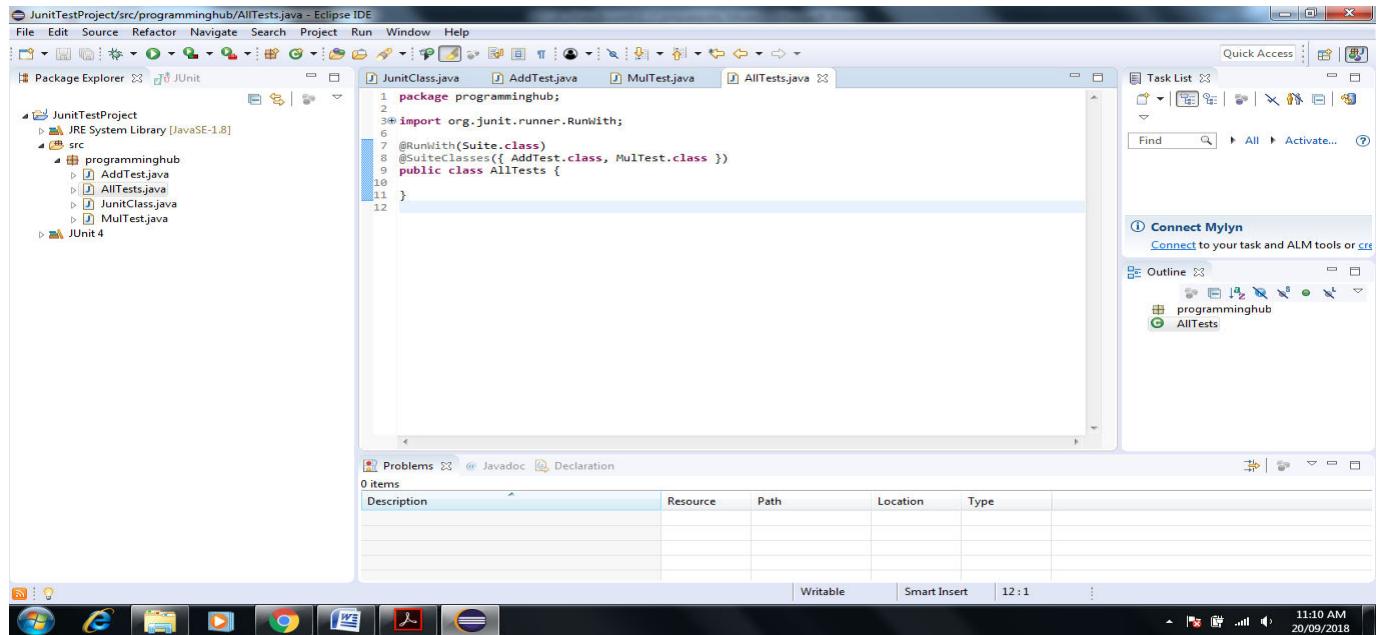
30. Click on Package name->New->Other->JUnit->JUnit Test Suite->Next



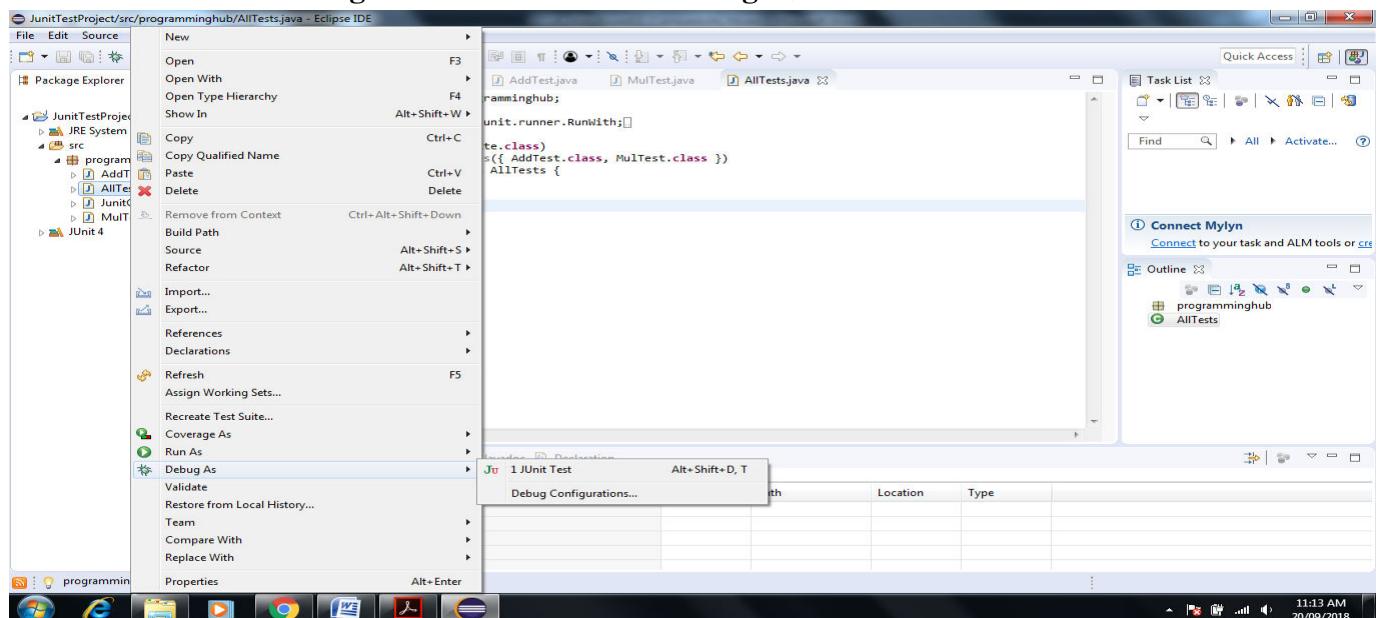
31. Click on Finish



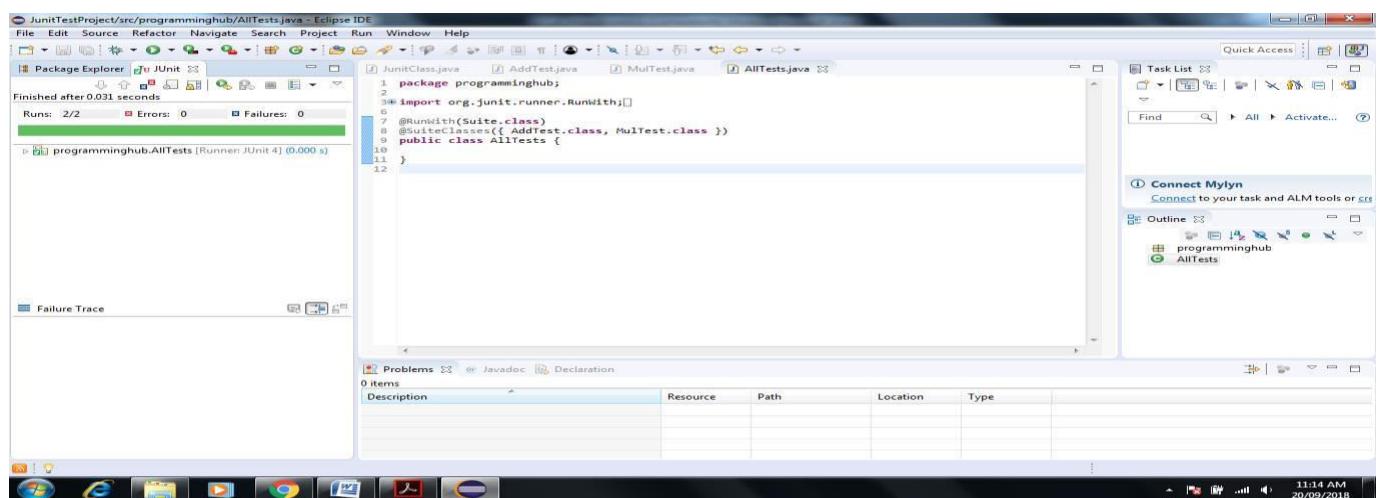
32. Next Screen Appear that automatically create Test Suite for Add and Mul



33. Execute Test Suite Right Click on All Test ->Debug->JUnit Test



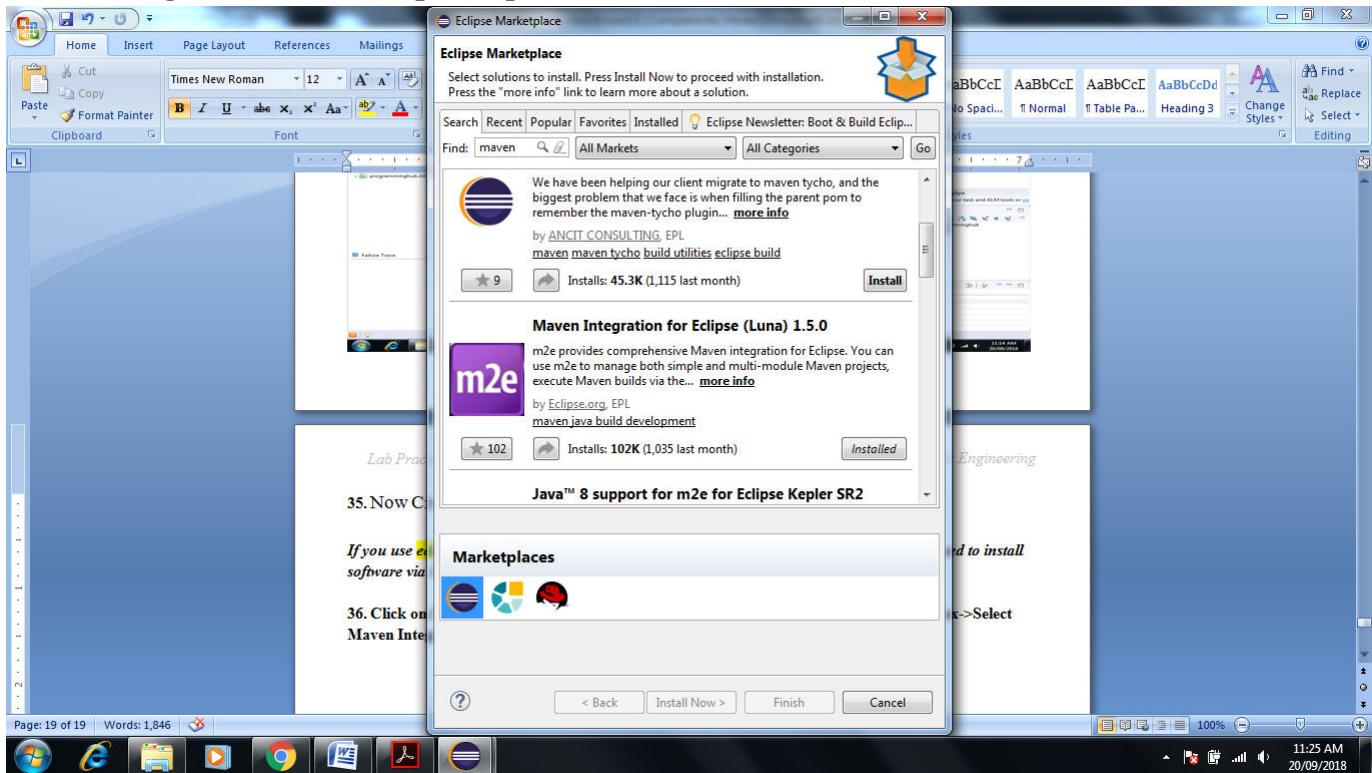
34. Test Suite Executed successfully Test suite fails even if a single test case among all fails.



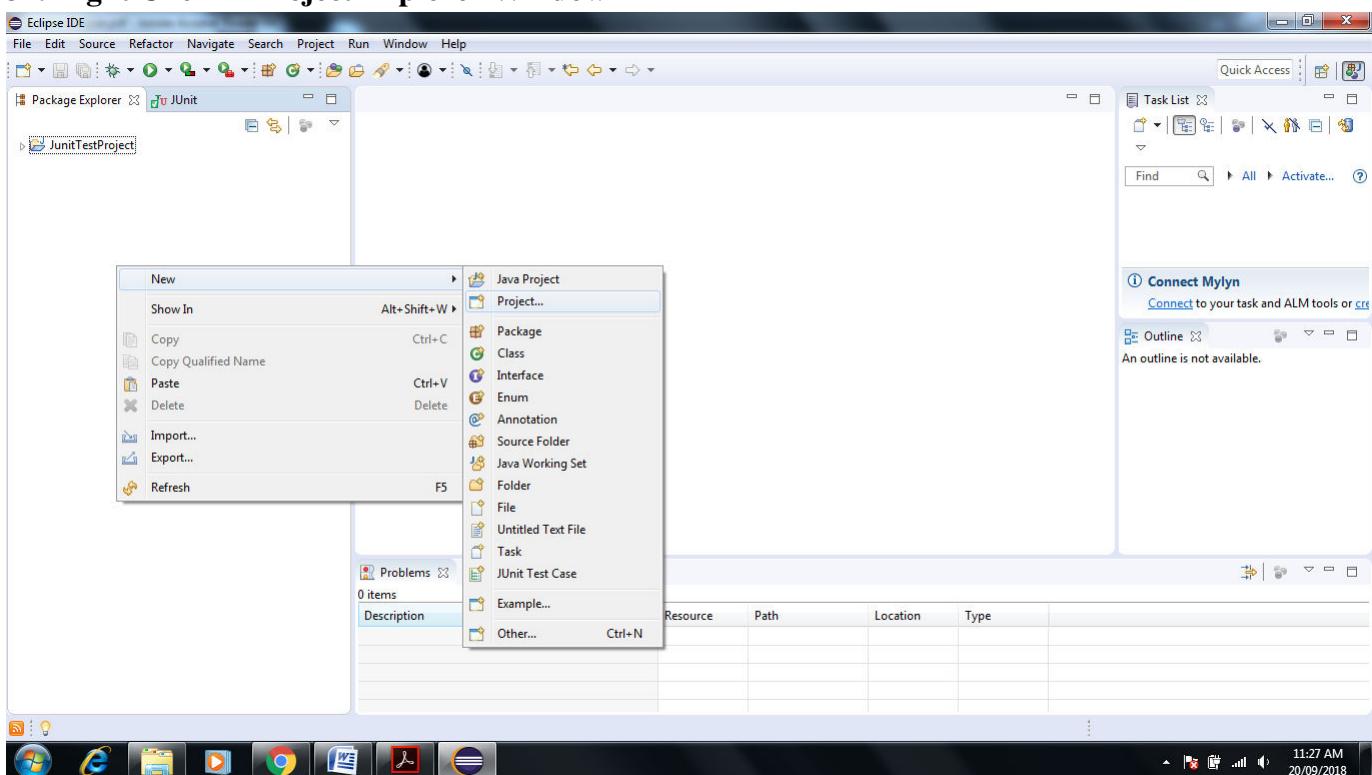
35. Now Create Test Report Using Apache Maven

If you use **eclipse-java-photon-R-win32** Version it include Maven in built installed so no need to install software via Eclipse help Install Software Option

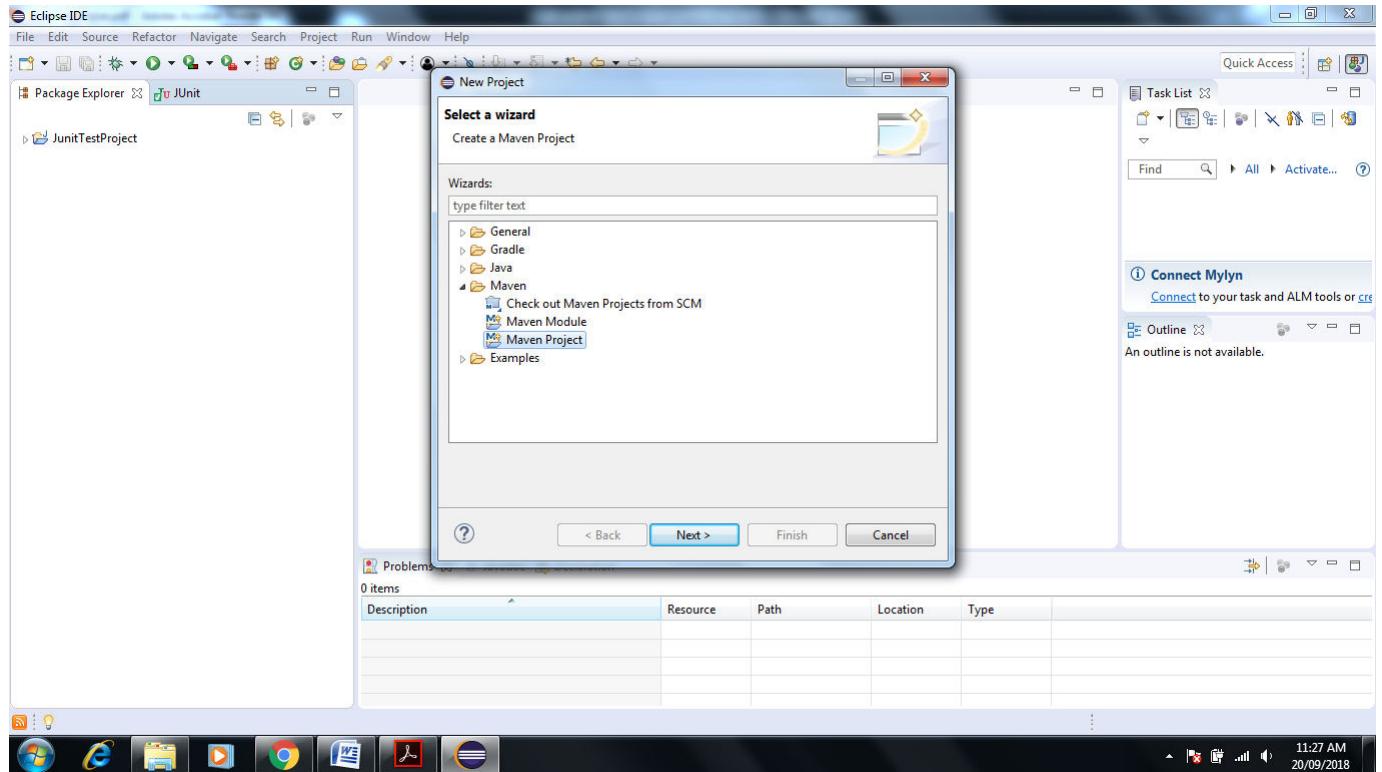
36. Click on Help in Eclipse->Eclipse Marketplace->Enter Maven Keyword in Search box->Select Maven Integration version as per requirement->Click on Install



