A LABORATORY MANUAL FOR

SOFTWARE TESTING (STG)

(21533)

ODD SEMESTER- V

DIPLOMA PROGRAMME IN COMPUTER TECHNOLOGY

GOVERNMENT POLYTECHNIC, NASHIK

(AN AUTONOMOUS INSTITUTE OF GOVT. OF MAHARASHTRA)

GOVERNMENT POLYTECHNIC NASHIK

(An Academic Autonomous Institute of Govt. of Maharashtra)

VISION:

To be a premier technical training and development institute catering to the skill and professional development in multi-domain for successful employment/self-employment by offering certified and accredited NSQF compliant programmes. The institute shall be the center for excellence in skill development and community development through different training programmes, business incubation and entrepreneurship development.

MISSION:

The Government Polytechnic Nashik, an autonomous institute of Government of Maharashtra has the mission to provide education for skill development, engineering diploma and continuing education programmes for enhancement of employability skills of the aspirants in the job/self-employment through continually developing quality learning systems. The institute aims at holistic and student centric education in collaboration with business, industry and having practice based education.

GOVERNMENT POLYTECHNIC NASHIK

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Vision of Computer Technology department

To emerge as a center of excellence in the domain of Computer technology and be the player in Digital India, having capability of producing technically proficient manpower which is competent of making significant contributions as entrepreneurs or professionals to the industry and society.

Mission of Department of Computer Technology is committed

Department of Computer Technology is committed to**,**

M1. To impart quality engineering education and enhance problem solving skills.

M2. To develop innovative skills.

M3. To encourage students for employable, entrepreneurial and life-long learning skills.

M4. To mold students for integrity and ethics.

M5. To provide leadership with social sensitivity for the betterment of the society, humanity and country as a whole.

PROGRAMME: Diploma Programme in Computer Technology(CM)
COURSE: Software Testing (STG) **COURSE CODE:** 21533

TEACHING AND EXAMINATION SCHEME:

Teaching Scheme				Examination Scheme							
Hrs/week			Credits	TH Paper Hrs.	Marks						
TH	TU	PR				TH	TEST	TH+TEST	PR	OR	TW	TOTAL
03	--	02	04	03	Max.	80	20	100	--	25	25	150
					Min.	32	--	40	--	10	10	--

1.0 RATIONALE:

This course is for teaching the basic to advanced level concepts in software testing. It also includes technical as well as supporting skills necessary to become successful tester. In this course student will learn how to immediately find problems in any computer program, how to plan an effective test approach, how to clearly report your finding and how to tell when your software is ready for release.

2.0 COURSE OBJECTIVES:

The student will be able to,

1. Find defects / faults which may get generated throughout the development process of software.
2. To make sure that the end result meets the business and user requirements.
3. Apply manual and automation testing of software to ensure its correctness, completeness, quality and security and also report the testing efforts to test manager and developer.

3.0 COURSE OUTCOMES:

The course content should be taught and learning imparted in such a manner that students are able to acquire required learning outcome in cognitive, psychomotor and affective domain to demonstrate following course outcomes:

1. Identify impact of software bug and importance of software testing.
2. Select appropriate method for testing depending on purpose of testing and apply it.
3. Design and execute test cases for any software under test.
4. Execute test cases on software under test to validate its functionality.
5. Report the testing efforts in manual format and in defect tracking system and use various automation tools for testing .

GOVERNMENT POLYTECHNIC NASHIK
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CERTIFICATE

This is to certify that Mr./Ms._____

Roll No._____of Fifth Semester of diploma in _____

Engineering has completed the term work in subject Software Testing (21533) for academic year 20__to 20____as prescribed in curriculum.

Date:_____ **Exam Seat No: _____**

Sign: _____

Name of Student: _____

Subject Teacher **Head of Department** **Principal**

GOVERNMENT POLYTECHNIC NASHIK

(An Academically autonomous Institute of Government of Maharashtra)

Diploma Programme in Computer technology

Rubrics for Laboratory Task Assessment (TW)

Academic Year:- 2024-25
Course Name and Code :- STG (21533)
Name of Student:-
Roll No.:-
Year:- III **Term:-ODD**

Domain	Criteria	Total Weightage(P/S/D)	Experiment Number										
			1	2	3	4	5	6	7	8	9	10	11
	Type of Experiment (P/D/S)		s	p	p	p	p	p	p	d	d	s	p
Cognitive Domain	Identify and understand different bugs, defects in application.												
	Identify and know the use of automated testing tools.												
	Identify and understand different testing methods and types.												
	Average	6/12/6											
Psychomotor Domain	Design test and write test cases												
	Execute test cases on different applications.												
	Troubleshoot problems of bugs occurred in application.												
	Average	10/0/8											
Affective Domain	Follow safety measures while installing testing tools.												
	Punctuality and working in team												
	Use of effective measures for tracking and managing defects.												
	Average	4/8/6											
	Total Out Of 20												

Type of Experiment/ Domain	Cognitive	Psychomotor	Affective
P- Performance Type	30	50	20
S- Study Type	60	0	40
D- Demonstration Type	30	40	30

Course Incharge **HOD** **Student Sign**

INDEX

Academic Year:_____Name of Faculty: _____
Programme:_____ Course & Code:_____
Name of Student: _____

Sr. No	Title of Practical	Date		Marks	Sign of Lecturer
		Performance	Completion		
1	Study any software system specification and design test cases.				
2	Design test cases for Calculator application				
3	Create any GUI application and report bugs.				
4	Perform testing of any website and report bugs.				
5	Design test cases for railway reservation form.				
6	Design test cases for Social site (Twitter, Facebook) login form.				
7	Write test cases for usability testing of website.				
8	Design and run test cases for WordPad using any automated tool				
9	Report the bugs using Bug Tracking Tool (e.g. JIRA).				
10	Automate any application for test management tool (e. g. Test Manager).				
11	Perform unit testing on any s/w unit using automated tool (e.g. junit)				
			Total		
			Average		

Name & Signature of Student **Signature of Faculty**

Practical No. 1

Title : Study any Software System specification and design test cases,
Theory :- Proposition 1 :

- **Black box testing**

Black box testing is a software testing technique in which functionality of the softwareunder test (SUT) is tested without looking of internal code Structure, implementation details and knowledge of internal paths of the software. This type of testing is based entirely on the software requirements and Specifications.