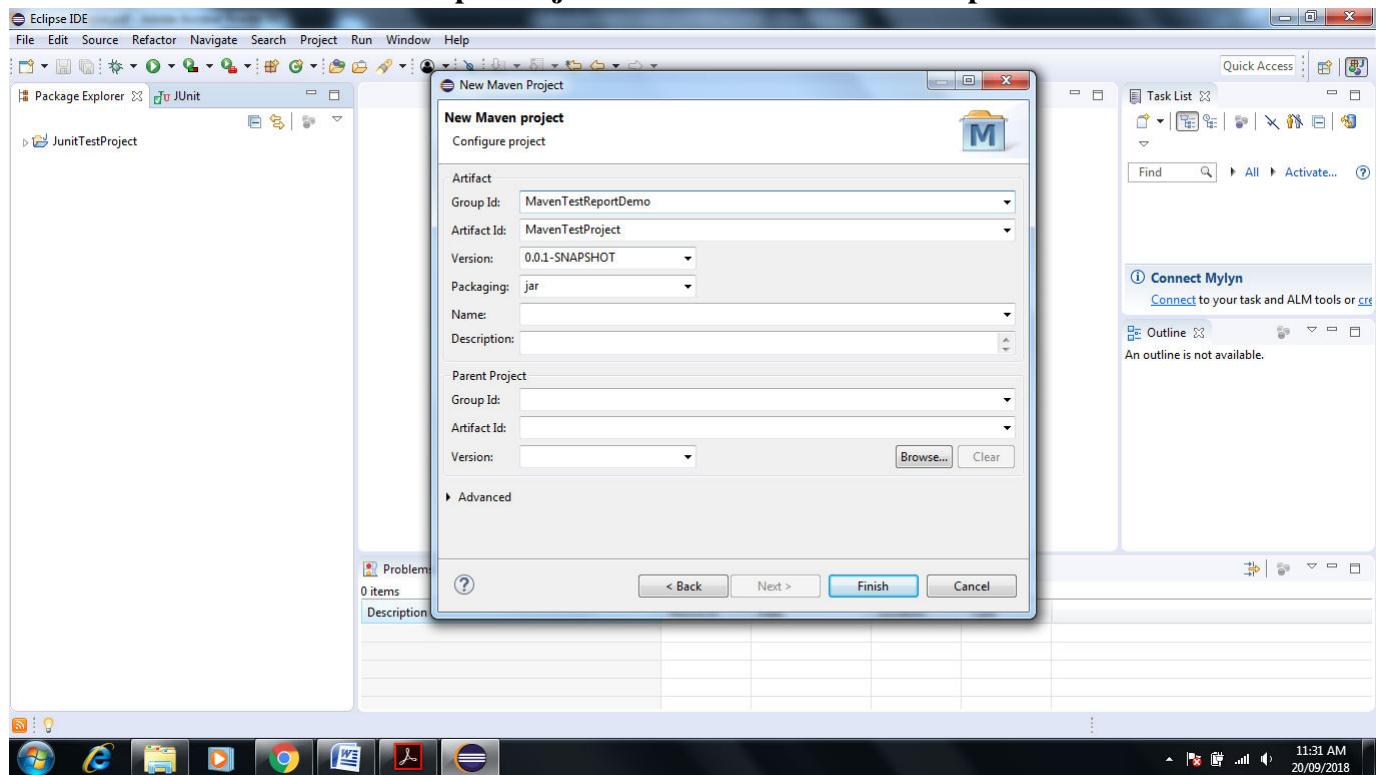
37. Right Click in Project Explorer Window



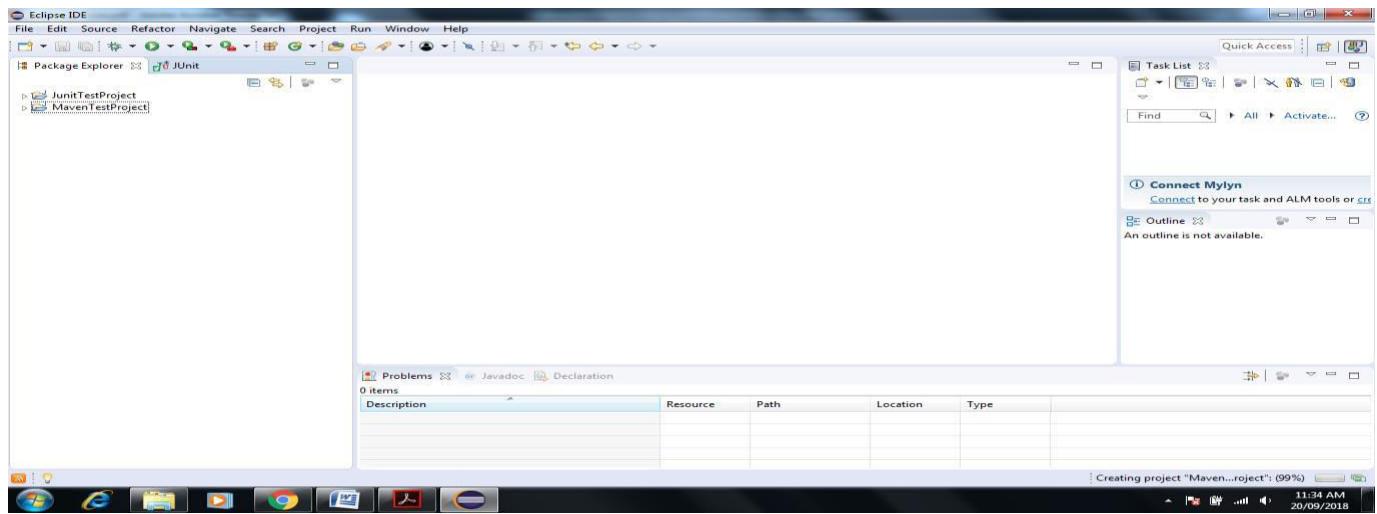
38. Go to Maven Project-> Click Next



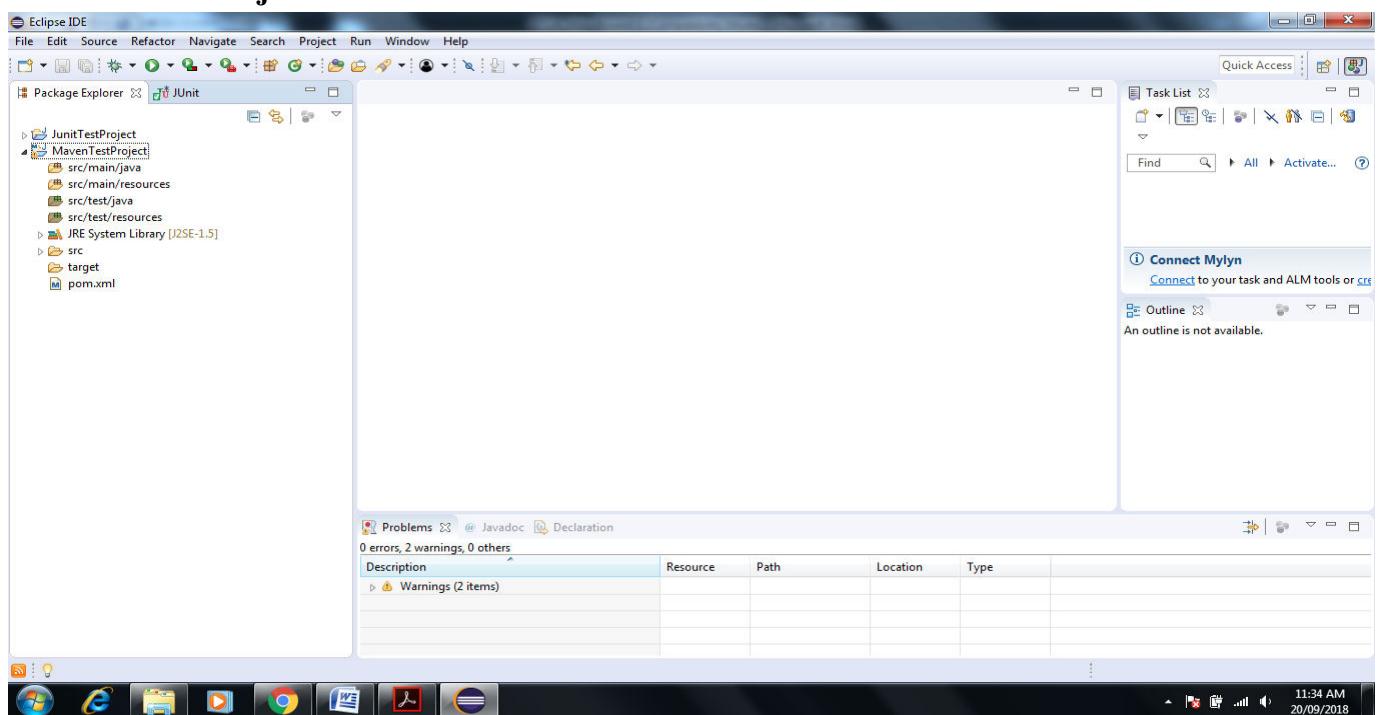
39. Select Check Box Create Simple Project-> Click Next-> Give Group Id and Artifact name



40. Click on Finish-> Next Screen Appear



41. MavenTestProject shown Pom.xml file doble click on same

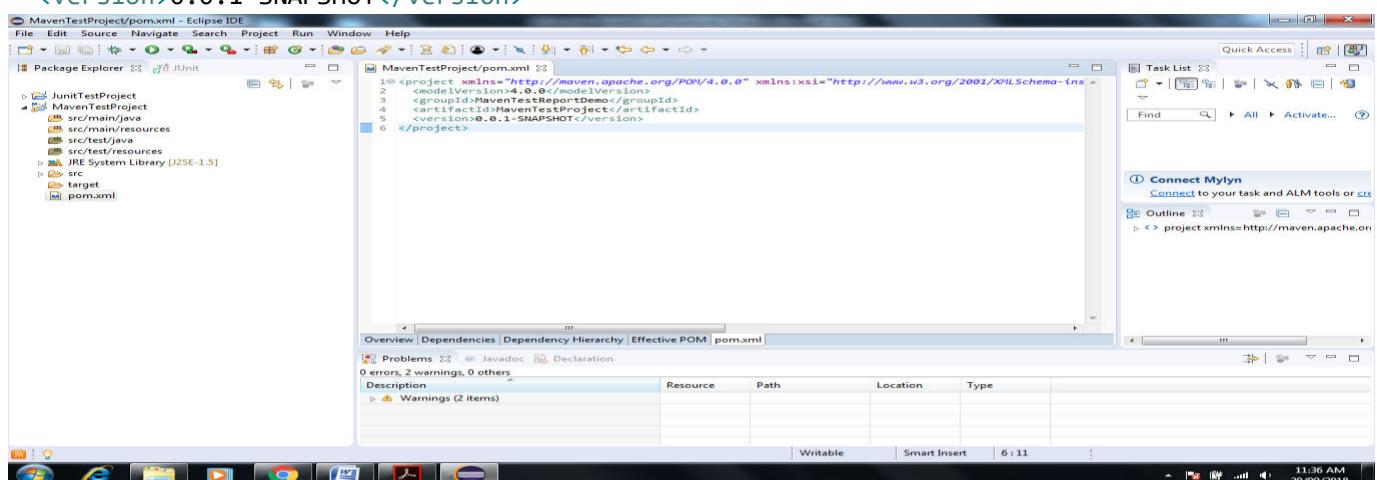


42. it shown some description like

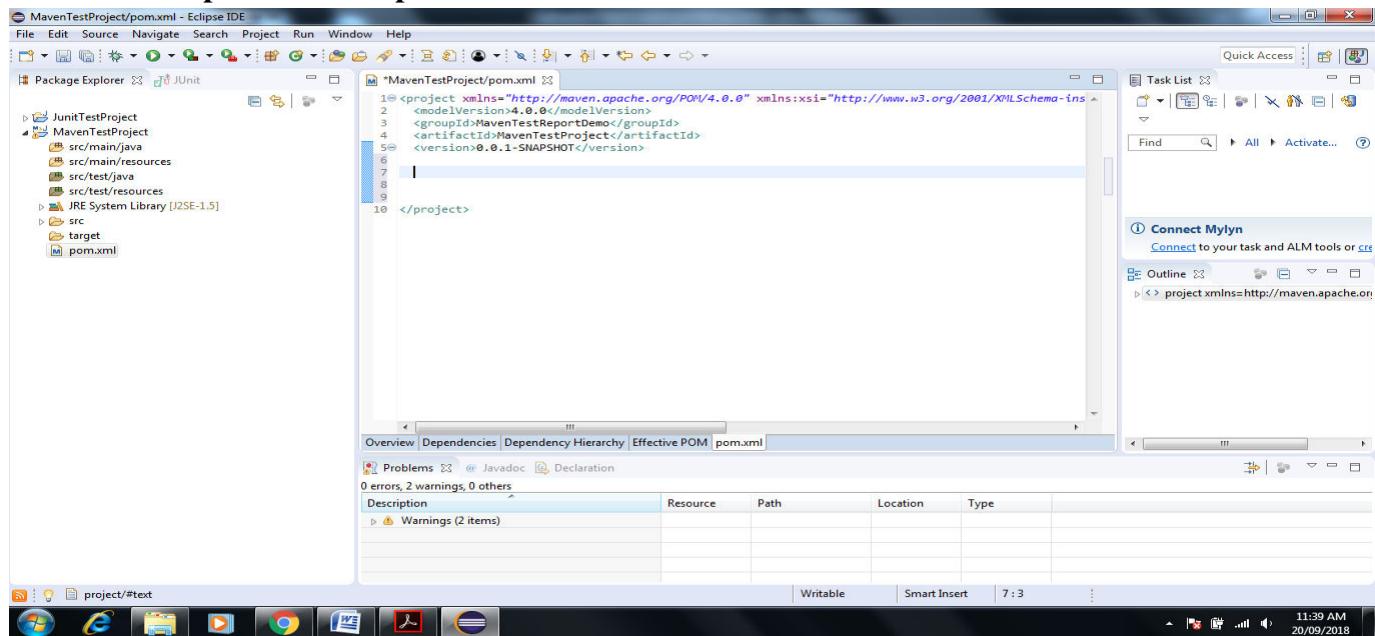
```

<modelVersion>4.0.0</modelVersion>
<groupId>MavenTestReportDemo</groupId>
<artifactId>MavenTestProject</artifactId>
<version>0.0.1-SNAPSHOT</version>

```



43. We add dependencies to pom.xml of Junit and Selenium



44. To add dependency → Go to Google.com->Enter Maven repository-> in Search box on Site Enter Junit

Maven repository - Google

Maven repository

All News Books Images Videos More Settings Tools

About 1,08,00,000 results (0.54 seconds)

[Maven Repository: Search/Browse/Explore](#)
mvnrepository.com/

Popular Categories · Aspect Oriented · Actor Frameworks · Application Metrics · Build Tools · Bytecode Libraries · Command Line Parsers · Cache ...

Results from mvnrepository.com

Maven Repository: spring
Spring TestContext Framework. Last Release on Sep 7, 2018 ...

Central
URL, http://central.maven.org/maven2/. Jars, 3,116,199 ...

Categories
JavaServlet(TM) Specification, CDDLGPL, 10,126 · Java ...

Maven Repositories - TutorialsPoint
https://www.tutorialspoint.com/maven/maven_repositories.htm · Maven Repositories - Learn Maven in simple and easy steps starting from basic to advanced concepts with examples including Overview, Environment Setup, ...

Apache Maven Software

Maven is a build automation tool used primarily for Java projects. Maven addresses two aspects of building software: first, it describes how software is built, and second, it describes its dependencies. [Wikipedia](#)

Developed by: Apache Software Foundation
Written in: Java

People also search for

Spring Framework, Eclipse, Gradle, Apache Tomcat, Jenkins

45. after Enter keyword Junit inside Seach box then Enter->it shown another Site Maven Repository for Junit Select that site.

Maven repository - Google

Secure | https://www.google.com/search?ei=wDmjW-iiHYSW8gWy87uAAw&q=Maven+repository&oq=Maven+repository&gs_l=psy-ab.3..0i67k1l2j0i7i30k1l8.19617.20252.0.21572.7.4.0... ☆ :

Google Maven repository

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Maven Repository: Search/Browse/Explore
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Junit

Maven Repository: spring
Spring TestContext Framework. Last Release on Sep 7, 2018 ...

Central
URL, http://central.maven.org/maven2/. Jars, 3,116,199 ...

Categories
JavaServlet(TM) Specification, CDDLGPL, 10,126 · Java ...

Aspect Oriented
The byteman jar merges the byteman-agent jar contents with ...

Aws-java-sdk-sqs
The AWS Java SDK for Amazon SQS module holds the client ...

Build Tools
A minimal build system interpreting Maven-style pom.xml files. Last ...

Maven Repositories - TutorialsPoint
https://www.tutorialspoint.com/maven/maven_repositories.htm ▾
Maven Repositories - Learn Maven in simple and easy steps starting from basic to advanced concepts with examples including Overview, Environment Setup, ...

Apache Maven maven

Software

Maven is a build automation tool used primarily for Java projects. Maven addresses two aspects of building software: first, it describes how software is built, and second, it describes its dependencies. Wikipedia

Developed by: Apache Software Foundation
Written in: Java

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Jenkins Jenkins

Feedback

Junit site:mvnrepository.com

Secure | https://www.google.com/search?ei=3TmjW92lCoqk8QXOwaboDw&q=Junit%20site%3Amvnrepository.com&oq=Maven+repository&gs_l=psy-ab.3..0i67k1l2j0i7i30k1l8.19617.202... ☆ :

Google Junit site:mvnrepository.com

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About 1,94,000 results (0.34 seconds)

Maven Repository: junit » junit
https://mvnrepository.com/artifact/junit/junit ▾
JUnit. JUnit is a unit testing framework for Java, created by Erich Gamma and Kent Beck. ... Mastering Unit Testing Using Mockito and JUnit (2014) by Sujay ...

Maven Repository: junit
https://mvnrepository.com/artifact/junit/ ▾
junit » junit-depCPALCPL. JUnit is a regression testing framework written by Erich Gamma and Kent Beck. It is used by the developer who implements unit tests ...

Maven Repository: junit » junit » 4.12
https://mvnrepository.com/artifact/junit/junit/4.12 ▾
JUnit is a unit testing framework for Java, created by Erich Gamma and Kent Beck. ... Mastering Unit Testing Using Mockito and JUnit (2014) by Sujay Acharya.
Repositories: CentralAsposeRedhat GASONatype Used By: 75,164 artifacts
License: EPL 1.0 Date: (Dec 04, 2014)

Maven Repository: junit » junit » 4.11
https://mvnrepository.com/artifact/junit/junit/4.11 ▾
JUnit is a unit testing framework for Java, created by Erich Gamma and Kent Beck. ... Mastering Unit Testing Using Mockito and JUnit (2014) by Sujay Acharya.
Repositories: CentralAdobeAsposeGeomajas... License: CPAL 1.0CPL 1.0
Categories: Testing Frameworks Used By: 75,281 artifacts

https://mvnrepository.com/artifact/junit

46. Click on Maven Repository-JUnit it open another site-(<https://mvnrepository.com/artifact/junit>)

47. Click on JUnit-> Open and click on latest version as shown below (here 4.12x)

Version	Repository	Usages	Date
4.12	Central	34,788	Dec, 2014
4.12-beta-3	Central	30	Nov, 2014
4.12-beta-2	Central	31	Sep, 2014
4.12-beta-1	Central	31	Jul, 2014
4.11	Central	22,754	Nov, 2012
	Central	22	Oct, 2012

48. Copy above dependency to paste in pom.xml in Maven in Eclipse

Indexed Artifacts (12.3M)

JUnit > 4.12

JUnit is a unit testing framework for Java, created by Erich Gamma and Kent Beck.

License: EPL 1.0
Categories: Testing Frameworks
Organization: JUnit
HomePage: http://junit.org
Date: (Dec 04, 2014)
Files: pom (23 KB) | jar (307 KB) | View All
Repositories: Central | Aspose | Redhat GA | Sonatype
Used By: 78,839 artifacts

Maven | Gradle | SBT | Ivy | Grape | Leiningen | Buildr

```
<!-- https://mvnrepository.com/artifact/junit/junit -->
<dependency>
    <groupId>junit</groupId>
    <artifactId>junit</artifactId>
    <version>4.12</version>
    <scope>test</scope>
</dependency>
```

Include comment with link to declaration

Copied to clipboard!

49. Add <dependencies> tag before pasting as shown below

```

<!-- https://mvnrepository.com/artifact/junit/junit -->
<dependencies>
</dependencies>
</project>

```

50. Now Paste the above code in between <dependencies> tag then save pom.xml file

<!-- https://mvnrepository.com/artifact/junit/junit -->

```

<dependency>
    <groupId>junit</groupId>
    <artifactId>junit</artifactId>
    <version>4.12</version>
    <scope>test</scope>
</dependency>

```

```

<project xmlns="http://maven.apache.org/POM/4.0.0" xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
  xsi:schemaLocation="http://maven.apache.org/POM/4.0.0 http://maven.apache.org/xsd/maven-4.0.0.xsd">
  <modelVersion>4.0.0</modelVersion>
  <groupId> MavenTestReportDemo </groupId>
  <artifactId> MavenTestProject </artifactId>
  <version> 0.0.1-SNAPSHOT </version>
  <dependencies>
    <!-- https://mvnrepository.com/artifact/junit/junit -->
    <dependency>
      <groupId>junit</groupId>
      <artifactId>junit</artifactId>
      <version>4.12</version>
      <scope>test</scope>
    </dependency>
  </dependencies>
</project>

```

Problems view (2 warnings):

Description	Resource	Path	Location	Type
Warnings (2 items)				

51. Now it gets reflected in Maven by adding Junit jars

```

<project xmlns="http://maven.apache.org/POM/4.0.0" xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
  xsi:schemaLocation="http://maven.apache.org/POM/4.0.0 http://maven.apache.org/xsd/maven-4.0.0.xsd">
  <modelVersion>4.0.0</modelVersion>
  <groupId> MavenTestReportDemo </groupId>
  <artifactId> MavenTestProject </artifactId>
  <version> 0.0.1-SNAPSHOT </version>
  <dependencies>
    <!-- https://mvnrepository.com/artifact/junit/junit -->
    <dependency>
      <groupId>junit</groupId>
      <artifactId>junit</artifactId>
      <version>4.12</version>
      <scope>test</scope>
    </dependency>
  </dependencies>
</project>

```

Maven Dependencies view:

- junit-4.12.jar - C:\Users\admin\.m2\repository\junit\junit\4.12\junit-4.12.jar
- hamcrest-core-1.3.jar - C:\Users\admin\.m2\repository\org\hamcrest\hamcrest-core\1.3.0.1\hamcrest-core-1.3.0.1.jar

Problems view (2 warnings):

Description	Resource	Path	Location	Type
Warnings (2 items)				

52. Same process can be repeated for Selenium server

Go to Google-> Enter Maven Repository->Enter Selenium Server in Search box->Enter

Google Maven repository

About 1,08,00,000 results (0.54 seconds)

Maven Repository: Search/Browse/Explore
mvnrepository.com/

Popular Categories: Aspect Oriented · Actor Frameworks · Application Metrics · Build Tools · Bytecode Libraries · Command Line Parsers · Cache ...

selenium

Maven Repository: spring
Spring TestContext Framework. Last Release on Sep 7, 2018 ...

Central
URL: <http://central.maven.org/maven2/>. Jars, 3,116,199 ...

Categories
JavaServlet(TM) Specification, CDDLGPL, 10,126 ...

Maven Repositories - TutorialsPoint
https://www.tutorialspoint.com/maven/maven_repositories.htm · Maven Repositories - Learn Maven in simple and easy steps starting from basic to advanced concepts with examples including Overview, Environment Setup, ...

Aspect Oriented
The byteman jar merges the byteman-agent jar contents with ...

Aws-java-sdk-sqs
The AWS Java SDK for Amazon SQS module holds the client ...

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A minimal build system interpreting Maven-style pom.xml files. Last ...

Apache Maven Software 

Maven is a build automation tool used primarily for Java projects. Maven addresses two aspects of building software: first, it describes how software is built, and second, it describes its dependencies. [Wikipedia](#)

Developed by: Apache Software Foundation
Written in: Java

People also search for [spr](#) [eclips](#) [Gradle](#) [Apache Tomcat](#) [Jenkins](#) View 15+ more

Feedback

53. Click on First Link of Website-> Click on latest version

Google selenium server site:mvnrepository.com

About 47,700 results (0.42 seconds)

Maven Repository: org.seleniumhq.selenium » selenium-server
<https://mvnrepository.com/artifact/org.seleniumhq.selenium/selenium-server> · Selenium automates browsers. That's it! What you do with that power is entirely up to you. License, Apache 2.0. Categories, Web Testing.

Maven Repository: org.seleniumhq.selenium
<https://mvnrepository.com/artifact/org.seleniumhq.selenium> · org.seleniumhq.selenium » selenium-serverApache. Selenium automates browsers. That's it! What you do with that power is entirely up to you. Last Release on ... Selenium Server · Selenium Server Standalone · Selenium Java · Selenium API

Maven Repository: org.seleniumhq.selenium » selenium-server ...
<https://mvnrepository.com/artifact/org.seleniumhq.selenium/seelenium-server...usages> · Artifacts using Selenium Server Standalone (32) ... automation framework designed to extend and enhance the capabilities provided by Selenium (WebDriver).

Maven Repository: org.seleniumhq.selenium » selenium-server » 2.48.0
<https://mvnrepository.com/artifact/org.seleniumhq.selenium/selenium-server/2.48.0> · Selenium Server » 2.48.0. Selenium automates browsers. That's it! ... Selenium Webdriver: Software Automation Testing Secrets Revealed Part 2 (2016)

Maven Repository: org.seleniumhq.selenium » selenium-server » 2.28.0
<https://mvnrepository.com/artifact/org.seleniumhq.selenium/seelenium-server/2.28.0> · or Functional Automation Testing: Your Beginners

Maven Repository: org.seleniumhq.selenium

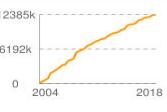
Home > org.seleniumhq.selenium > selenium-server

Selenium Server
Selenium automates browsers. That's it! What you do with that power is entirely up to you.

License Apache 2.0
Categories Web Testing
Tags testing, selenium, server, web
Used By 249 artifacts

Version	Repository	Usages	Date
3.14.x	Central	6	Aug, 2018
3.13.x	Central	8	Jun, 2018
3.12.x	Central	9	May, 2018
3.11.x	Central	13	Mar, 2018
3.10.x	Central	2	Mar, 2018
3.9.x	Central	7	Feb, 2018
3.8.x	Central	14	Dec, 2017
3.7.x	Central	1	Nov, 2017

Indexed Artifacts (12.3M)



Popular Categories

- Aspect Oriented
- Actor Frameworks
- Application Metrics
- Build Tools
- Bytecode Libraries
- Command Line Parsers
- Cache Implementations
- Cloud Computing
- Code Analyzers
- Collections
- Configuration Libraries
- Core Utilities
- Date and Time Utilities
- Dependency Injection
- Embedded SQL Databases

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LAPP 

54. Copy Code in Maven Tab

The screenshot shows the Maven Repository website at <https://mvnrepository.com/artifact/org.seleniumhq.selenium/selenium-server/3.14.0>. The page displays information about the Selenium Server 3.14.0 artifact, including its license (Apache 2.0), categories (Web Testing), homepage, date (Aug 02, 2018), files (pom 3 KB, jar 589 KB), repositories (Central), and usage (249 artifacts). A graph titled 'Indexed Artifacts (12.3M)' shows the growth of indexed artifacts from 2004 to 2018. Below the artifact details, there is a code editor containing the Maven dependency XML code:

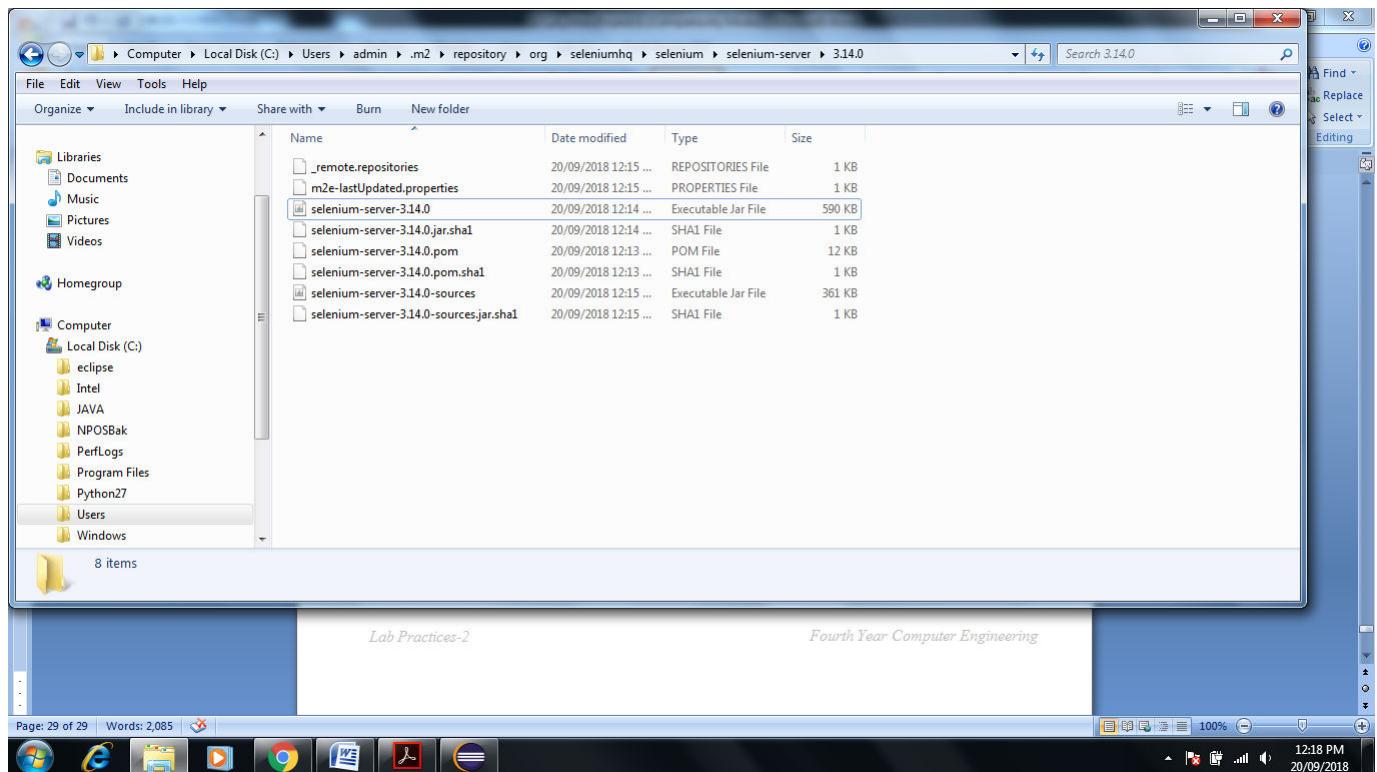
```
<!-- https://mvnrepository.com/artifact/org.seleniumhq.selenium/selenium-server -->
<dependency>
    <groupId>org.seleniumhq.selenium</groupId>
    <artifactId>selenium-server</artifactId>
    <version>3.14.0</version>
</dependency>
```

A message at the bottom of the code editor says "Copied to clipboard!".

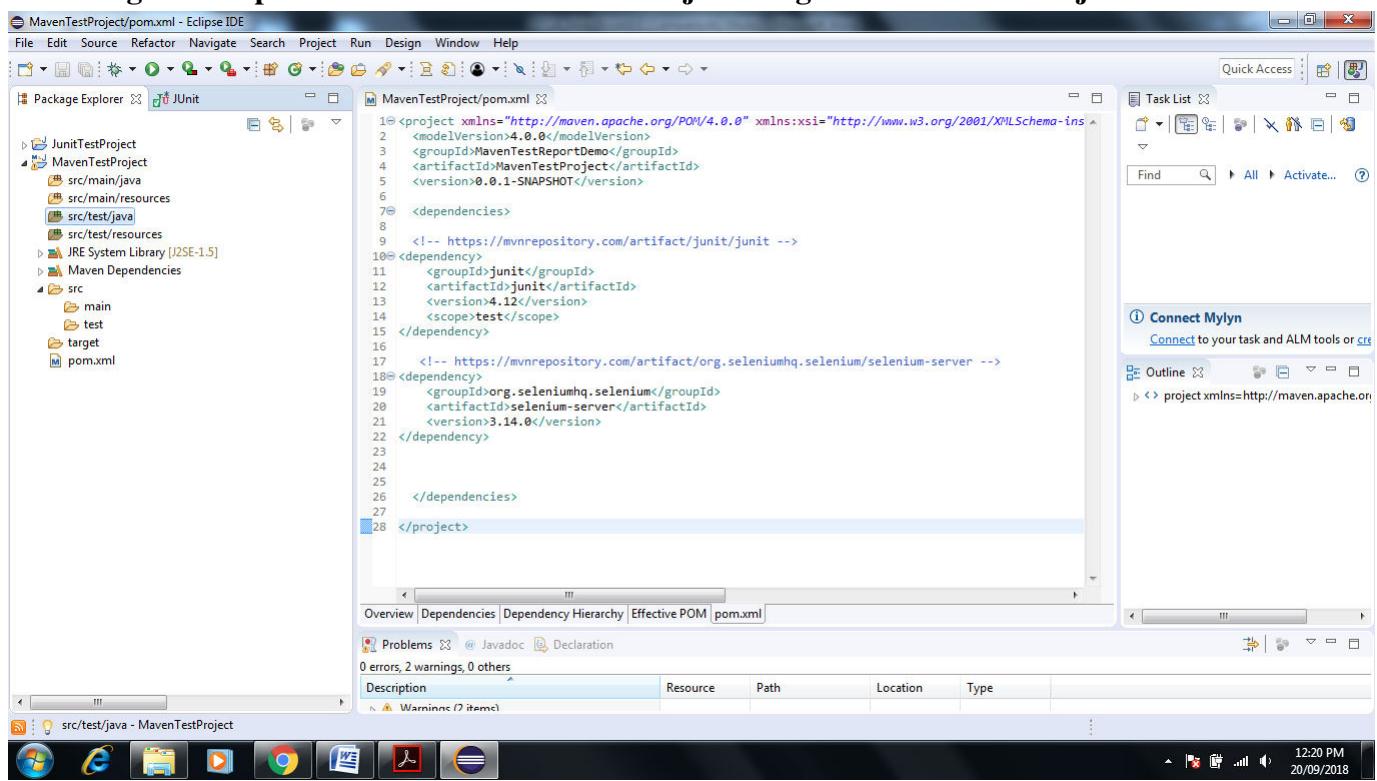
55. Paste in pom.xml file in between <dependencies> tag

The screenshot shows the Eclipse IDE interface with the title bar "MavenTestProject/pom.xml - Eclipse IDE". The central editor window displays the Maven project's pom.xml file. The code is highlighted with blue background and white text, indicating syntax highlighting for XML. The code includes the dependency for Selenium Server 3.14.0, which was copied from the Maven Repository page. The Eclipse interface includes the Package Explorer, Task List, and Outline panes on the right side.

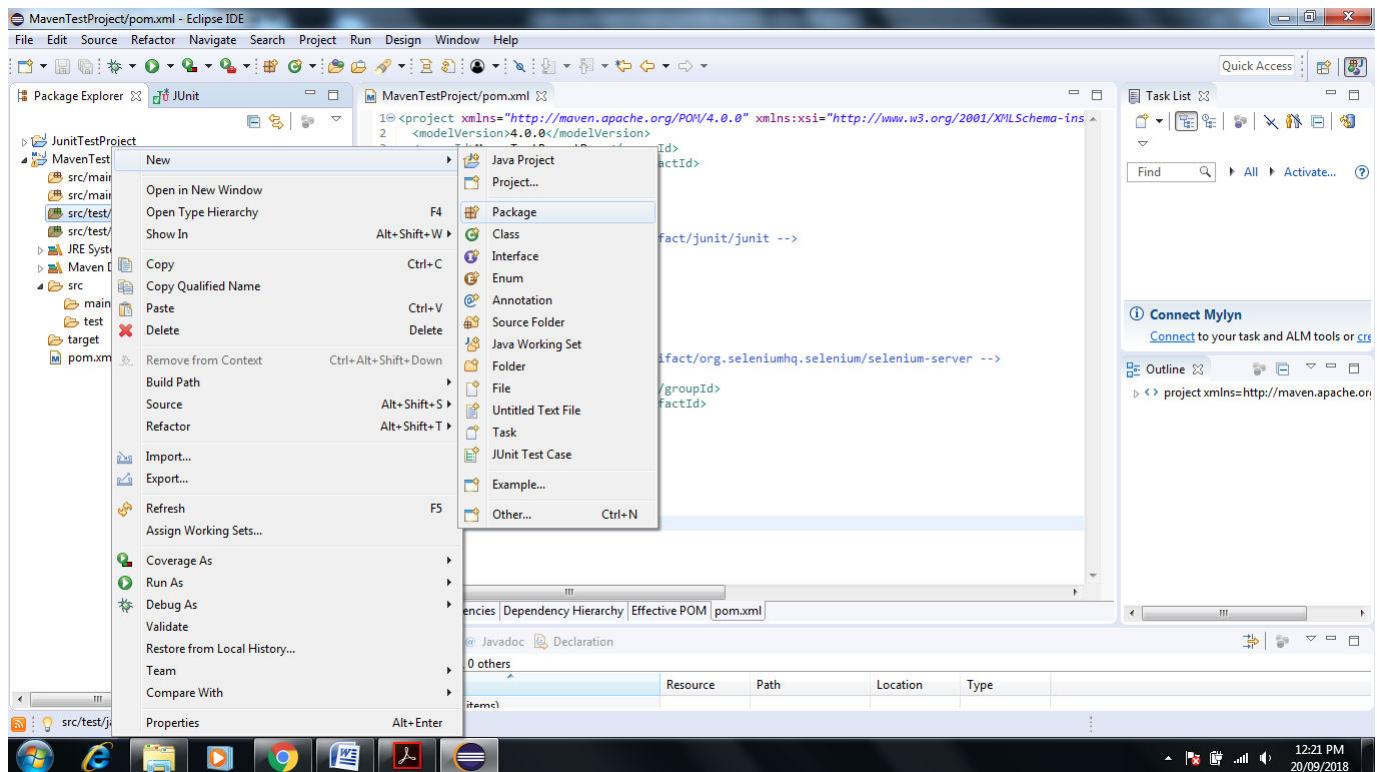
56. Now Go to C:\Users\admin\.m2\repository\org\seleniumhq\selenium\selenium-server\3.14.0 Check the latest selenium server version.