In BlackBox Testing we just focus on inputs and output of the software system withoutbothering about internal knowledge of the software program.

The above Black-Box can be any software system you want to test. For example: an operating system like Windows, a website like Google, a database like Oracle or even your own custom application. Under Black Box Testing, you can test these applicationsby just focusing on the inputs and outputs without knowing their internal code implementation.

- **Behavioral Testing Techniques:**

There are different techniques involved in Black Box testing.

1. Equivalence Class
2. Boundary Value Analysis
3. Domain Tests
4. Orthogonal Arrays
5. Decision Tables
6. State Model
7. Exploratory Testing
8. All-pairs testing

- **Static testing:**

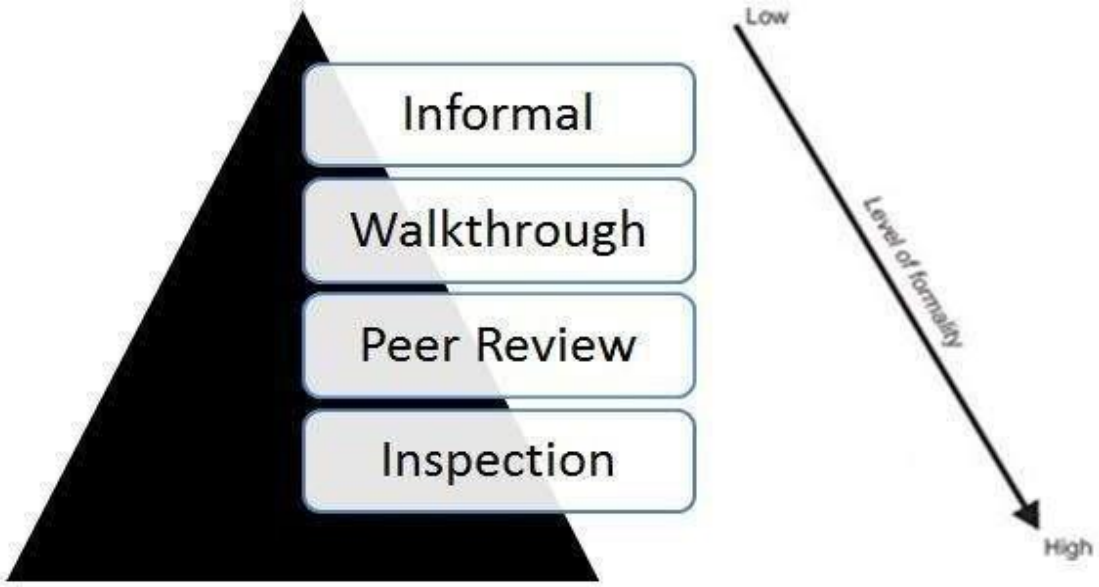
Static Testing, a software testing technique in which the software is testedwithout executing the code. It has two parts as listed below:

1. Review - Typically used to find and eliminate errors or ambiguities indocuments such as requirements, design, test cases, etc.

2. Static analysis - The code written by developers are analysed (usually by tools)for structural defects that may lead to defects.

- **Types of Reviews:**

The types of reviews can be given by a simple diagram:



- **Dynamic testing :**

Dynamic Testing is a kind of software testing technique using which the dynamicbehaviour of the code is analysed.

For Performing dynamic, testing the software should be compiled and executedand parameters such as memory usage, CPU usage, response time and overall performance of the software are analysed.

Dynamic testing involves testing the software for the input values and outputvalues are analysed.
Dynamic testing is the Validation part of Verification and Validation.

- **Dynamic Testing Techniques:**

The Dynamic Testing Techniques are broadly classified into two categories.They are:
1. Functional Testing
2. Non-Functional Testing

- **Levels of Dynamic Testing:**

There are various levels of Dynamic Testing Techniques. They are:
1. Unit Testing
2. Integration Testing
3. System Testing
4. Acceptance Testing

- **White box testing :**

White box testing is a testing technique that examines the program structure andderives test data from the program logic/code. The other names of glass box testing are clear box testing, open box testing, logic driven testing or path driven testing or structural testing.

1. Branch Coverage - This technique is running a series of tests to ensure that allbranches are tested at least once.

Path Coverage - This technique corresponds to testing all possible paths which means that each statement and branch is covered.

Test Cases:

ID	NAME	DESCRIPTION	STEPS

INPUT	EXPECTED OUTOUT	ACTUAL OUTPUT	STATUS

ID	NAME	DESCRIPTION	STEPS

INPUT	EXPECTED OUTOUT	ACTUAL OUTPUT	STATUS

ID	NAME	DESCRIPTION	STEPS

INPUT	EXPECTED OUTOUT	ACTUAL OUTPUT	STATUS

Questions:

1. List the main two types of testing and give definition of each.

2. What is Static Testing?

3. What is Dynamic Testing?

Conclusion:

S/P/D									Total	Signature	Date
C			P			A					
12			0			8			20		
4	4	4	0	0	0	3	2	3			

Practical No: 2

Title : Design test cases for Calculator application.

Theory :

Preposition 1 :

- **What is User Interface Testing ?**

User interface testing, a testing technique used to identify the defects is aproduct/software under test by using Graphical user interface [GUI].

- **GUI Testing - Characteristics:**
  1. GUI is a hierarchical, graphical front end to the application, containsgraphical objects with a set of properties.
  2. During execution, the values of the properties of each objects of a GUI definethe GUI state.
  3. It has capabilities to exercise GUI events like key press/mouse click.
  4. Able to provide inputs to the GUI Objects.
  5. To check the GUI representations to see if they are consistent with theexpected ones.
  6. It strongly depends on the used technology.

- **What do user think in GUI testing**
  1. Check all the GUI elements for size, position, width, length and acceptance ,of character or numbers. For instance you might be able to provide input tothe input file.
  2. Check you can execute the intended functionality of the application using theGUI.
  3. Check whether message is displayed correctly.
  4. Check for clear demonstration of difficult section on screen.
  5. Check alignment of test is proper.
  6. Check the colour of font and warning message is aesthetically pleasing.
  7. Check that images have good clearity.

Proposition 2 :

- **Calculator**

1. A calculator is a device or software that performs mathematical operations.
2. Calculator provides key features like Comprehensive Functionality, Scientific Mode and Percentage Calculations and many more.

Test Cases :

ID	NAME	DESCRIPTION	STEPS

INPUT	EXPECTED OUTOUT	ACTUAL OUTPUT	STATUS

ID	NAME	DESCRIPTION	STEPS

INPUT	EXPECTED OUTOUT	ACTUAL OUTPUT	STATUS

ID	NAME	DESCRIPTION	STEPS

INPUT	EXPECTED OUTOUT	ACTUAL OUTPUT	STATUS

Questions :

1. What is GUI application ?

2. Why testing required ?

3. What are the test cases ?

Conclusion :

S/P/D									Total	Signature	Date
C			P			A					
6			10			4			20		
2	2	2	3	3	4	2	1	1			

Practical no:3

Title: Create any GUI application and report bugs.

Theory-

Proposition1:

Graphical user interface testing is built on specific paradigms that help developers to test the full range and functionality of the system. These are sometimes called "testcases."

Developers and others need to check to make sure that each part of a graphical user interface is functioning correctly— for example, that use of each individual menu item, window, text box or other control works the way it is supposed to With GUI testing, professionals look for a wide Range of problems, from improper output and small bugs or glitches to complete system crashes.

Regression testing for GUIs involves multiple or complex control paths. For instance, a developer might have to check a specific series of user activities where a user might first select the menu item and then use other controls in sequence, The idea of complex control paths has numerous different permutations that need to be checked in GUI testing.

GUI testing also has to be done for each individual device environment. One major application of GUI testing has occurred as portable devices like smartphones and table to shave gradually taken over a lot of the functionality previously facilitated by laptop computers. The GUIs for mobile devices are different from those of laptop or desktop computers, and many different kind software teams needed to try to

Mi grate GUI systems to phones accordingly.

The graphical user interface represents, in many ways, the core of the environment, and GUI testing generally takes significant work and investment on the part of tech providers.

- **Source code**

```
//Student Registration Form
 Import java . awt .*;
 Import java. awt. event.*;
 Class StudentRegDemo extends Frame implements ActionListener
{
   Label L9;
  StudentRegDemo()
{
   setLayout(null);
  Font f1=new Font ("Times new roman",Font.BOLD|Font.ITALIC,25);
  Font f2=new Font ("Times new roman",Font.ITALIC,20);
  Label L1=new Label ("****STUDENT REGISTRACTION FORM****");
```

```
L1.setFont (f1);
setFont (f2);
L1.setBackground (Color.cyan);
setBackground (Color.pink);
setForeground (Color.red);
Label L2=new Label ("Enter First Name:",Label.RIGHT);

Label L4=new Label ("Enter Address:",Label.RIGHT);
Label L5=new Label ("Enter Mobile No:",Label.RIGHT);
Label L6=new Label ("Enter Email ID:",Label.RIGHT);
Label L7=new Label ("Enter City Name:",Label.RIGHT);
Label L8=new Label ("Enter DOB:",Label.RIGHT);
L9=new Label ("                          ");

TextField tf1=new TextField (20);
TextField tf2=new TextField (20);
TextField tf3=new TextField (20);
TextField tf4=new TextField (20);
TextField tf5=new TextField (20);
TextField tf6=new TextField (20);
TextField tf7=new TextField (20);

Button b1=new Button("Submit");

L1.setBounds (100,100,500,50);
L2.setBounds (100,200,200,30);
tf1.setBounds (350,200,180,30);

L3.setBounds (100,250,200,30);
tf2.setBounds (350,250,180,30);

L4.setBounds (100,300,200,30);
tf3.setBounds (350,300,180,30);

L5.setBounds (100,350,200,30);
tf4.setBounds (350,350,180,30);

L6.setBounds (100,400,200,30);
tf5.setBounds (350,400,180,30);

L7.setBounds (100,450,200,30);
tf6.setBounds (350,450,180,30);

L8.setBounds (100,500,200,30);
tf7.setBounds (350,500,180,30);

b1.setBounds (250,600,150,40);
b1.setBackground (Color.green);
```