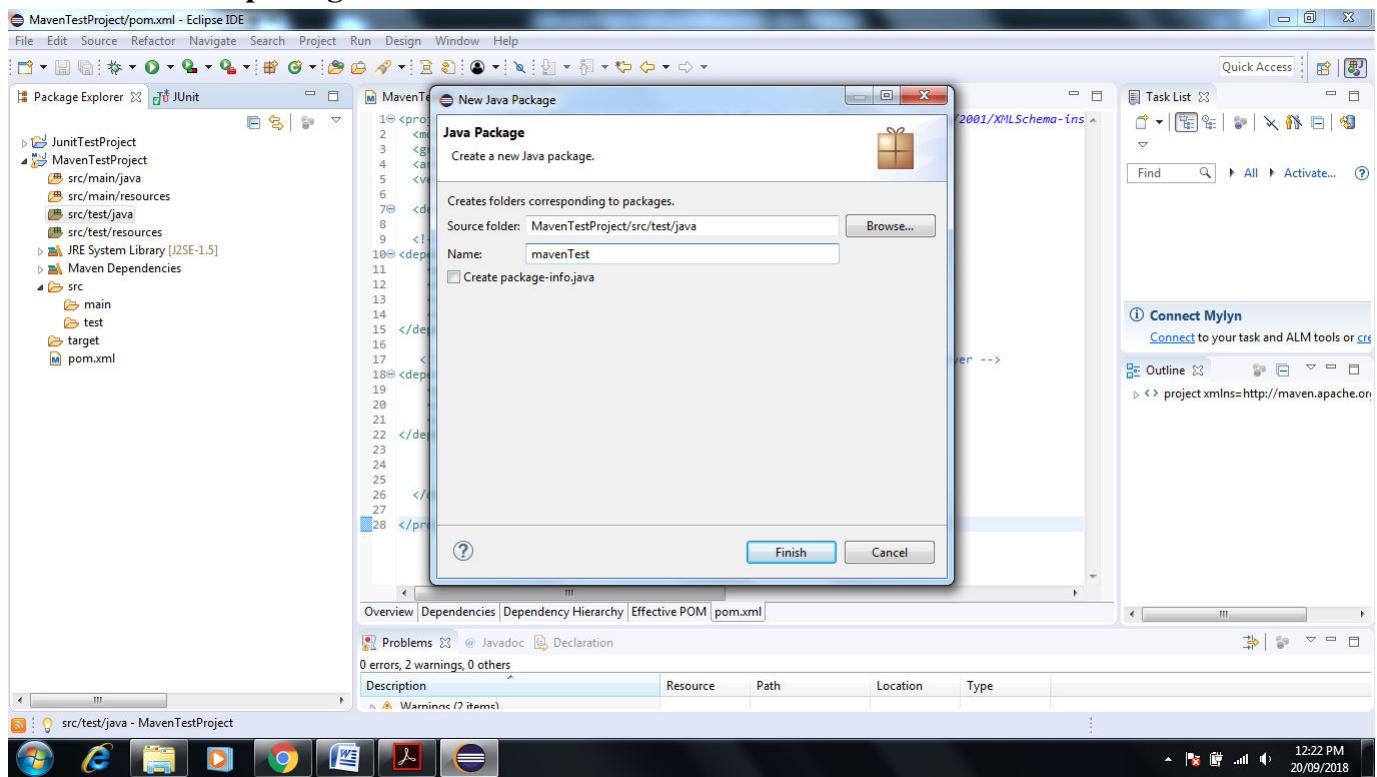
57. Now go to Eclipse -> Click on Maven Test Project->Right Click on src/test/java



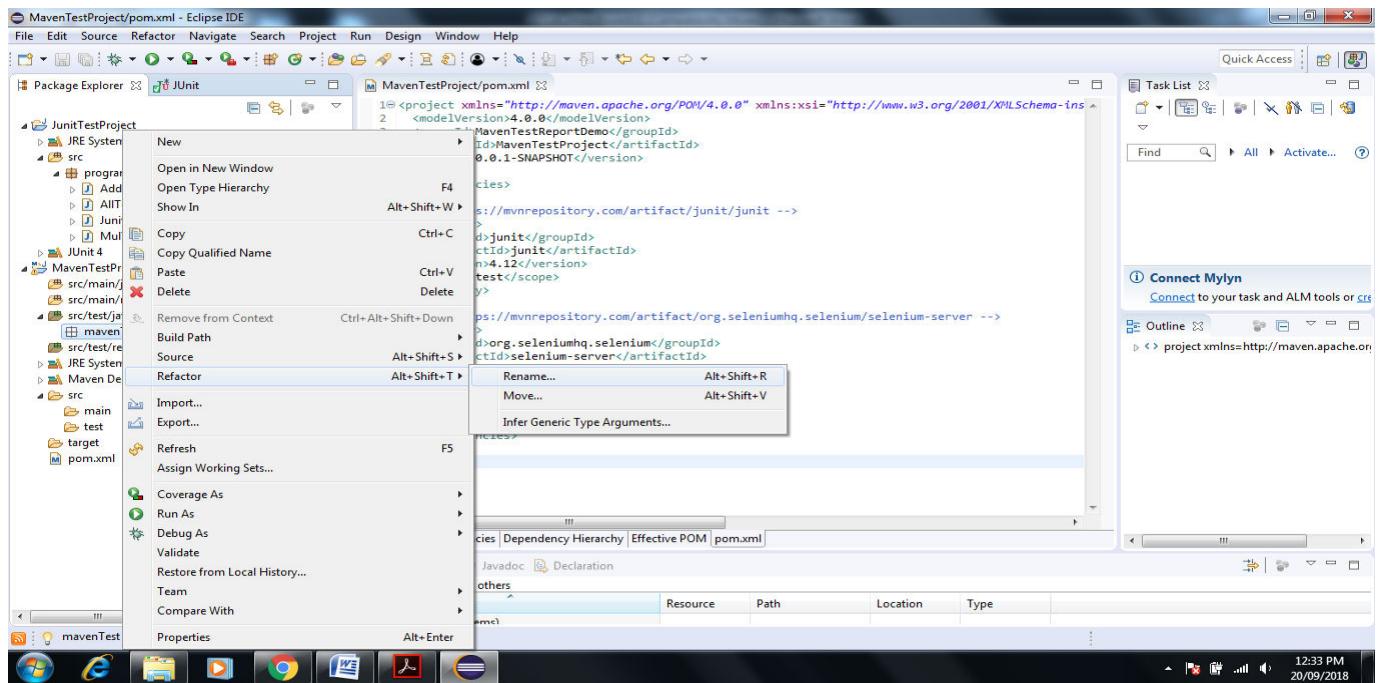
58. Click New->Package



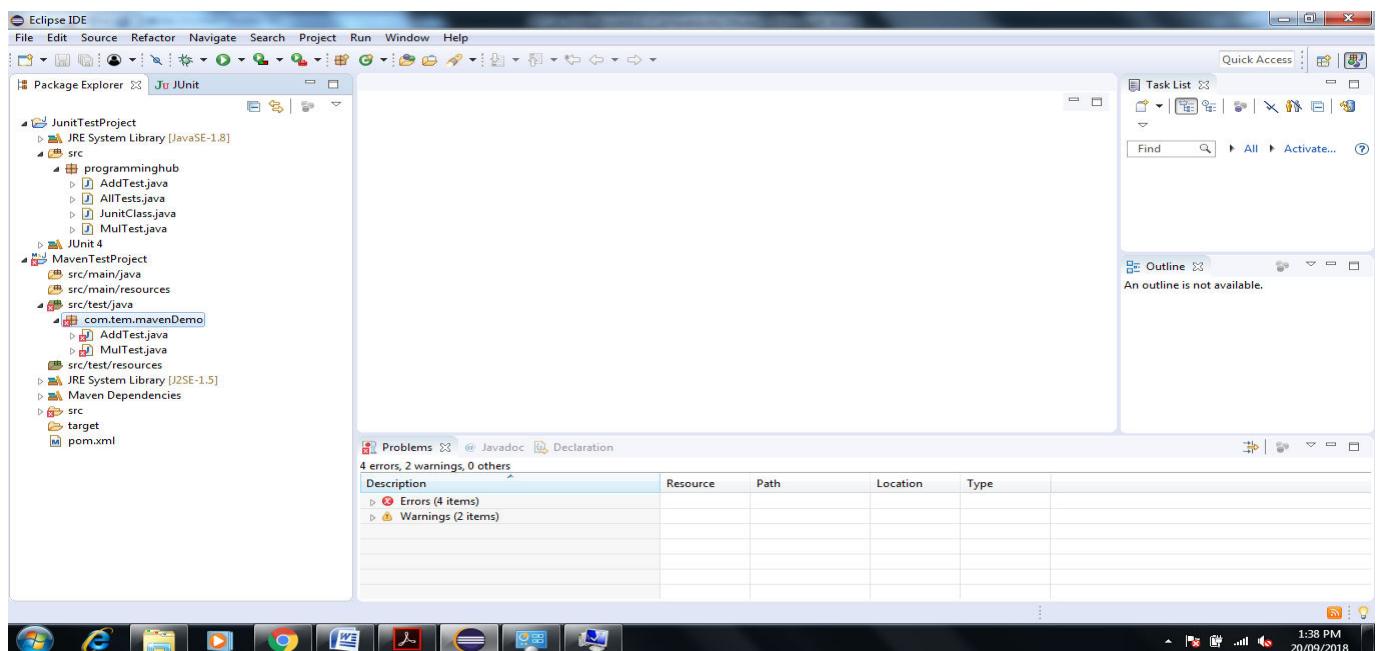
59. Give name to package mavenTest



60. It shows the manvenTest Package under src/test/java folder now rename same by right click on mavenTest Click on Refactor->Rename->give another name com.tem.mavenDemo->Click on ok



61. rename as com.tem.mavenDemo



62. Download Apache Maven Select that binary apache-maven-3.5.4-bin

Maven & JUnit - Test Automation

Maven – Download Apache Maven

Not secure | maven.apache.org/download.cgi

Repository

- Maven Developer Centre
- Books and Resources
- Security
- COMMUNITY
- Community Overview
- Project Roles
- How to Contribute
- Getting Help
- Issue Management
- Getting Maven Source
- The Maven Team
- PROJECT DOCUMENTATION
- Project Information
- MAVEN PROJECTS
- Archetype
- Artifact Resolver
- Doxia
- JXR
- Maven
- Parent POMs
- Plugins
- Plugin Testing
- Plugin Tools

Operating System

No minimum requirement. Start up scripts are included as shell scripts and Windows batch files.

Files

Maven is distributed in several formats for your convenience. Simply pick a ready-made binary distribution archive and follow the [installation instructions](#). Use a source archive if you intend to build Maven yourself.

In order to guard against corrupted downloads/installations, it is highly recommended to verify the signature of the release bundles against the public [KEYS](#) used by the Apache Maven developers.

Link	Checksums	Signature
Binary tar.gz archive	apache-maven-3.5.4-bin.tar.gz	apache-maven-3.5.4-bin.tar.gz.asc
Binary zip archive	apache-maven-3.5.4-bin.zip	apache-maven-3.5.4-bin.zip.asc
Source tar.gz archive	apache-maven-3.5.4-src.tar.gz	apache-maven-3.5.4-src.tar.gz.asc
Source zip archive	apache-maven-3.5.4-src.zip	apache-maven-3.5.4-src.zip.asc

- [Release Notes](#)
- [Reference Documentation](#)
- [Apache Maven Website As Documentation Archive](#)
- All current release sources (plugins, shared libraries,...) available at <https://www.apache.org/dist/maven/>
- [Latest source code from source repository](#)
- Distributed under the [Apache License, version 2.0](#)

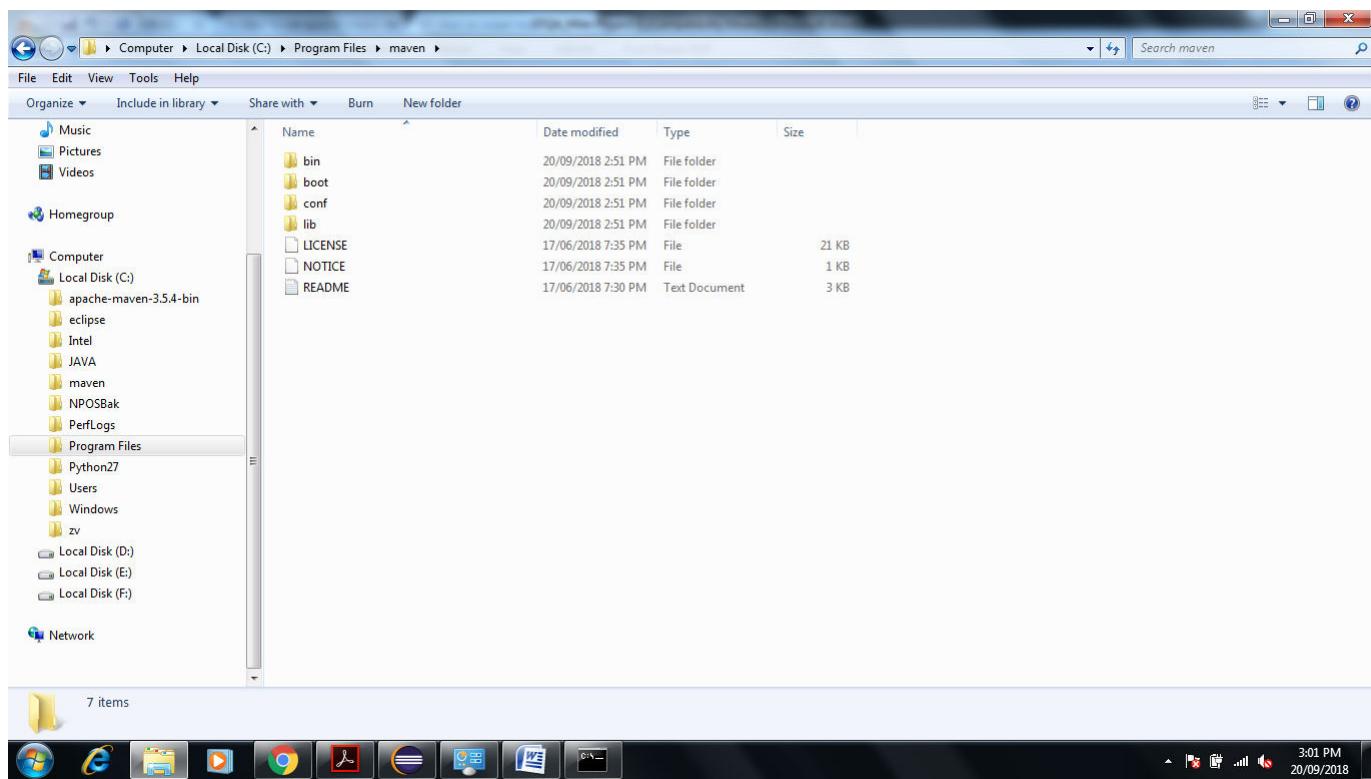
Previous Releases

It is strongly recommended to use the latest release version of Apache Maven to take advantage of newest features and bug fixes.

If you still want to use an old version you can find more information in the [Maven Releases History](#) and can download files from the [archives](#) for versions 3.0.4+ and [legacy](#).

1:32 PM 20/09/2018

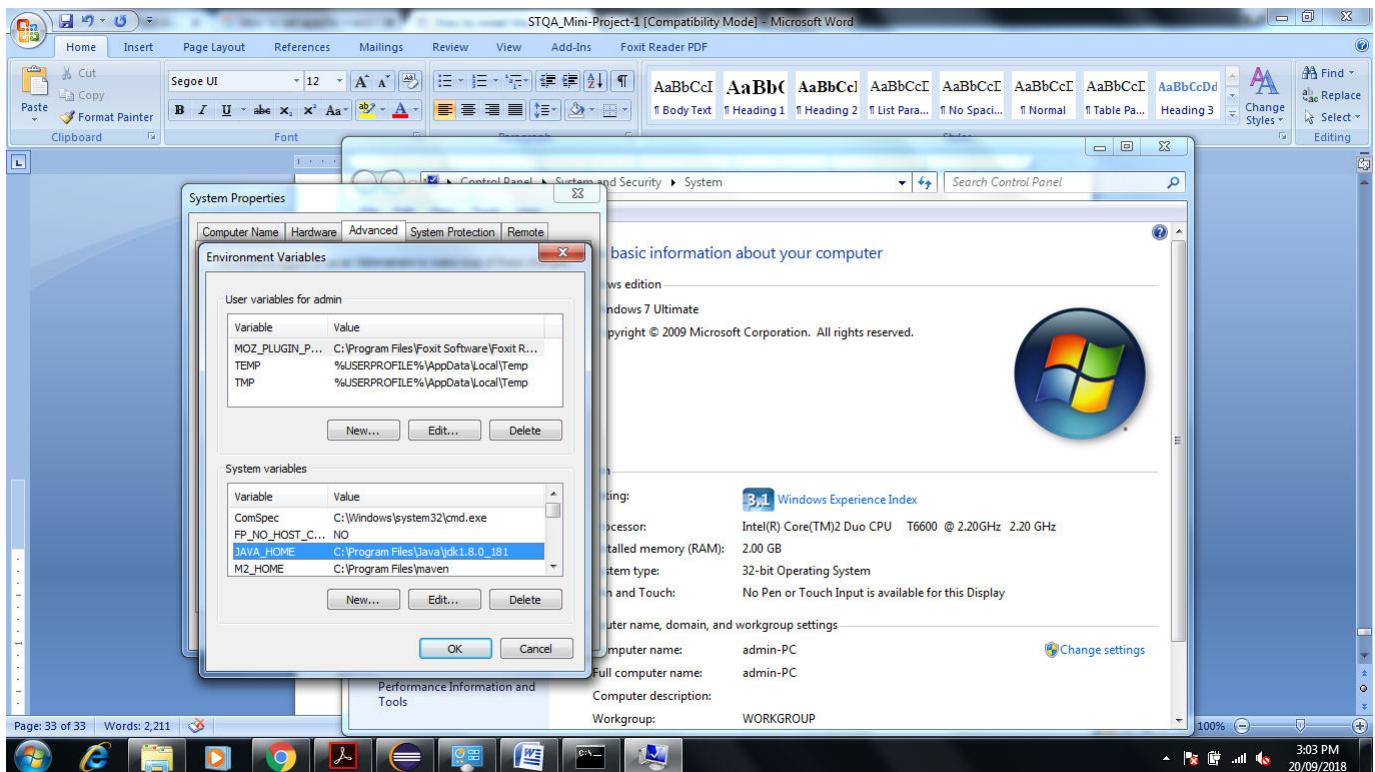
63. after Download->go to Program File->create one folder give name maven-> now extract the downloaded file in maven folder



64. Environment Setup Very Important Steps to Generate Report

1. JDK and JAVA_HOME

Make sure JDK is installed, and “**JAVA_HOME**” variable is added as Windows environment variable. Our JDK installed in Program File ->JAVA->JDK 1.8.0