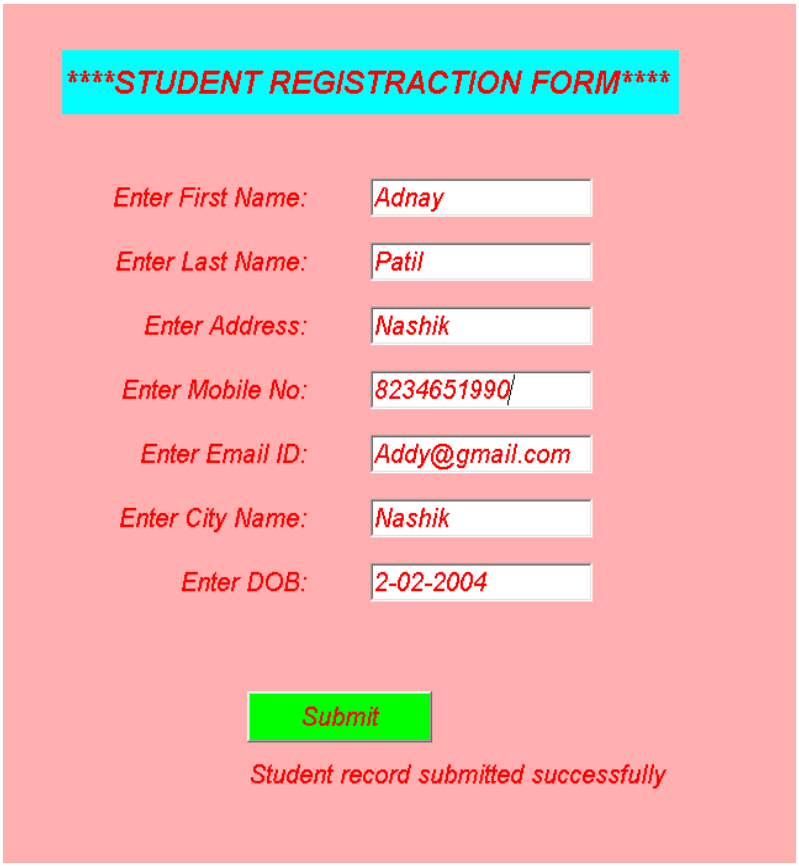
```
            L9.setBounds (250,650,500,30);

            add(L1);
            add(L2);add(tf1);
            add(L3);add(tf2);
            add(L4);add(tf3);
            add(L5);add(tf4);
            add(L6);add(tf5);
            add(L7);add(tf6);
            add(L8);add(tf7);
            add(b1);add(L9);

            b1.addActionListener(this);

    }
    public void actionPerformed (ActionEvent ae)
    {
            L9.setText("Student record submitted successfully");
    }
    public static void main(String args[])
    {
            StudentRegDemo s1=new StudentRegDemo();
            s1.setVisible(true);
            s1.setSize(700,700);
            s1.setTitle("Student Registraction Form");
    }
}
```

Output:


****STUDENT REGISTRACTION FORM****
Enter First Name:
Adnay
Enter Last Name:
Patil
Enter Address:
Nashik
Enter Mobile No:
8234651990
Enter Email ID:
Addy@gmail.com
Enter City Name:
Nashik
Enter DOB:
2-02-2004
Submit
Student record submitted successfully

ID	NAME	DESCRIPTION	STEPS

INPUT	EXPECTEDOUTOUT	ACTUALOUTPUT	STATUS

ID	NAME	DESCRIPTION	STEPS

INPUT	EXPECTEDOUTOUT	ACTUALOUTPUT	STATUS

ID	NAME	DESCRIPTION	STEPS

INPUT	EXPECTEDOUTOUT	ACTUALOUTPUT	STATUS

Question:

1. What are Bugs?

2. Difference between Error and Bugs?

Conclusion:

S/P/D									Total	Signature	Date
C			P			A					
6			10			4			20		
2	2	2	3	3	4	2	1	1			

Practical No: 4

Title: - Perform testing of any website and report bugs

Theory:

Proposition 1:

• **Unit Testing: -**

Unit testing is a software development process in which the smallest testable partsof an application, called units, are individually scrutinized for proper operation. Unit testing can be done manually but is often automated.

Unit testing involves only those characteristics that are vital to the performance ofthe unit under test. This encourages developer to modify the source code without immediate concern about how such changes might affect the functioning of other units or the program as a whole.

• **Integration Testing:**

Integration testing is a level of software testing where individual units are combined and tested as a group. The purpose of this level of testing is to expose faults inthe interaction between integrated units Test drivers and test stubs are used to assist in Integration Testing.

Testing performed to expose defect in the interface and in the interaction betweenintegrated components or systems.

• **System Testing:**

System Testing is a black box testing technique performed to evaluate the computersystem the system's compliance against specified requirement. In System testing, the functionalities of the system are tested from an end-to-end perspective.

System Testing is usually carried out by a team that is independent of the developmentteam in order to measure the quality of the system unbiased. It includes both functional and Non-functional testing.

• **Acceptance Testing:**

Acceptance testing is a level of software testing where a system is tested for acceptability. The purpose of this is to evaluate the system's compliance with thebusiness requirements and assess whether it is acceptable for delivery.

Test Cases:

ID	NAME	DESCRIPTION	STEPS

INPUT	EXPECTED OUTOUT	ACTUAL OUTPUT	STATUS

ID	NAME	DESCRIPTION	STEPS

INPUT	EXPECTED OUTOUT	ACTUAL OUTPUT	STATUS

ID	NAME	DESCRIPTION	STEPS

INPUT	EXPECTED OUTOUT	ACTUAL OUTPUT	STATUS

Questions:

1. What is Strub and Drivers?

2. Explain types of System testing.

Conclusion:

S/P/D									Total	Signature	Date
C			P			A					
6			10			4			20		
2	2	2	3	3	4	2	1	1			

Practical No: 5

Title : Design Test cases for Railway Reservation form.

Theory :-

Preposition 1:

- **Quality Factors of Usability testing:**
  1. **Comprehensibility**:- UML activity diagrams and state machines are both used for modeling system behavior from the user perspective and are frequently the basis for deriving system test cases. In practice, system test cases are often derived manually from UML activity diagrams or state machines. For this task, comprehensibility of respective models is essential and a relevant question for practice to support model selection and design, as well as subsequent test derivation. Therefore, the objective of this paper is to compare the comprehensibility of UML activity diagrams and state machines during manual test case derivation.
  2. **Consistency**:-An important aspect in the software development process is the consistency between various parts of the software system being designed and implemented. During the development of a system we are aware of the consistency problems and we usually solve these by special arrangements developed as part of the development of the software system. In general the solutions applied for some specific system cannot be reused for other systems. The purpose of this paper is to introduce a general understanding of consistency and the techniques and tools for handling consistency. We introduce a concept called description to denote the various pieces of information which must be consistent. Consistency of descriptions is defined as relations between the interpretations of the descriptions.