2. Set Path of Add **M2_HOME** and **MAVEN_HOME**

Create new system variable name **M2_HOME** and **MAVEN_HOME** separately set variable value → **C:\Program Files\maven**

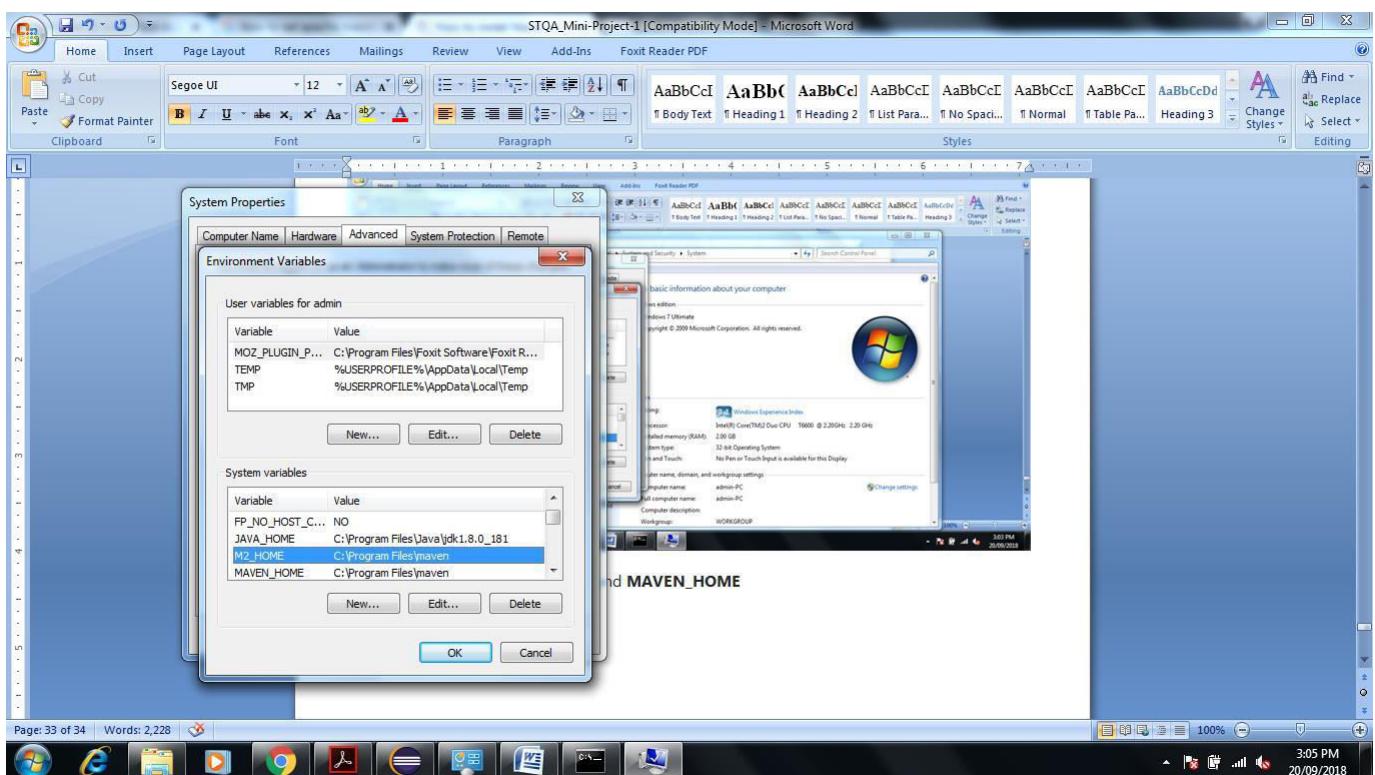


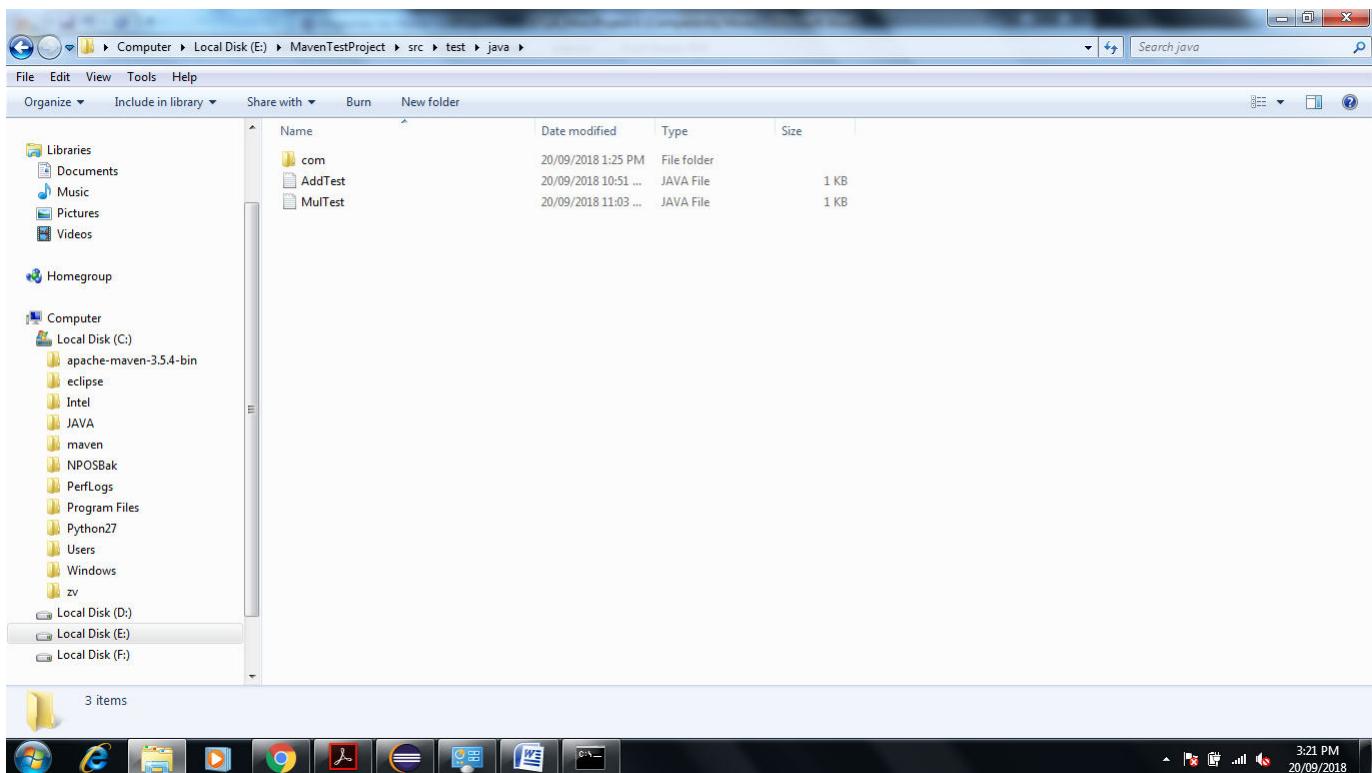
Figure Shows the Path of M2_HOME & MAVEN_HOME same.

3. Update PATH Variable as per following

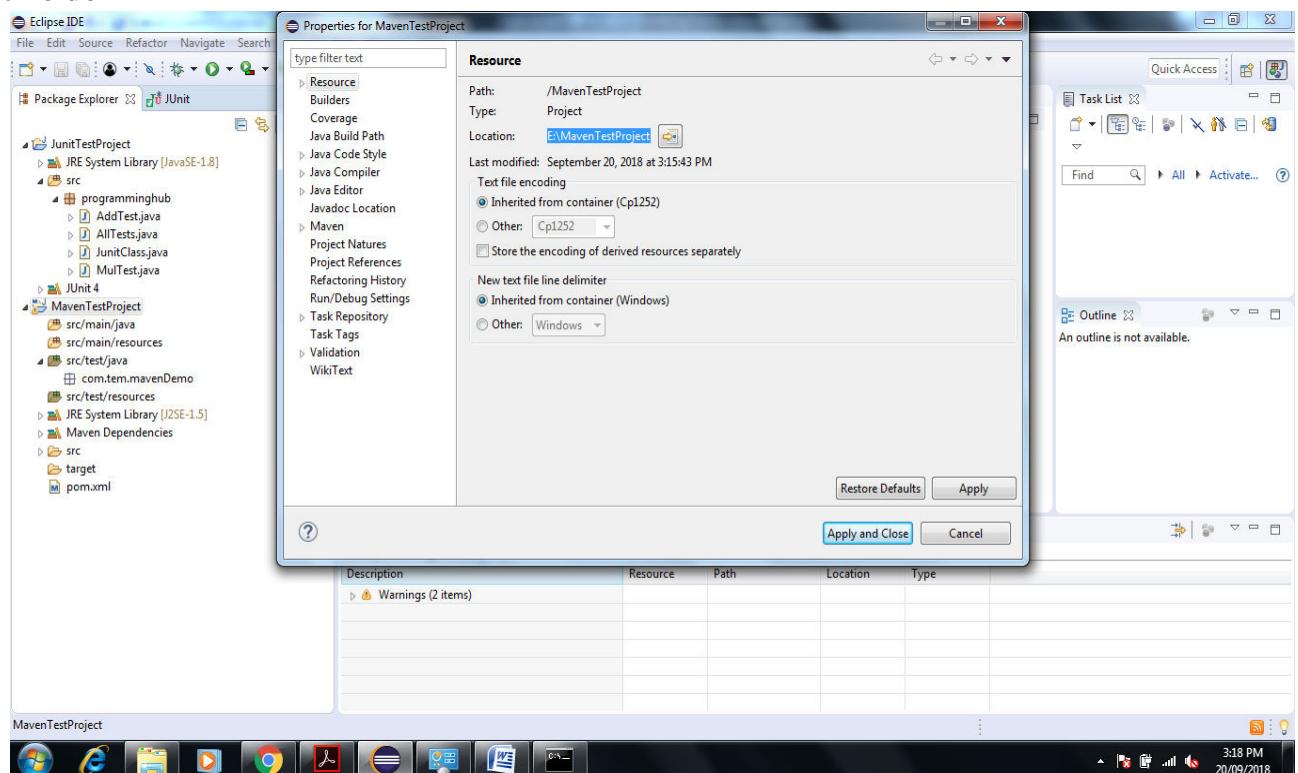
C:\Program Files\maven;%MAVEN_HOME%\bin;%M2_HOME%\bin;

4. Verification

Now copy Previous Created JUnit Test case java file Add Test and Mul Test Paste Externally in E:\MavenTestProject\src\test\java



Now Open Eclipse Right Click on MavenTestProject->Properties→Resources→Copy Path of Project Folder



Now go to command prompt→E:\MavenTestProject>mvn clean

```

E:\Administrator:C:\Windows\system32\cmd.exe
Microsoft Windows [Version 6.1.7600]
Copyright (c) 2009 Microsoft Corporation. All rights reserved.

C:\Users\ADMIN>:
E:\> MavenTestProject
'MavenTestProject' is not recognized as an internal or external command,
operable program or batch file.

E:>cd MavenTestProject
E:\MavenTestProject>mvn clean
[INFO] Scanning for projects...
[INFO] ------------------------------------------------------------------------
[INFO] Building MavenTestProject 0.0.1-SNAPSHOT
[INFO] ------------------------------------------------------------------------
[INFO] Downloading from central: https://repo.maven.apache.org/maven2/org/apache/maven/plugins/maven-clean-plugin/2.5/maven-clean-plugin-2.5.pom
[INFO] Downloaded from central: https://repo.maven.apache.org/maven2/org/apache/maven/plugins/maven-clean-plugin/2.5/maven-clean-plugin-2.5.pom (3.9 kB at 748 B/s)
[INFO] Downloading from central: https://repo.maven.apache.org/maven2/org/apache/maven/plugins/maven-clean-plugin/2.5/maven-clean-plugin-22.pom
[INFO] Downloaded from central: https://repo.maven.apache.org/maven2/org/apache/maven/plugins/maven-clean-plugin/2.5/maven-clean-plugin-22.pom (13 kB at 34 kB/s)
[INFO] 
[INFO] --- maven-clean-plugin:2.5:clean (default-clean) @ MavenTestProject ---
[INFO] Downloading from central: https://repo.maven.apache.org/maven2/org/codehaus/plexus/plexus-utils/3.0/plexus-utils-3.0.pom
[INFO] Downloaded from central: https://repo.maven.apache.org/maven2/org/codehaus/plexus/plexus-utils/3.0/plexus-utils-3.0.pom (4.1 kB at 11 kB/s)
[INFO] Downloading from central: https://repo.maven.apache.org/maven2/org/sonatype/spice/spice-parent/16/spice-parent-16.pom
[INFO] Downloaded from central: https://repo.maven.apache.org/maven2/org/sonatype/spice/spice-parent/16/spice-parent-16.pom (8.4 kB at 22 kB/s)
[INFO] Downloading from central: https://repo.maven.apache.org/maven2/org/sonatype/forge/forge-parent/5/forge-parent-5.pom
[INFO] Downloaded from central: https://repo.maven.apache.org/maven2/org/sonatype/forge/forge-parent/5/forge-parent-5.pom (8.4 kB at 23 kB/s)
[INFO] Downloading from central: https://repo.maven.apache.org/maven2/org/codehaus/plexus/plexus-utils/3.0/plexus-utils-3.0.jar
[INFO] Downloaded from central: https://repo.maven.apache.org/maven2/org/codehaus/plexus/plexus-utils/3.0/plexus-utils-3.0.jar (226 kB at 196 kB/s)
[INFO] Deleting E:\MavenTestProject\target
[INFO] 
[INFO] BUILD SUCCESS
[INFO] 
[INFO] Total time: 15.087 s
[INFO] Finished at: 2018-06-20T15:15:43+05:30
[INFO] 
[INFO] 'cmd' is not recognized as an internal or external command,
operable program or batch file.

E:\MavenTestProject>mvn -version
Apache Maven 3.5.4 (4ed60d938998edf8bf061f1ceb3cfdeccf443fe; 2018-06-18T00:03:14+05:30)
Maven home: C:\Program Files\maven\bin\..
Java version: 1.8.0_181, vendor: Oracle Corporation, runtime: C:\Program Files\Java\jdk1.8.0_181\jre
Default locale: en_US, platform encoding: Cp1252
OS name: "windows 7", version: "6.1", arch: "x86", family: "windows"
'cmd' is not recognized as an internal or external command,
operable program or batch file.

E:\MavenTestProject>

```

Enter E:\MavenTestProject>mvn –version

```

E:\Administrator:C:\Windows\system32\cmd.exe
Apache Maven 3.5.4 (4ed60d938998edf8bf061f1ceb3cfdeccf443fe; 2018-06-18T00:03:14+05:30)
Maven home: C:\Program Files\maven\bin\..
Java version: 1.8.0_181, vendor: Oracle Corporation, runtime: C:\Program Files\Java\jdk1.8.0_181\jre
Default locale: en_US, platform encoding: Cp1252
OS name: "windows 7", version: "6.1", arch: "x86", family: "windows"
'cmd' is not recognized as an internal or external command,
operable program or batch file.

E:\MavenTestProject>

```

To run test suite or all test cases under project, give command mvn test

Enter E:\MavenTestProject>mvn test

This Command is Used to See the Test Report

You can even run individual test cases. Give command mvn test –Dtesttestcasename

Eg. mvn test -Dtest=AllTest

The screenshot shows a Windows desktop environment. On the left, a command prompt window titled 'Administrator: C:\Windows\system32\cmd.exe' displays the output of the 'mvn test -Dtest=AllTest' command. The output shows Maven scanning for projects, building the 'MavenTestProject' version 0.0.1-SNAPSHOT, and executing the 'maven-resources-plugin:2.6:resources' and 'maven-compiler-plugin:3.1:compile' phases. It also shows a warning about platform encoding. On the right, a Microsoft Word document titled 'Compatibility Mode - Microsoft Word' is open, showing a slide with the text 'project, give command mvn test'. The status bar at the bottom of the screen indicates the date as 20/09/2018 and the time as 3:44 PM.

```
E:\MavenTestProject>mvn test -Dtest=AllTest
[INFO] Scanning for projects...
[INFO] [ MavenTestReportDemo:MavenTestProject ] >-->
[INFO] Building MavenTestProject 0.0.1-SNAPSHOT
[INFO] [ jar ]
[INFO] --- maven-resources-plugin:2.6:resources (default-resources) @ MavenTestProject ---
[WARNING] Using platform encoding (Cp1252 actually) to copy filtered resources,
i.e. build is platform dependent!
[INFO] Copying 0 resource
[INFO] --- maven-compiler-plugin:3.1:compile (default-compile) @ MavenTestProject ---
[INFO] Nothing to compile - all classes are up to date
[INFO] --- maven-resources-plugin:2.6:testResources (default-testResources) @ MavenTestProject ---
[WARNING] Using platform encoding (Cp1252 actually) to copy filtered resources,
i.e. build is platform dependent!
[INFO] Copying 0 resource
[INFO] --- maven-compiler-plugin:3.1:testCompile (default-testCompile) @ MavenTestProject ---
[INFO] Changes detected - recompiling the module!
[WARNING] File encoding has not been set, using platform encoding Cp1252, i.e. build is platform dependent!
[INFO] --- maven-surefire-plugin:2.12.4:test (default-test) @ MavenTestProject --
Downloaded from central: https://repo.maven.apache.org/maven2/org/apache/maven/surefire/surefire-booter/2.12.4/surefire-booter-2.12.4.pom
Downloaded from central: https://repo.maven.apache.org/maven2/org/apache/maven/surefire/surefire-booter/2.12.4/surefire-booter-2.12.4.pom (3.0 kB at 614 B/s)
Downloaded from central: https://repo.maven.apache.org/maven2/org/apache/maven/surefire/surefire-booter/2.12.4/surefire-booter-2.12.4.pom (3.0 kB at 614 B/s)
Downloaded from central: https://repo.maven.apache.org/maven2/org/apache/maven/surefire/surefire-api/2.12.4/surefire-api-2.12.4.pom (2.5 kB at 6.4 kB/s)
Downloaded from central: https://repo.maven.apache.org/maven2/org/apache/maven/surefire/maven-surefire-common/2.12.4/maven-surefire-common-2.12.4.pom
Downloaded from central: https://repo.maven.apache.org/maven2/org/apache/maven/surefire/maven-surefire-common/2.12.4/maven-surefire-common-2.12.4.pom (5.5 kB at 13 kB/s)
Downloaded from central: https://repo.maven.apache.org/maven2/org/apache/maven/plugin-tools/maven-plugin-annotations/3.1/maven-plugin-annotations-3.1.pom
Downloaded from central: https://repo.maven.apache.org/maven2/org/apache/maven/plugin-tools/maven-plugin-annotations/3.1/maven-plugin-annotations-3.1.pom (1.6 kB at 4.4 kB/s)
Downloaded from central: https://repo.maven.apache.org/maven2/org/apache/maven/plugin-tools/maven-plugin-tools/3.1/maven-plugin-tools-3.1.pom
Downloaded from central: https://repo.maven.apache.org/maven2/org/apache/maven/plugin-tools/maven-plugin-tools/3.1/maven-plugin-tools-3.1.pom (16 kB at 30 kB/s)
Downloaded from central: https://repo.maven.apache.org/maven2/org/apache/maven/reporting/maven-reporting-api/2.0.9/maven-reporting-api-2.0.9.pom
[INFO] Total time: 3.848 s
[INFO] Finished at: 2018-09-20T15:53:21+05:30
[INFO] 
[INFO] 'cmd' is not recognized as an internal or external command,
operable program or batch file.
E:\MavenTestProject>mvn test -Dtest=AllTest
[INFO] Scanning for projects...
[INFO] [ MavenTestReportDemo:MavenTestProject ] >-->
[INFO] Building MavenTestProject 0.0.1-SNAPSHOT
[INFO] [ jar ]
[INFO] --- maven-resources-plugin:2.6:resources (default-resources) @ MavenTestProject ---
[WARNING] Using platform encoding (Cp1252 actually) to copy filtered resources,
i.e. build is platform dependent!
[INFO] Copying 0 resource
[INFO] --- maven-compiler-plugin:3.1:compile (default-compile) @ MavenTestProject ---
[INFO] Nothing to compile - all classes are up to date
[INFO] --- maven-resources-plugin:2.6:testResources (default-testResources) @ MavenTestProject ---
[WARNING] Using platform encoding (Cp1252 actually) to copy filtered resources,
i.e. build is platform dependent!
[INFO] Copying 0 resource
[INFO] --- maven-compiler-plugin:3.1:testCompile (default-testCompile) @ MavenTestProject ---
[INFO] Nothing to compile - all classes are up to date
[INFO] --- maven-surefire-plugin:2.12.4:test (default-test) @ MavenTestProject --
[INFO] BUILD SUCCESS
[INFO] 
[INFO] Total time: 3.848 s
[INFO] Finished at: 2018-09-20T15:53:21+05:30
[INFO] 
```

The screenshot shows a Windows desktop environment. On the left, a command prompt window titled 'Administrator: C:\Windows\system32\cmd.exe' displays the output of the 'mvn test -Dtest=AllTest' command. The output shows Maven scanning for projects, building the 'MavenTestProject' version 0.0.1-SNAPSHOT, and executing the 'maven-resources-plugin:2.6:resources' and 'maven-compiler-plugin:3.1:compile' phases. It also shows a warning about platform encoding. On the right, a Microsoft Word document titled 'Compatibility Mode - Microsoft Word' is open, showing a slide with the text 'THE END*****'. The status bar at the bottom of the screen indicates the date as 20/09/2018 and the time as 3:56 PM.

```
E:\MavenTestProject>mvn test -Dtest=AllTest
[INFO] Scanning for projects...
[INFO] [ MavenTestReportDemo:MavenTestProject ] >-->
[INFO] Building MavenTestProject 0.0.1-SNAPSHOT
[INFO] [ jar ]
[INFO] --- maven-resources-plugin:2.6:resources (default-resources) @ MavenTestProject ---
[WARNING] Using platform encoding (Cp1252 actually) to copy filtered resources,
i.e. build is platform dependent!
[INFO] Copying 0 resource
[INFO] --- maven-compiler-plugin:3.1:compile (default-compile) @ MavenTestProject ---
[INFO] Nothing to compile - all classes are up to date
[INFO] --- maven-resources-plugin:2.6:testResources (default-testResources) @ MavenTestProject --
```

1.8.8 Conclusion

In this way using JUnit and Maven Automation tool we are Perform Unit Testing and Prepare Test Report of same.

1.8.9 Assignment Question

1. Write any Five Tool for White Box and Black Box Testing Purpose.

STQA Mini Project No. 2

2.1 Title

Create a small web-based application by selecting relevant system environment/platform and programming languages. Narrate concise Test Plan consisting features to be tested and bug taxonomy. Narrate scripts in order to perform regression tests. Identify the bugs using Selenium WebDriver and IDE and generate test reports encompassing exploratory testing.

2.2 Problem Definition:

Perform Web testing and identify the bugs using Selenium WebDriver and IDE and generate test reports encompassing exploratory testing.

2.3 Prerequisite:

Knowledge of Core Java

2.4 Software Requirements:

Eclipse photon R latest Version, JAVA 1.8, selenium-server-standalone-3.13.0 Chromedriver.exe

2.5 Hardware Requirement

PIV, 2GB RAM, 500 GB HDD, Lenovo A13-4089 Model.

2.6 Learning Objectives:

We are going to learn how to identify the bugs using Selenium WebDriver and IDE and generate test reports encompassing exploratory testing.

2.7 Outcomes:

You are able to perform Web Testing using Automation Tool like Selenium Web driver and IDE

2.8 Theory Concepts:

2.8.1 What is Selenium?

Selenium is a free (open source) automated testing suite for web applications across different browsers and platforms.

Selenium is a suite of software tools to automate Web Browsers.

- It is an Open source suite of tools mainly used for Functional and Regression Test Automation.

Selenium is a free (open source) automated testing suite for web applications across different browsers and platforms.

It is quite similar to HP Quick Test Pro (QTP now UFT) only that Selenium focuses on automating web-based applications. Testing done using Selenium tool is usually referred as Selenium Testing.

- **Selenium supports various Operating environments.**

- ✓ MS Windows
- ✓ Linux
- ✓ Macintosh etc...

- **Selenium supports various Browsers.**

- ✓ Mozilla Firefox
- ✓ IE
- ✓ Google Chrome
- ✓ Safari
- ✓ Opera etc...

Note: **Selenium IDE supports Mozilla Firefox only.**

- **Selenium supports various programming environments to write programs (Test scripts)**

- ✓ Java
- ✓ C#
- ✓ Python
- ✓ Perl
- ✓ Ruby
- ✓ PHP

2.8.2 History of the Selenium Project

Selenium first came to life in 2004.

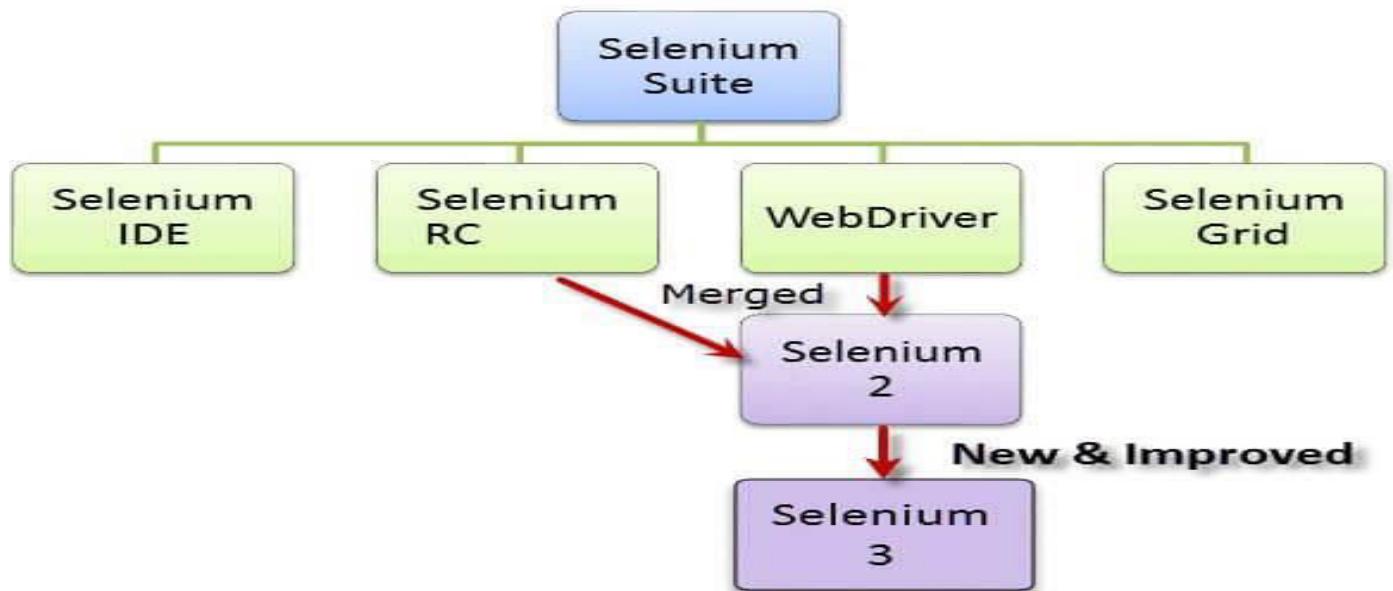
- In 2006, Selenium WebDriver was launched at Google.
- In 2008, the whole Selenium team decided to merge Selenium WebDriver with Selenium RC in order to form more powerful tool called Selenium 2.0
 - ✓ **Selenium 1**
(Selenium IDE + Selenium RC + Selenium Grid)
 - ✓ **Selenium 2**
(Selenium IDE + Selenium RC + Selenium WebDriver + Selenium Grid)

2.8.3 Selenium's Tools Suite

Selenium is not just a single tool but a suite of software's, each catering to different testing needs of an organization.

It has four components.

- Selenium Integrated Development Environment (IDE)
- Selenium Remote Control (RC)
- WebDriver
- Selenium Grid



2.8.4 Brief Introduction Selenium IDE

It is a Firefox browser plug in, used to create and execute Test cases.

1. Selenium IDE Features:

- Create Test Cases, Test suites (We can Record test cases or type Test steps using element locators and Selenese commands)
- Edit Test Cases
- Execute Test cases, Test suites
- Debug Test Cases.
- Enhance Test Cases
- Export Test cases to other formats (java, ruby etc...)

Note: **selenium IDE Test case default format is .html**

2. Drawbacks of Selenium IDE

- It supports Mozilla Firefox browser only.
- It doesn't support Programming logic/features to enhance Test cases.
- It doesn't support Data Driven Testing.
- It is not suitable for complex test case design.
- No centralized maintenance of Objects/Elements

3. Selenium RC (* Out dated) -Currently, Selenium RC is still being developed but only in maintenance mode.

4. Selenium WebDriver

- ✓ It is a Programming interface to create and execute Test cases.

Selenium IDE has IDE but doesn't have Programming interface

- ✓ Selenium WebDriver has Programming interface but doesn't have IDE
- ✓ It communicates Directly to the browser.
- ✓ No need of Separate Server such as RC Server
- ✓ UFT/QTP has both IDE as well as Programming interface
- ✓ Faster Execution than IDE & RC

- **Selenium WebDriver supports various programming environments to write programs.**

- ✓ Java,
- ✓ C#
- ✓ Perl
- ✓ Python
- ✓ Ruby
- ✓ PHP

- Using Element/Object locators/properties and Webdriver Methods we can create and execute Test cases.
- Selenium Webdriver supports various browsers to create and execute test case/test script/test

Note: **Browser driver varies from one browser to another.**

- **Selenium WebDriver supports various operating environments**

- ✓ MS Windows
- ✓ Linux Macintosh etc...

Drawback of Selenium WebDriver

- It doesn't generate detailed Test Reports.
- No centralized maintenance of Object/elements
- It require Programming Knowledge
- cannot support the readily new browser
- Installation is More Complicated than Selenium IDE
- No built-in mechanism for logging runtime message

5. Selenium Grid

- Selenium Grid is used to execute tests across multiple browsers, operating environments and machines in parallel.
- Selenium Grid 2 supports Selenium RC Tests as well as Selenium WebDriver Tests.
- i) Selenium WebDriver to create Test cases using element locators and Webdriver methods.
- ii) Java Programming to enhance test cases.
- iii) TestNG Framework to group test cases, execute test batches and generate detailed test reports.

Features:

- Enables **simultaneous running of tests in multiple browsers and environments.**
- **Saves time** enormously.
- Utilizes the **hub-and-nodes** concept. The hub acts as a central source of Selenium commands to each node connected to it.

Note on Browser and Environment Support

- Because of their architectural differences, Selenium IDE, Selenium RC, and WebDriver support different sets of browsers and operating environments.

	Selenium IDE	WebDriver
Browser Support	Mozilla Firefox	Internet Explorer versions 6 to 11, both 32 and 64-bit Microsoft Edge version 12.10240 & above (partial support some)

	Selenium IDE	WebDriver
		<p>functionalities under development)</p> <p>Firefox 3.0 and above</p> <p>Google Chrome 12.0. and above</p> <p>Opera 11.5 and above</p> <p>Android - 2.3 and above for phones and tablets (devices & emulators)</p> <p>iOS 3+ for phones (devices & emulators) and 3.2+ for tablets (devices & emulators)</p> <p>HtmlUnit 2.9 and above</p>
Operating System	Windows, Mac OS X, Linux	All operating systems where the browsers above can run.

- **Note:** Selenium WebDriver is termed as the successor of Selenium RC which has been deprecated & officially announced by SeleniumHQ.

2.8.5 How to Choose the Right Selenium Tool for Your Need

Tool	Why Choose?
Selenium IDE	<ul style="list-style-type: none"> • To learn about concepts on automated testing and Selenium, including: • Selenese commands such as type, open, clickAndWait, assert, verify, etc. • Locators such as id, name, xpath, css selector, etc. • Executing customized JavaScript code using runScript • Exporting test cases in various formats. • To create tests with little or no prior knowledge in programming. • To create simple test cases and test suites that you can export later to RC or WebDriver. • To test a web application against Firefox only.
Selenium RC	<ul style="list-style-type: none"> • To design a test using a more expressive language than Selenese • To run your test against different browsers (except HtmlUnit) on different operating systems. • To deploy your tests across multiple environments using Selenium Grid.

Tool	Why Choose?
	<ul style="list-style-type: none"> • To test your application against a new browser that supports JavaScript. • To test web applications with complex AJAX-based scenarios.
WebDriver	<ul style="list-style-type: none"> • To use a certain programming language in designing your test case. • To test applications that are rich in AJAX-based functionalities. • To execute tests on the HtmlUnit browser. • To create customized test results.
Selenium Grid	<ul style="list-style-type: none"> • To run your Selenium RC scripts in multiple browsers and operating systems simultaneously. • To run a huge test suite, that needs to complete in the soonest time possible.

2.8.6 Advantages of Selenium

- i) It is an Open source Software.
- ii) It supports various Operating environments (Windows, Linux, Mac etc...)
- iii) It supports various browsers (IE, Mozilla Firefox, Chrome, safari, Opera etc...)
- iv) It supports various programming environments (Java, Perl, Python, Ruby and PHP)
- v) It supports parallel Test execution.
- vi) It uses less Hardware resources.

2.8.7 Disadvantages of Selenium

- i) It supports Web based Applications only.
- ii) No reliable support from anybody.
- iii) No centralized maintenance of Elements/objects
- iv) Difficult to setup environment.
- v) Difficult to use.
- vi) Limited support for Image based testing.
- vii) New features may not work properly.
- viii) No other tool integration for test management & No built in Reporting facility.

2.8.8 Selenium Versus UFT

Selenium	UFT / QTP
1) Open Source	Vendor tool, License is required.
2) Supports various OS Environments.	MS Windows only.
3) Supports various Programming Environments	VBScript only.
4) No Object Repositories	Local and Shared object Repositories.
5) No built-in Reporting feature.	Built-in reporting feature.
6) Selenium WebDriver has no IDE and Selenium IDE has no Programming Interface.	UFT has both IDE and Programming Interface.
7) Uses less Hardware resources.	Uses more Hardware resources
8) Difficult to setup environment and use.	Easy to setup and use.
9) Limited support for Image Testing	Rich support for Image Testing
10) No Reliable support	Support from HP
11) No other tool integration for Test management.	UFT can be integrated with ALM/QC for Test Management.
12) New features may not work properly.	New features will work properly.
13) No Add ins for supporting Application Environments.	Add ins are required for supporting Application environments.
14) Supports Web Applications only	Supports Desktop and Web Applications.
15) No Authorized Certification	Authorized Certification program.

2.8.9 What is TestNG?

TestNG is a powerful testing framework, an enhanced version of JUnit which was in use for a long time before TestNG came into existence. NG stands for 'Next Generation'.

TestNG framework provides the following features –

- Annotations help us organize the tests easily.
- Flexible test configuration.
- Test cases can be grouped more easily.
- Parallelization of tests can be achieved using TestNG.
- Support for data-driven testing.
- Inbuilt reporting.

2.8.9 Step by Step Tutorial

1. First of Download Latest Eclipse java photon-R version.
2. Download latest selenium-server-standalone-3.13.0 jar File from following link

<https://www.seleniumhq.org/download/> here on site 3.14.0 version is latest

The screenshot shows the SeleniumHQ website with the URL <https://www.seleniumhq.org/download/> in the address bar. The page header includes the SeleniumHQ logo, a search bar, and navigation links for Projects, Download, Documentation, Support, and About. A yellow banner at the top says "[SeleniumConf Chicago] Tickets are on sale (while supplies last)! Go [HERE](#) for details". The main content area is titled "Downloads" and contains sections for "Selenium Downloads", "Previous Releases", "Source Code", and "Maven Information". Below this is a "Donate to Selenium" section with a PayPal button and logos for VISA, MasterCard, American Express, and Discover. Another section for "through sponsorship" mentions the Selenium project. There are also "Selenium Sponsors" listed with logos for BrowserStack and SAUCE LABS. The "Selenium Standalone Server" section notes that the server is needed for running WebDriver. It provides links for "Download version 3.14.0" and "Download version 3.14.0 for (recommended) [32 bit Windows IE](#) or [64 bit Windows IE CHANGELOG](#)". The "The Internet Explorer Driver Server" section is also present. The bottom of the page features a footer with links for "CHROMEDRIVER", "CAPABILITIES & CHROMEOPTIONS", "CHROME EXTENSIONS", "CHROMEDRIVER CANARY", "CONTRIBUTING", "DOWNLOADS", "GETTING STARTED" (with sub-links for ANDROID and CHROMEOS), "LOGGING" (with sub-links for PERFORMANCE LOG), "MOBILE EMULATION", "NEED HELP?", "CHROMEDRIVER CRASHES", "CLICKING ISSUES", "DEVTOOLS WINDOW KEEPS CLOSING", and "OPERATION NOT SUPPORTED WHEN USING REMOTE DEBUGGING". The footer also includes a "Search this site" input field and a copyright notice: "© 2018 The Selenium Project. All rights reserved. This document is released under the Apache 2.0 license." The status bar at the bottom right shows the time as 2:04 PM and the date as 9/29/2018.

3. Download and Extract Chromedriver.exe for windows on any drive of computer.

<http://chromedriver.chromium.org/downloads> 2.42 is latest version

The screenshot shows the ChromeDriver download page with the URL <http://chromedriver.chromium.org/downloads> in the address bar. The page title is "ChromeDriver - WebDriver for Chrome". On the left, there's a sidebar with links for CHROMEDRIVER, CAPABILITIES & CHROMEOPTIONS, CHROME EXTENSIONS, CHROMEDRIVER CANARY, CONTRIBUTING, DOWNLOADS, GETTING STARTED (with sub-links for ANDROID and CHROMEOS), LOGGING (with sub-links for PERFORMANCE LOG), MOBILE EMULATION, NEED HELP?, CHROMEDRIVER CRASHES, CLICKING ISSUES, DEVTOOLS WINDOW KEEPS CLOSING, and OPERATION NOT SUPPORTED WHEN USING REMOTE DEBUGGING. The main content area is titled "Latest Release: ChromeDriver 2.42" and states "Supports Chrome v68-70". It includes a "Changes include:" section with a bulleted list of fixes and improvements. The footer of the page includes a "Search this site" input field and a copyright notice: "© 2018 The Chromium Project. All rights reserved. This document is released under the Apache 2.0 license." The status bar at the bottom right shows the time as 2:08 PM and the date as 9/29/2018.