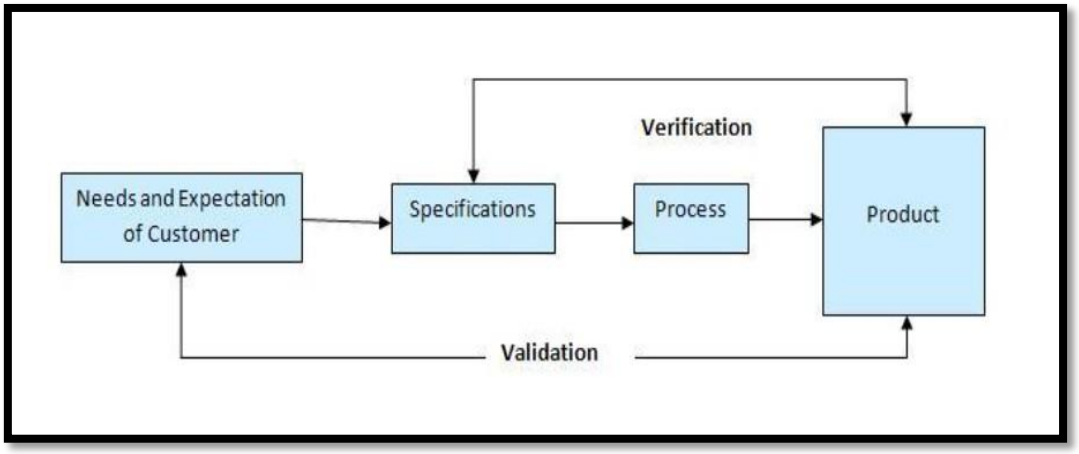
  3. **Navigation:**

     GPS navigation software usually falls into one of the following two categories:
     i. Navigation with route calculation and directions from the software to the user of the route to take, based on a vector-based map, normally for motorized vehicles with some motorized forms added on as an afterthought.
     ii. Navigation tracking, often with a map "picture" in the background, but showing where you have been, and allowing "routes" to be pre-programmed, giving a line you can follow on the screen. This type can also be used for geocaching
  4. **Responsiveness**: - Responsive design is an approach to web page creation that makes use of flexible layouts, flexible images and cascading style sheet media queries. The goal of responsive design is to build web pages that

detect the visitor's screen size and orientation and change the layout accordingly.

Proposition 2 :

What is Verification and Validation?



1. What is Verification?

Verification is a process of evaluating the intermediary work products of a software development lifecycle to check if we are in the right track of creating the final product.

Now the question here is What are the intermediary products? Well, These cant include the documents which are produced during the development phases like, requirements specification, design documents, data base table design, ER diagrams, test cases, traceability matrix etc. We sometimes tend to neglect the importance of reviewing these documents but we should understand that reviewing itself can find out many hidden anomalies when if found or fixed in the later phase of development cycle, can be very costly.

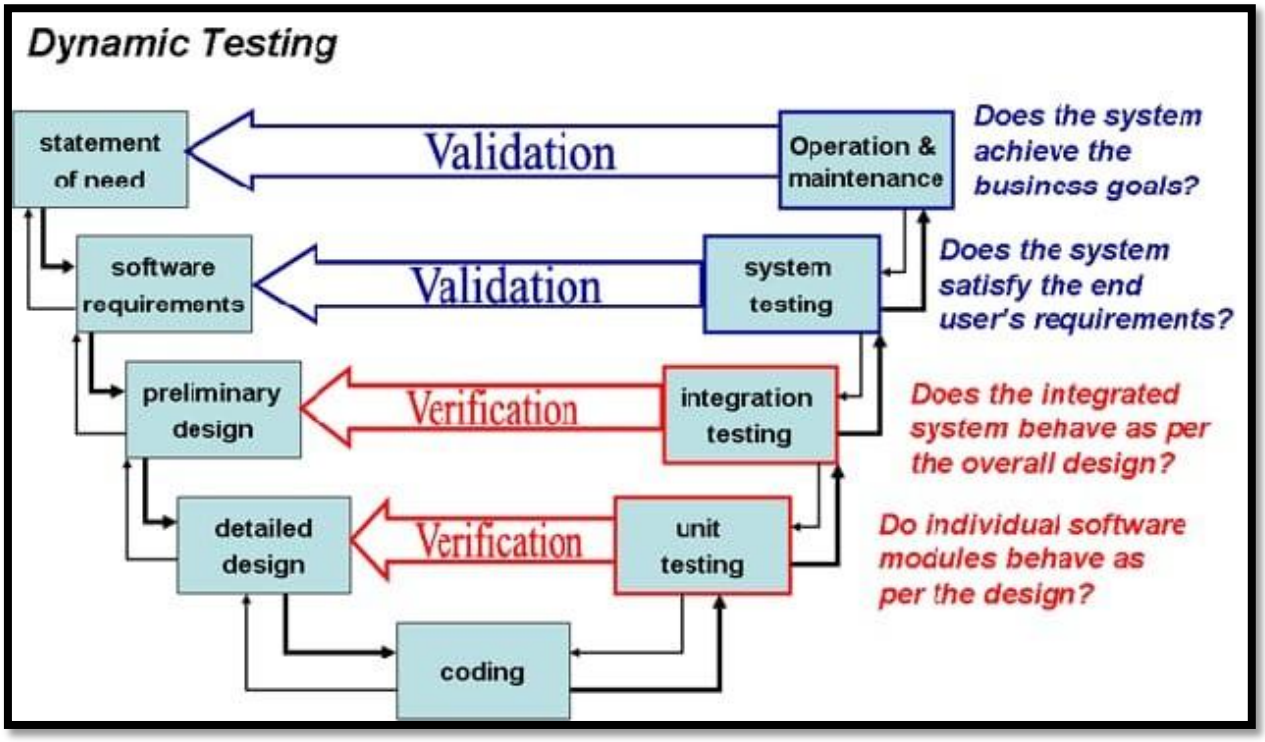
In other words we can also state that verification is a process to evaluate the mediator products of software to check whether the products satisfy the conditions imposed during the beginning of the phase

2. What is Validation?

Validation is the process of evaluating the final product to check whether the software meets the business needs In simple words the test execution which we

do in our day to day life are actually the validation activity which includes woke testing, functional testing, regression testing, systems testing etc...