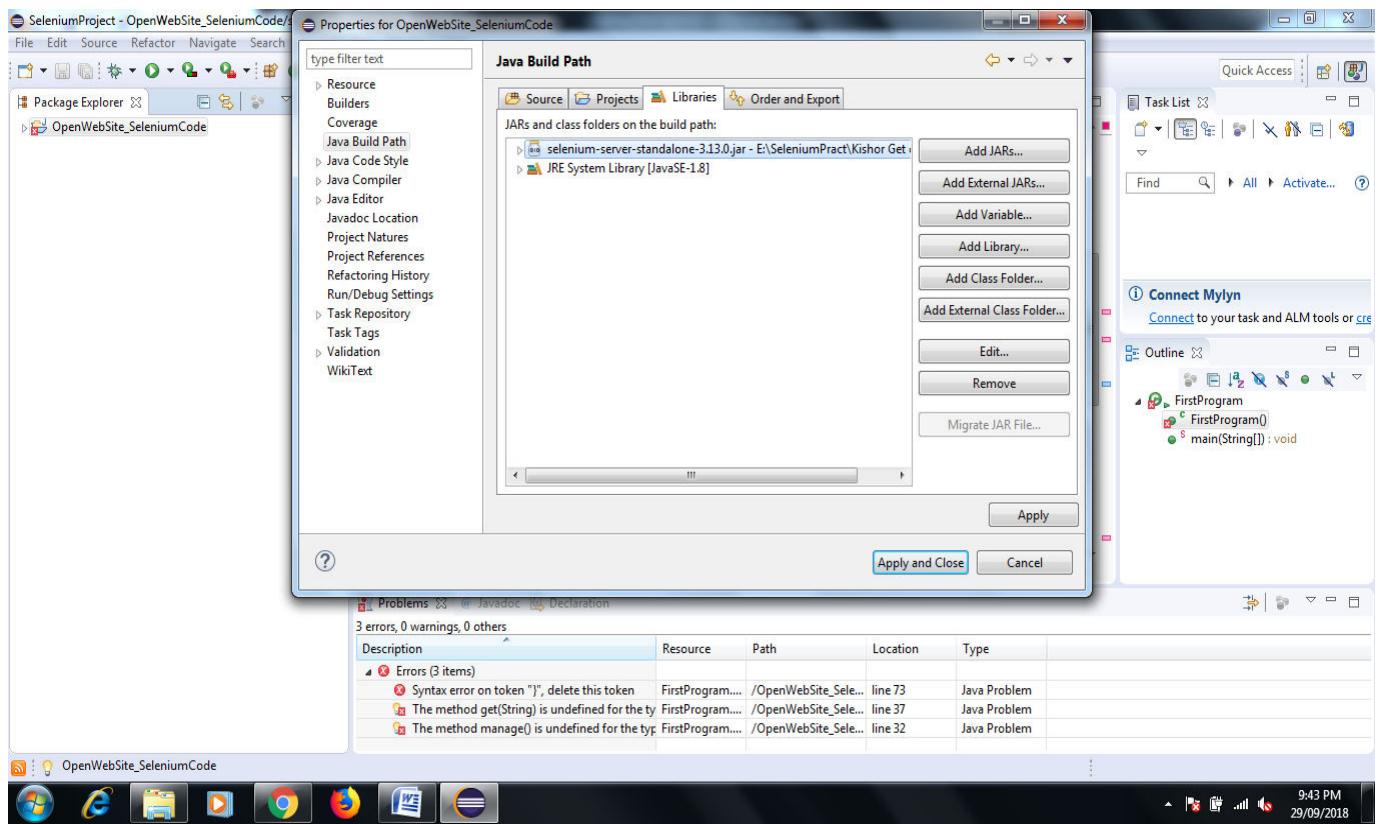
Name	Last modified	Size	ETag
Parent Directory		-	
chromedriver_linux64.zip	2018-09-13 19:30:37	3.85MB	acfcc29fb03df9e913ef4c360a121ad1
chromedriver_mac64.zip	2018-09-13 18:14:11	5.75MB	3fc0e4a97cbf2c8c2a9b824d95e25351
chromedriver_win32.zip	2018-09-13 21:11:33	3.42MB	28d91b31311146250e7ef1afbcd6d026
notes.txt	2018-09-13 21:23:09	0.02MB	18bdf6fc9f9d8dd668fa444b77d06bdd



4. After Download Extract same on any Drive here I m extract on D Drive and my path of that exe file is D:\my document\Download\chromedriver_win32

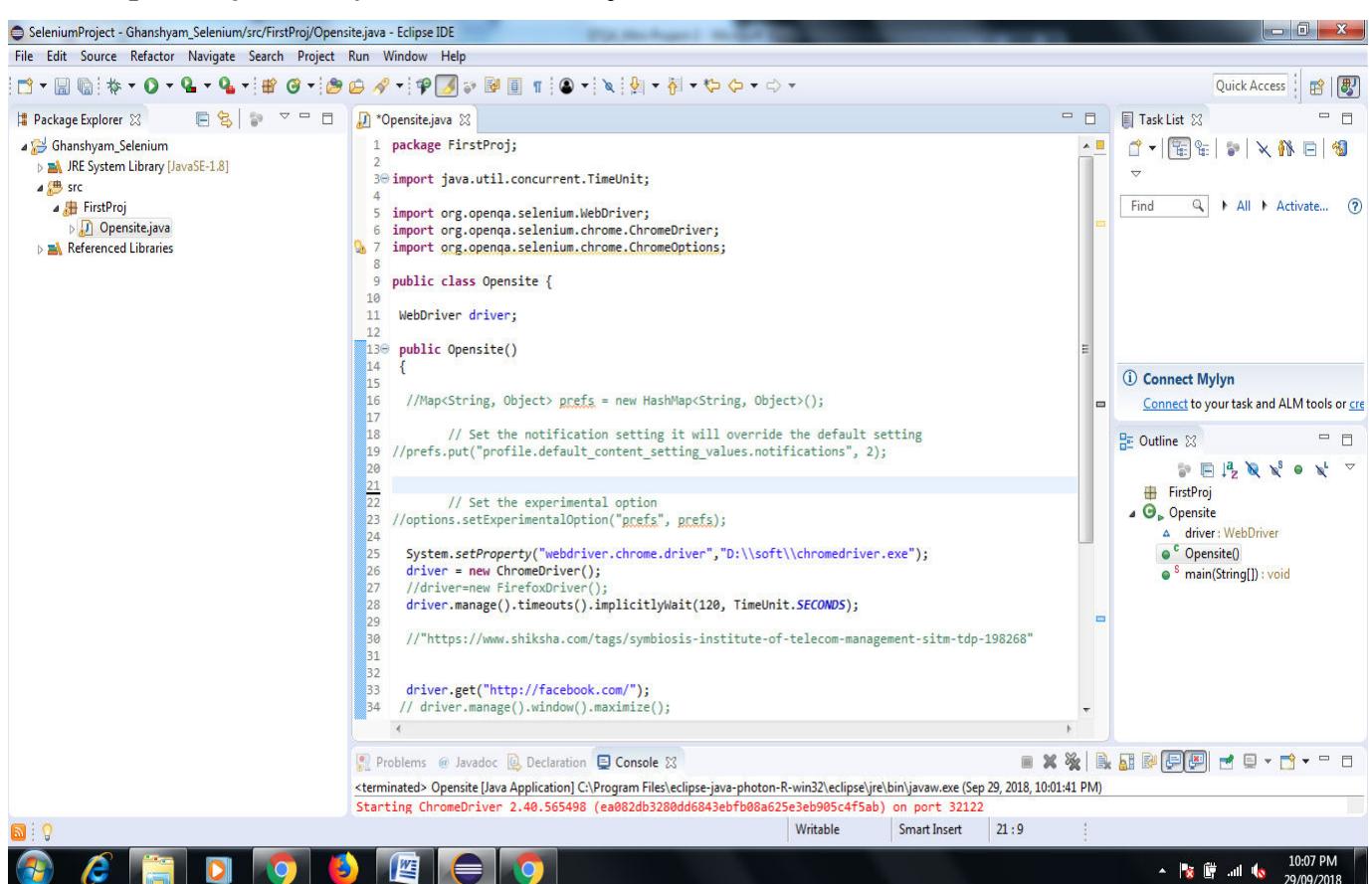
Name	Date modified	Type	Size
41_2018_09_03_101005_F_E_Basic_Civil_a...	9/3/2018 2:08 PM	Nitro PDF Docum...	51 KB
41_2018_09_04_107002_Engineering_Physi...	9/4/2018 2:19 PM	Nitro PDF Docum...	53 KB
41_2018_09_04_107009_Engine...			52 KB
41_2018_09_06_107001_Engine...			65 KB
41_2018_09_08_110003_Fundar...			52 KB
265-1225-1-PB			249 KB
2018-09-03-11-27-23-630_153...	2018-09-03-11-27-27-997_AL...		95 KB
179701848_ExamForm			35 KB
179702088_ExamForm			255 KB
a606554e6ad66129171716107...			255 KB
Academic Calendar for Engine...			57 KB
ADMISSION 2018-19 ENQUIRY			540 KB
AJS Research proposal			32 KB
ALL YEARS TT - Final			25 KB
assignment-no-3-matrix			19 KB
attendanceSummary_Report1			23 KB
BE			52 KB
c5ff66ee7270aa932072533c26b5...			13 KB
Properties			23 KB
chromedriver_win32		ZIP archive	3,500 KB
chromedriver_win32	Date modified: 9/29/2018 2:10 PM	Date created: 9/29/2018 2:09 PM	Size: 3.41 MB

5. Now Open Eclipse IDE----> Create Java Project-> Right Click Project Name→Properties→ Java Build Path→Libraries→Add External JAR→ add selenium-server-standalone-3.13.0 jar →Apply and Close.



6. Now Want **Open the chrome browser with facebook.com page via Selenium Web driver Java Coding** so here we need to write Java Code in Class file which we already created

7. Here in My Program I Create **Ghanshyam_Selenium Java Project Folder name** and **Opensite.java** is my class file so write java code in this class file



8. Right click on java program, select Run As and > "Java Application". After Code Successfully Run now see the output in Console Prompt

```

1 package FirstProj;
2
3 import java.util.concurrent.TimeUnit;
4
5 import org.openqa.selenium.WebDriver;
6 import org.openqa.selenium.chrome.ChromeDriver;
7 import org.openqa.selenium.chrome.ChromeOptions;
8
9
10 public class OpenSite {
11     public static void main(String[] args) {
12         System.setProperty("webdriver.chrome.driver", "C:\\Users\\Ghanshyam\\Desktop\\chromedriver.exe");
13         WebDriver driver = new ChromeDriver();
14         driver.get("http://www.google.com");
15         driver.quit();
16     }
17 }

```

Console Output:

```

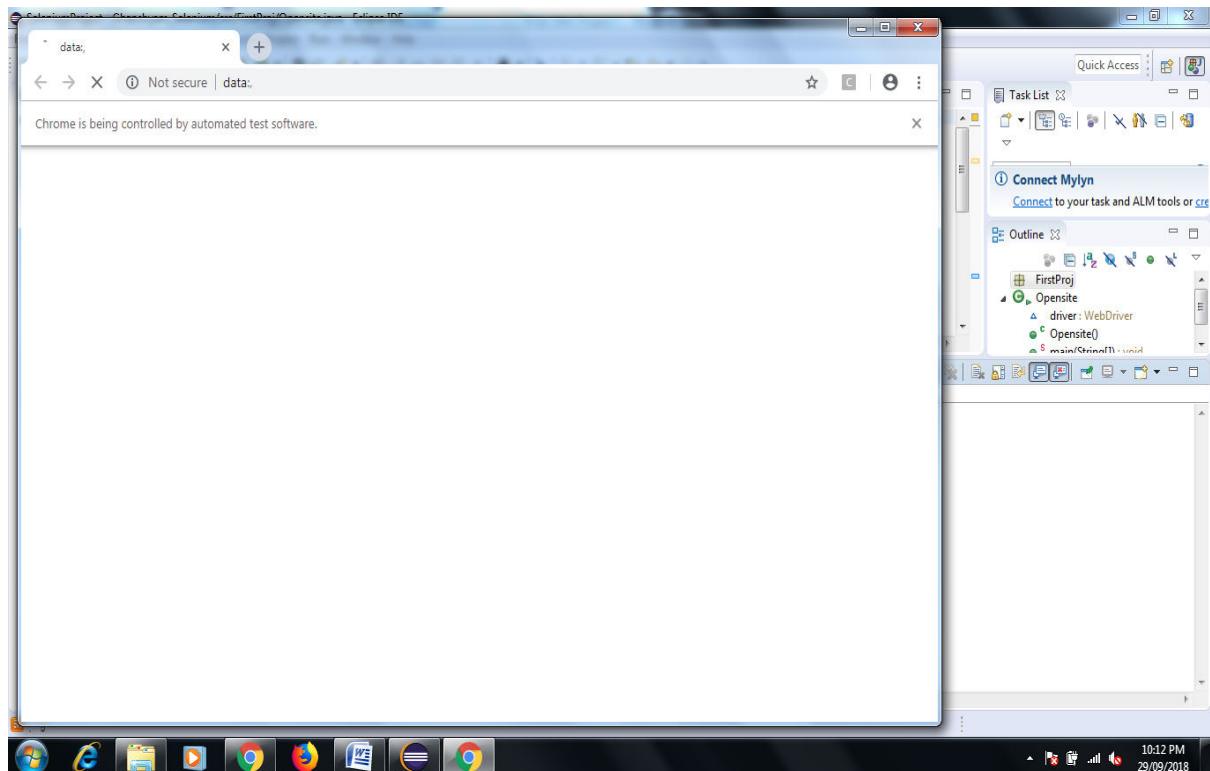
<terminated> OpenSite [Java Application] C:\Program Files\eclipse-java-photon-R-win32\eclipse\jre\bin\javaw.exe (Sep 29, 2018, 10:01:41 PM)
Starting ChromeDriver 2.40.565498 (ea082db3280dd6843ebfb08a025e3eb905c4f5ab) on port 32122
Only local connections are allowed.
[1538238724.192][WARNING]: Timed out connecting to Chrome, retrying...
Sep 29, 2018 10:02:06 PM org.openqa.selenium.remote.ProtocolHandshake createSession
INFO: Detected dialect: OSS

```

9. Now Your browser Open Automatically it shown data;

10. one more message display **chrome is being controlled by Automated Test Software**

It mean we open chrome browser and facebook.com page by selenium web driver java code Successfully.



In this way Our First Module Run Successfully.

Module-2 In This Project I want to collect all Rating Feedback related our college available on website Justdial.com

1. Create One Java Project Folder Give Name → Review Demo → Now Create One Class File give name Practo.com
2. Right Click Project Name → Properties → Java Build Path → Libraries → Add External JAR → add selenium-server-standalone-3.13.0 jar → Apply and Close.
3. Similarly Copy the Chromedriver.exe file on my D Drive `D:/soft/chromedriver.exe` in this way.
4. Now Start right writing code for Practo.java to Collect all review of any Hospital.

Here I want search all feedback of **SNJB-s-Late-Sau-Kantabai-Bhavarlalji-Jain-College-Of-Engineering-Neminagar-Chandwad**

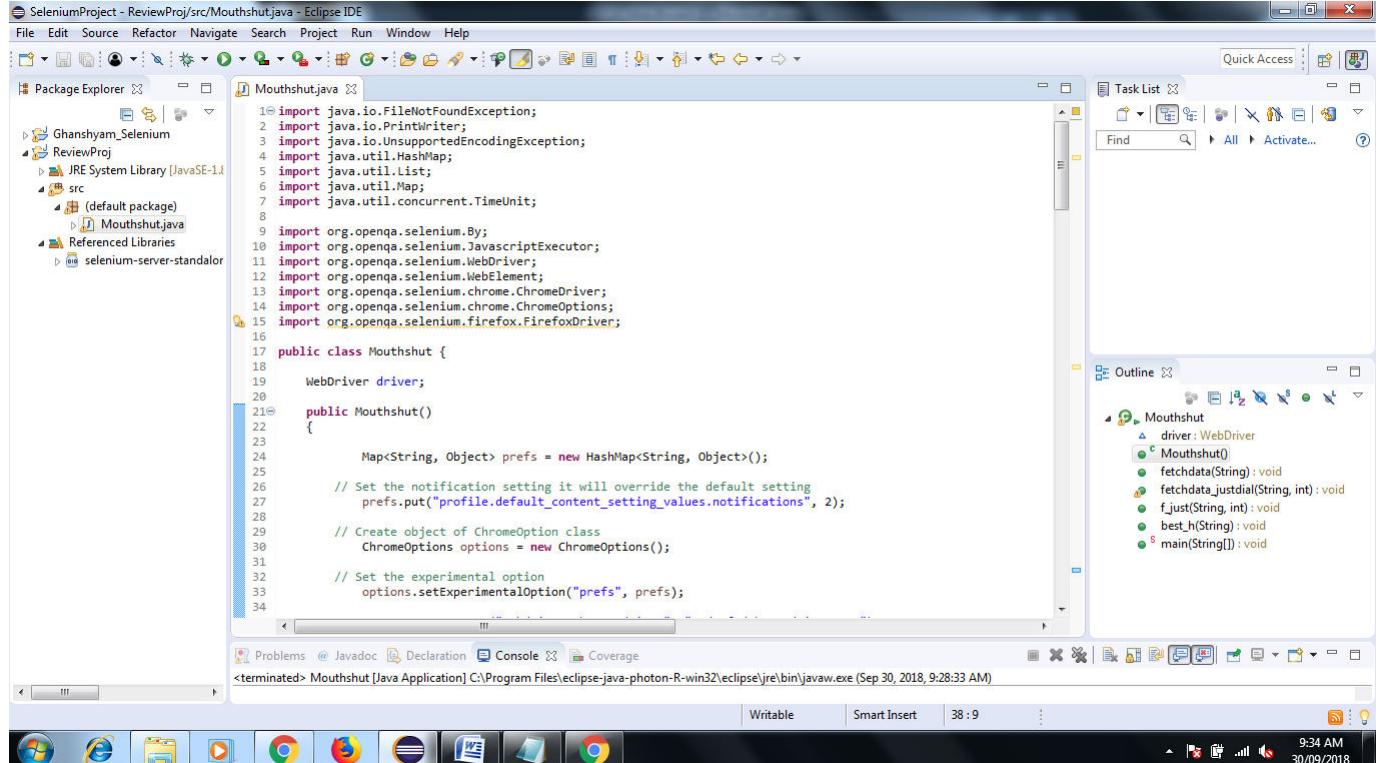
Link of Feedback of All Customer-

https://www.justdial.com/Nashik/SNJB-s-Late-Sau-Kantabai-Bhavarlalji-Jain-College-Of-Engineering-Neminagar-Chandwad/0253PX253-X253-151019113056-B2P9_BZDET/reviews/page-6

5. Now to save Feedback of all pages here I create one text file give name
`C:\Users\admin\eclipse-workspace\SeleniumProject\ReviewProj\Snjb.txt`

Now First of All Execute Code here my file name `Mouthshut.java`

Mouthshut.com is website like Justdial.com



The screenshot shows the Eclipse IDE interface with the following details:

- Title Bar:** SeleniumProject - ReviewProj/src/Mouthshut.java - Eclipse IDE
- File Menu:** File Edit Source Refactor Navigate Search Project Run Window Help
- Toolbar:** Standard toolbar icons for file operations.
- Package Explorer:** Shows the project structure with packages Ghanshyam_Selenium, ReviewProj, and a src folder containing Mouthshut.java.
- Middle Area:** The code editor window displays the `Mouthshut.java` file. The code imports various Selenium packages and defines a class `Mouthshut` with a constructor that initializes a WebDriver and sets experimental options for notifications and prefs.
- Outline View:** Shows the class structure with methods `fetchdata`, `fetchdata_justdial`, `f_just`, `best_hString`, and `main`.
- Task List:** Shows a find bar and a list of tasks.
- Console:** Displays the output of the executed code, indicating it terminated successfully at 9:28:33 AM on Sep 30, 2018.
- Bottom Status Bar:** Shows Writable, Smart Insert, and line numbers (38:9).
- System Tray:** Shows standard Windows icons for taskbar.