- **V model of testing**



ID	NAME	DESCRIPTION	STEPS

INPUT	EXPECTED OUTOUT	ACTUAL OUTPUT	STATUS

ID	NAME	DESCRIPTION	STEPS

INPUT	EXPECTED OUTOUT	ACTUAL OUTPUT	STATUS

ID	NAME	DESCRIPTION	STEPS

INPUT	EXPECTED OUTOUT	ACTUAL OUTPUT	STATUS

Questions:

1. **What is usability testing?**

2. **Give difference between verification and validation?**

Conclusion:

S/P/D									Total	Signature	Date
C			P			A					
6			10			4			20		
2	2	2	3	3	4	2	1	1			

Practical No: 6

Title: Design test cases for Social Site (Twitter, Facebook) Login forms.

Theory:

Preposition:

- **What is Configuration Testing ?**

Configuration testing is the method of testing an application with multiple combinationsof software and hardware to find out the optimal configurations that the system can work without any flaws or bugs

As discussed above, Configuration Testing is a software testing where the applicationunder fest has to be tested using multiple combinations of Software and Hardware

- **Configuration Testing Example**

  Let's understand this with an example of a Desktop Application:

  Generally, Desktop applications will be if 2 tier or 3 tier, here we will consider a 3 tier Desktop application which is developed using Asp Net and consists of Client, BusinessLogic Server and Database Server where each component supports below-mentioned platforms.

  1. Client Platform-Windows XP, Window7 OS windows 8 OS,
  2. Server Platform-Windows Server 2008 R2, Windows Server 2008 R2,Windows Server 2012R2
  3. Database-SQL. Sever 2008 SQL Server 2008R2, SO1. Server 2012, etc.

  A tester has to test the Combination of Client Server and Database with combinations ofthe above-mentioned platforms and database versions to ensure that the application is functioning properly and does not fail.

  Configuration testing is not only restricted to Software but also applicable for Hardwarewhich is why it is also referred as a Hardware configuration testing, where we test different hardware devices like Printers, Scanners, Web cams, etc. that support the application under test.

Test Cases:

ID	NAME	DESCRIPTION	STEPS

INPUT	EXPECTED OUTOUT	ACTUAL OUTPUT	STATUS

ID	NAME	DESCRIPTION	STEPS

INPUT	EXPECTED OUTOUT	ACTUAL OUTPUT	STATUS

ID	NAME	DESCRIPTION	STEPS

INPUT	EXPECTED OUTOUT	ACTUAL OUTPUT	STATUS

Questions :

1. **What is Configuration Testing ?**

2. **State types of Configuration Testing:**

Conclusion:

S/P/D									Total	Signature	Date
C			P			A					
6			10			4			20		
2	2	2	3	3	4	2	1	1			

Practical No.7

Title: Write test cases for Usability testing of website

Theory:

Proposition 1:

- **What is Usability Testing?**

Usability testing, a non-functional testing technique that is a measure of how easily thesystem can be used by end users. It is difficult to evaluate and measure but can be evaluated based on the below parameters:

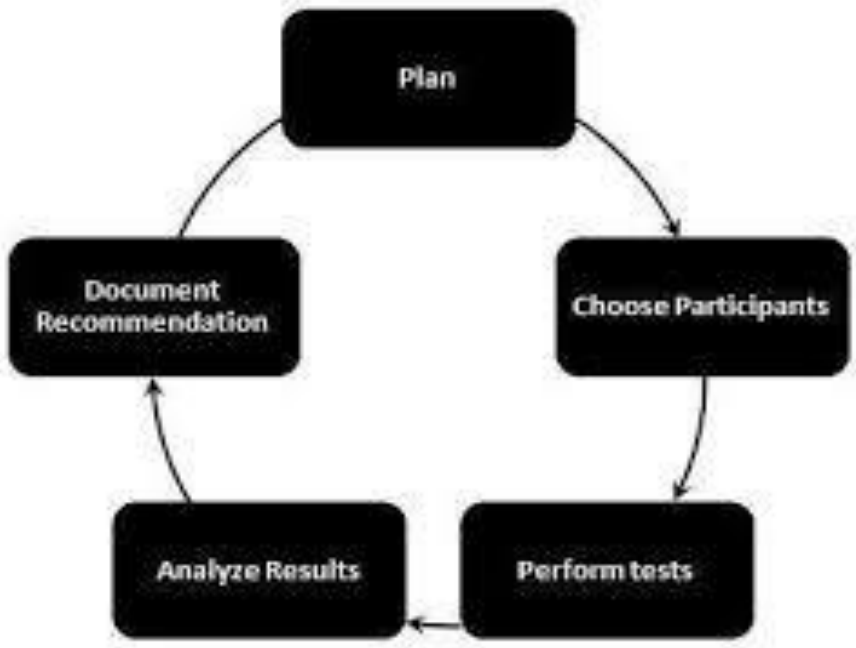
1 Levels of Skill required learn/use the software. It should maintain the balance for bothnovice and expert user.