After Execution Code `Mouthshut.java` Chrome Browser Opened Automatically with Specified website you can also see the output of rating in console as well as file you created.

SeleniumProject - ReviewProj/src/Mouthshut.java - Eclipse IDE

File Edit Source Refactor Navigate Search Project Run Window Help

Package Explorer

Ghanshyam_Selenium
ReviewProj
JRE System Library [JavaSE-1.8]
src
(default package)
Mouthshut.java
Referenced Libraries
selenium-server-standalone

Mouthshut.java

```

1 import java.io.FileNotFoundException;
2 import java.io.PrintWriter;
3 import java.io.UnsupportedEncodingException;

```

Problems @ Javadoc Declaration Console Coverage

terminated: Mouthshut [Java Application] C:\Program Files\eclipse\java-photon-R-win32\eclipse\jre\bin\javaw.exe (Sep 30, 2018, 9:28:33 AM)

Starting ChromeDriver 2.40.565498 (ea082db3280dd6843ebfb08a625e3eb905c4f5ab) on port 40918

Only local connections are allowed.

Sep 30, 2018 9:28:41 AM org.openqa.selenium.remote.ProtocolHandshake createSession

INFO: Detected dialect: OSS

Name: Mr Ajay
Post :Good

Name: Mr Vaibhav
Post :Excellent

Name: Jayesh Jadhav
Post :Excellent

Name: Mr Yash
Post :Good

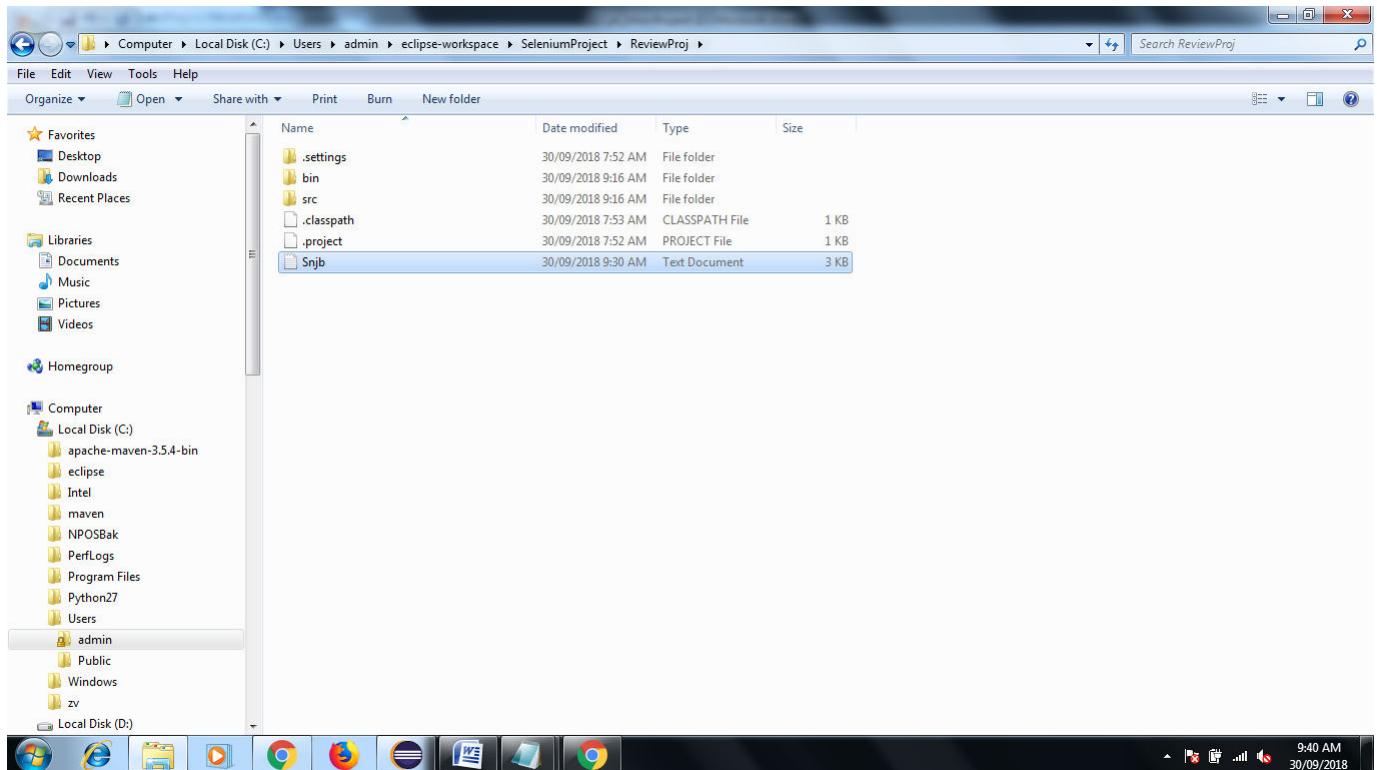
Name: Mr Prathmesh
Post :Very Good

Name: Mr Amit

9:38 AM 30/09/2018

Now Lets Check the Feedback of All Customer go to your Eclipse Workspace Path my path is

C:\Users\admin\eclipse-workspace\SeleniumProject\ReviewProj\Snjb.txt



After Open Txt File See the Output

```
Snbj - Notepad
File Edit Format View Help
url : https://www.justdial.com/Nashik/SNJB-s-Late-Sau-Kantabai-Bhavarlalji-Jain-College-of-Engineering-Neminagar-Chandwad/0253PX253-X253-151019113056-B2P9_BZDET/reviews
Name: Mr Ajay
Post :Good
Name: Mr Vaibhav
Post :Excellent
Name: Jayesh JadHAV
Post :Excellent
Name: Mr Yash
Post :Good
Name: Mr Prathmesh
Post :very Good
Name: Mr Amit
Post :Good
Name: Yash
Post :Poor
Name: Mr Subhash sonvane
Post :very Good
Name: Mr Dhananjay kakurte
Post :Very Good
Name: Rohit
Post :Average
Name: Mr Sushant
Post :Good
Name: Mr Yash
Post :Excellent
Name: Mr Mohit
Post :Excellent
Name: Mr Tushar
Post :Average
Name: Nikhil shirode
Post :very Good
Name: Om
Post :Very Good
Name: Sanket Agrawal
Post :Excellent
Name: Deepak
Post :Good
Name: Mr Bhambre vivek
Post :Good
Name: Mr Gautam
Post :Excellent
Name: Mr Mahesh Rathor
Post :Excellent
Name: Parag Achaliya
Post :Excellent
Name: Mr Sandip
Post :Good
Name: Mr Rahul Bachhav
Post :Very Good
Name: Nevendra
Post :Poor
9:40 AM
30/09/2018
```

In This you can Collect all different kind of colleges, hospital rating and review from various website like mouthshout.com, Justdial.com via Selenium Web driver Tool

Module-3 Now I want Collect Review of Aditya-Birla-Memorial-Hospital-Chinchwad-Pune

Link- <https://www.mouthshout.com/product-reviews/Aditya-Birla-Memorial-Hospital-Chchwad-Pune-reviews-925602748-page-2>

After Execution of Code-

```
Aditya-Birla-Memorial-Hospital-Chinchwad-Pune-reviews - Notepad
File Edit Format View Help
url : https://www.mouthshout.com/product-reviews/Aditya-Birla-Memorial-Hospital-chchwad-Pune-reviews-925602748-page-2
Post :I myself is a healthcare professional and I just want to share my personal amazg experience with Dr Madhulika sgh. My spouse was admitted to hospital for maternity. My experience with the staff was also good. May almighty bless Dr Madhulika sgh for her service.
All best to the hospital and team.
Regards
Mehboob Hudewala
Flag this review
Post :My younger cous brother hospitalized Aditya birla memorial hospital February 2017.
My experience is so good this hospital. This hospital is very clean nature. It is well mataed by hospital government.
This hospital whole staff is good and well educated and helpg nature. The various department are separated and specialist available for each department. The coastg is
Flag this review
Post :Aditya Birla is one of the best hospitals pune . It has huge and shy frastrucuture. The medical care is quite good . The surgeons are at their best and polite . I
Flag this review
Post :My younger brother hospitalized Aditya Birla Memorial hospital July 2017. My experience is so good this hospital. the whole staff is well educated and helpg n
the various department are separated and specialist available for each department.
the costg is more as compared to the other hospital. But they charge for the service they are offerg. Charges are of their high quality services.
frastructure is very good.
Flag this review
Post :They r dacoits. I took my daughter for eye check up. They took ?500. Then they called next week for their own confirmation on the power value her eyes. So next a
Flag this review
Post :worst phone- attendants.
The cident took place on 6th June 2017. I had called for an urgent consultation with the doctor.the followng happened.
Me. Hello, can I talk to dr # it is very urgent.
10:03 AM
30/09/2018
```

Selenium IDE:

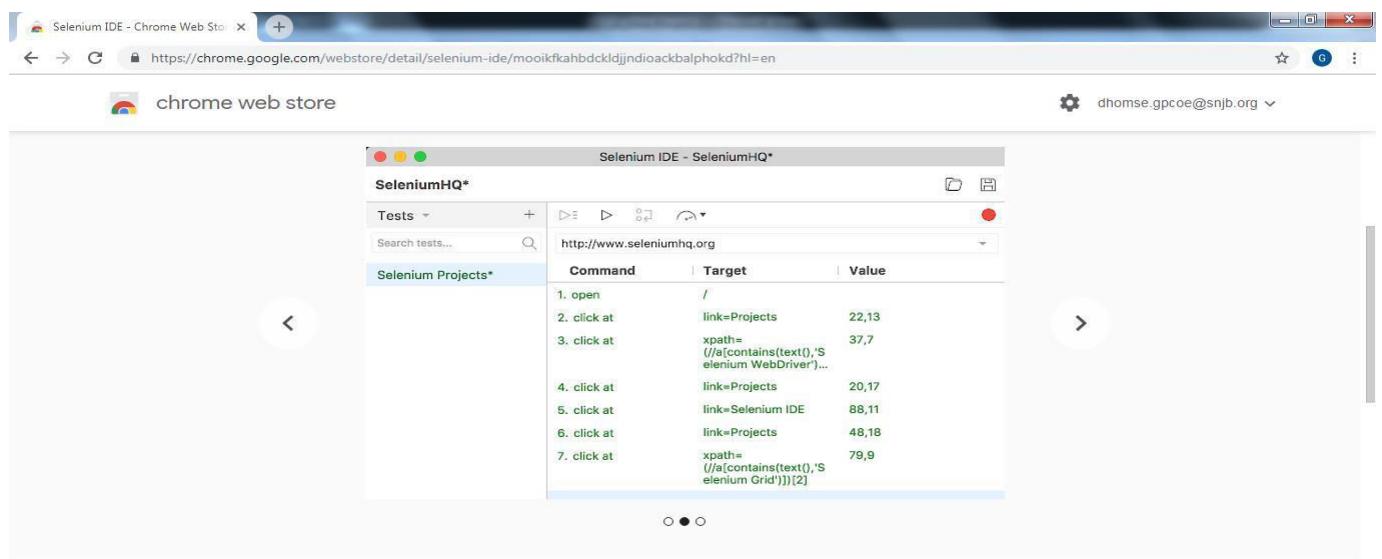
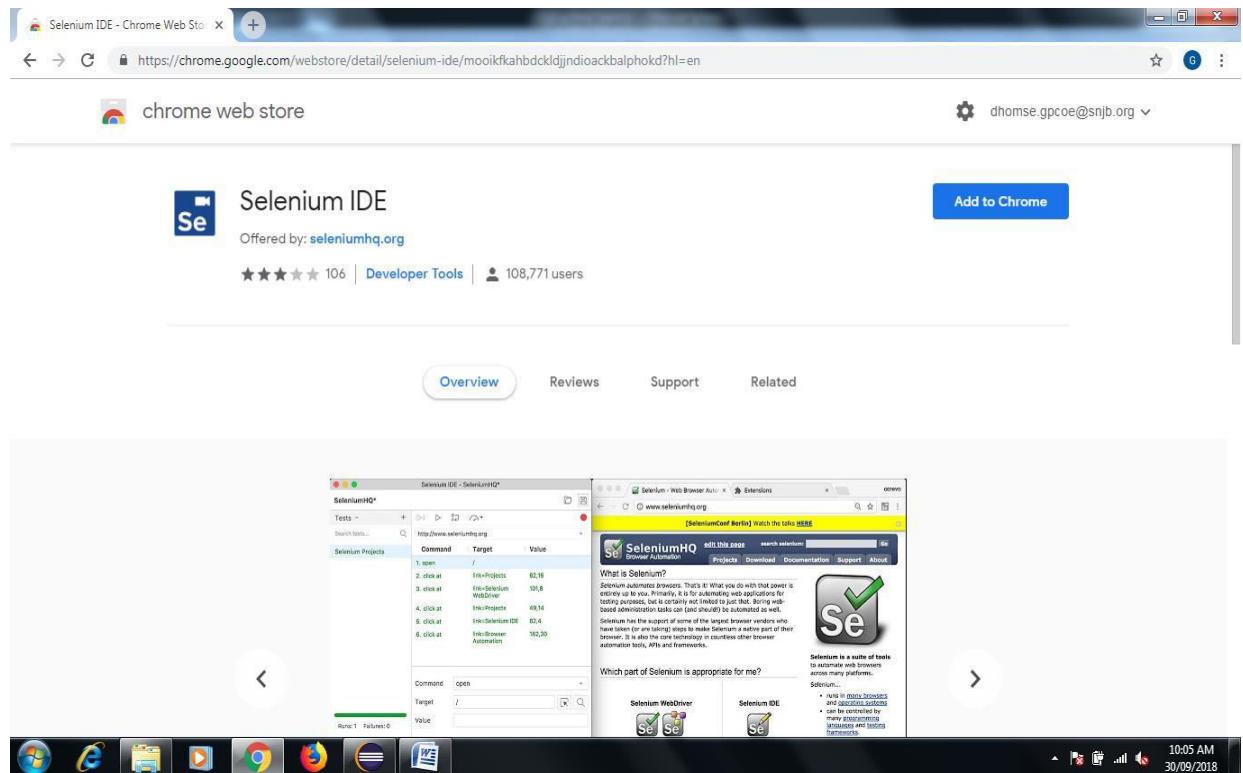
1. Download Selenium IDE Chrome Extension from following Link

<https://chrome.google.com/webstore/detail/selenium-ide/mooikfkahbdckldijndioackbalphokd?hl=en>

2. Click on Add to Chrome

3. Check the icon on of IDE Square in right side after browser after successfully installation to chrome

4. Now Click on record button do some operation on website...see the report in console of IDE command target and value....in this way you also find out xpath etc information.

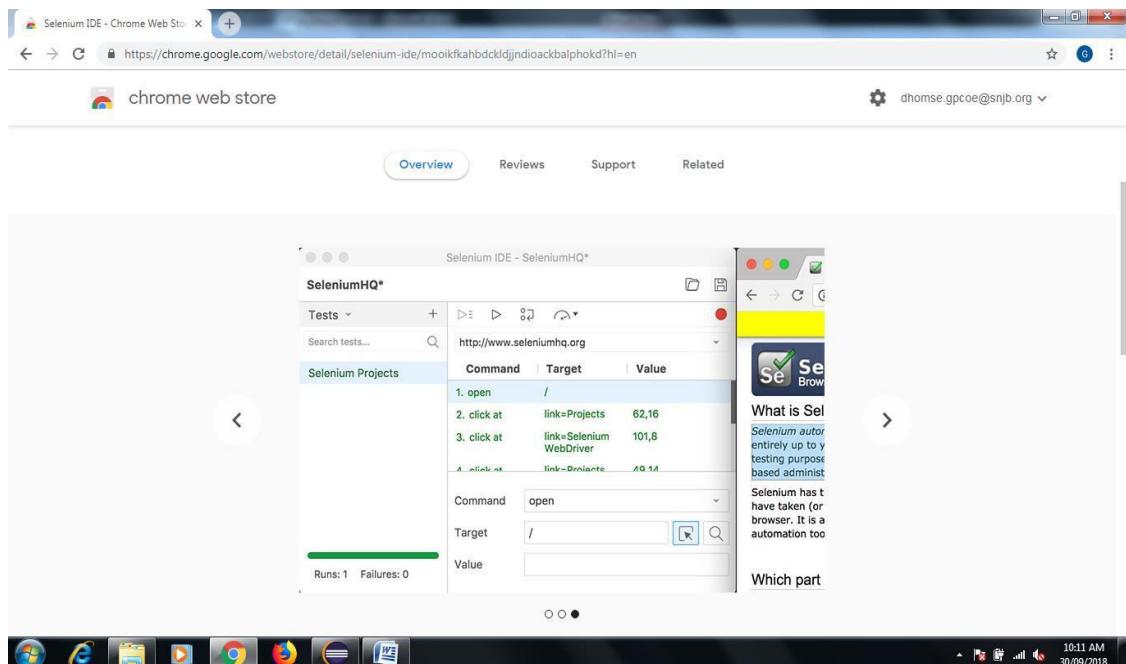


Overview

Additional Information



You can also check the Automated Test Case Pass or Fails see the following figure



2.9 Oral Question

1. What is the difference between Selenium and QTP?
 2. What is mean by Bug taxonomy?
 3. How to verify error and message in selenium webdriver?
 4. What are the different types of drivers available in WebDriver?
 5. What are the different types of locators in selenium?

2.10 Conclusion

In this way you learn how to use Selenium Open Source Tool for perform Automation Testing on web based application.