2. Time required to get used to in using the software.

3. The measure of increase in user productivity if any.

4. Assessment of a user's attitude towards using the software.

- **Usability Testing Process:**



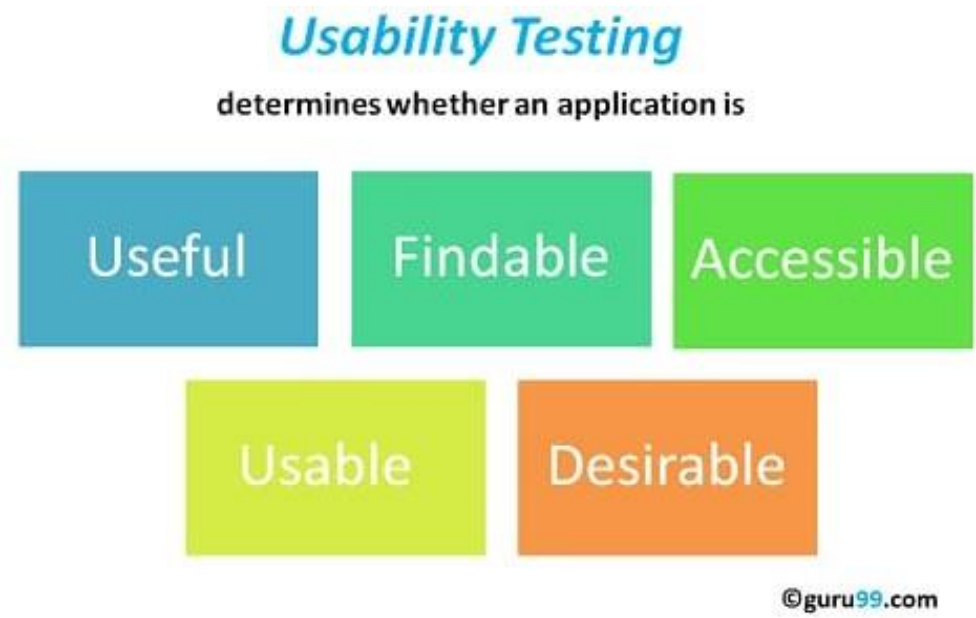
- **Characteristics of Usability Testing:**

1. Cases capture the interactions between factors and the system
2. 'Actors' represents user and their interactions that each user takes part into.
3. Test cases based on use cases and are referred as scenarios.
4. Capability to identify gaps in the system which would not be found by testingindividual components in isolation.
5. Very effective in defining the scope of acceptance tests.

- **Steps for Usability Testing:**

1. Define Goals The first step to any successful usability test is defining your goals.
2. Choose the Right Test
3. Create Your User Tasks
4. Write a Research Plan Document
5. Conduct the Test
6. Draft Up a Quick Report

- **Goals of Usability Testing**



- **Usability testing process:**

Usability testing process consist of the following phases:

1. **Planning:** During this phase the goals of usability test are determined. Havingvolunteers sit in front of your application and recording their actions is not a goal. You need to determine critical functionalities and objectives of system. You need to assign tasks to your testers, which exercise these critical functionalities. During this phase, usability testing method, number & demographics of usability testers, test report formats are also determined.

2. **Recruiting:** During this phase, you recruit the desired number of testers as peryour usability test plan. Finding testers who match your demographic (age, sex etc.) and professional (education, job etc.) profile can take time.

3. **Usability Testing:** During this phase, usability tests are actually executed.

4. **Data Analysis:** Data from usability tests is thoroughly analysed to derive meaningful inferences and give actionable recommendations to improve overallusability of your product.

5. **Reporting:** Findings of the usability test is shared with all concernedstakeholders which can include designer, developer, client, and CEO

Test Cases:

ID	NAME	DESCRIPTION	STEPS

INPUT	EXPECTED OUTOUT	ACTUAL OUTPUT	STATUS

ID	NAME	DESCRIPTION	STEPS

INPUT	EXPECTED OUTOUT	ACTUAL OUTPUT	STATUS

ID	NAME	DESCRIPTION	STEPS

INPUT	EXPECTED OUTOUT	ACTUAL OUTPUT	STATUS

Questions:

1. Write any two characteristics of Usability Testing?

2. Write down the phases of Usability Testing?

3. State the need of Usability Testing?

Conclusion:

S/P/D									Total	Signature	Date
C			P			A					
6			10			4			20		
2	2	2	3	3	4	2	1	1			

Practical No.8

Title:- Design and run test cases for Wordpad using any automated tool.
Theory:-

Proposition 1 :

- **What Is Selenium?**

Selenium is an open source tool which is used for automating the tests carried out on web browsers (Webapplications arc tested using any web browser).

We can neither test any desktop (software) application nor test any mobile application using Selenium.

There are many tools for testing software and mobile applications like: IBM's RFT, HP's QPT, Appium and many more. But, the focus of this blog is, testing dynamic web applications and why Selenium is the best for that purpose.

Since Selenium is open-source, there is no licensing cost involved, which is a major advantage over other testing tools. Other reasons behind Selenium's ever-growing popularity are:

1.Test scripts can be written in any of these programminglanguages: Java, Python,07/, PHP, Ruby, Perl & .Net

2.Tests can be carried out in any of these OS: Windows, Mac or Linux

3.Tests can be carried out using any browser: Mozilla Firefox, Internet Explorer, Google Chrome, Safarior Opera.

4.It can be integrated with tools such as TestNG & JUnit for managing test cases and generatingreports

5.It can be integrated with Maven, Jenkins & Docker to achieve Continuous Testing But there surely has to be shortcomings right?

1.We can use Selenium only to test web applications. We cannot test desktop applications or anyother software
2.There is no guaranteed support available for Selenium. We need to leverage on
the availablecustomer communities
3.It is not possible to perform testing on images. We need to integrate Selenium with
Sikuli for imagebased testing
4.There is no native reporting facility. But we can overcome that issue by
integrating it withframeworks like TestNG or JUnit
Before going any further in this what is Selenium blog, you ought to know the story behind howSelenium came into being what it is today. So, let's understand the scenario in the below order.

i. **Need for software testing**
ii. **Challenges with manual testing**
iii. **How automation testing beats manual testing?**
iv. **Selenium vs. other testing tools?**
v. **Selenium suite of tools**

i.Need For Software Testing

Software testing is where it all boils down to. Today's world-of technology is completely dominated by machines, and their behavior is controlled by the software powering it. Will the machines behave exactly as we want them to? Every time? Everywhere? The answer to these questions lies in software testing.

At the end of the day, it is the software application's success rate which is going to control your business's growth. The same thing can be said even for web applications because most businesses today arecompletely reliant on the internet.

Take for example, any e-commerce company. Be it Amazon or E-Bay or Flipkart, they rely on the customer traffic, on their web sites and traffic on their web based mobile applications for business.

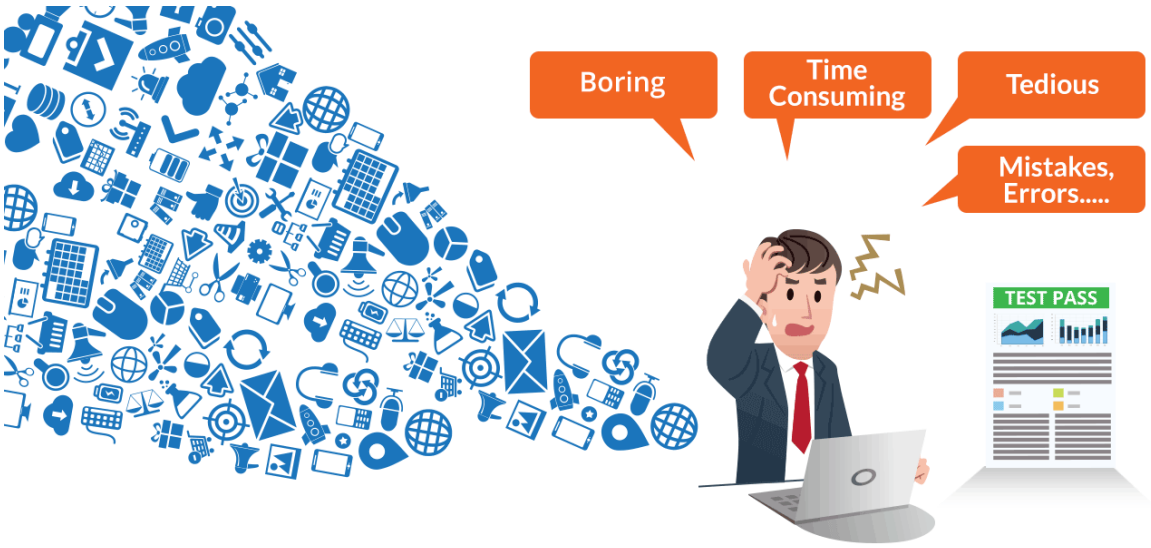
Imagine, if something catastrophic happens like the prices of a number of products being capped offat 10$, all because of a small bug in a "not so easily readable" part of the code. Then what can be done, and how can we prevent it the next time?

By testing the code before deployment, right? So, that is the need for software testing. But what is Selenium? Is it a software testing tool? Well, Selenium is an automation testing tool!

Before I go any further, let me clear out that, Software testing is of two types: Manual Testing & Automation Testing. Selenium was founded as an automation testing tool to overcome the drawbacks/ limitations of Manual testing. So, in the next section of this what is selenium blog, let's understand the challenges with manual testing. 8

ii.Challenges With Manual Testing

Manual testing means the (web) application is tested manually by QA testers. Tests need to be performed manually in every environment, using a different data set and the success/ failure rate of every transaction should be recorded.



Look at the above image of a poor chap, who manually verifies the transactions recorded. The challenges he is facing cause fatigue, boredom, delay in work, mistakes and errors because of manual effort. This leads to the need for automation testing.

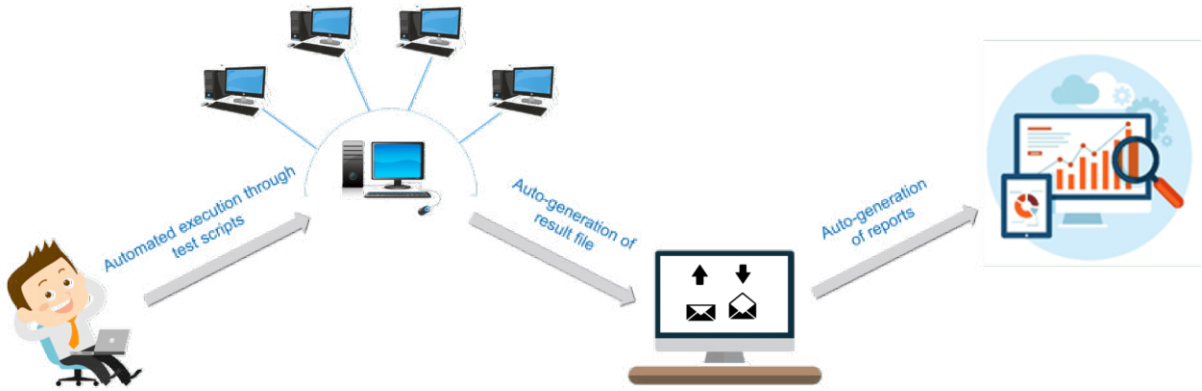
iii. Automation Testing Beats Manual Testing

Automation testing beats manual testing every time. Why? Because it is faster, needs less investment in human resource, it is not prone to errors, frequent execution of tests is possible, supports lights out execution, supports regression testing and also functional testing.

Let's take a similar example to the one mentioned earlier. Suppose there is a login page and we need to verify if all the login attempts are successful, then it will be really easy to write a piece of code which will validate if allthe transaction/ login attempts are a success or not (automated test case execution).

Moreover, these tests can be configured in such a way that they are tested in different environments and web browsers. What else can be done? You can automate the generation of result file,by scheduling it for
a particular time during the day. Then you can also automate the generation of reports based on those results and what not.

The key point is that automation testing makes a tester's job a whole lot simpler. Check out the image below which shows a more relaxed environment in which the same tester is working.



Now, let me talk about Selenium in particular.

Now let us see where Selenium stands in the market.

iv. Selenium vs QTP vs RFT

1.have compared its performance with two other popular tools: QTP and RFT in the table below.

Features.	**HP QTP**	**IBM RFT**	**Selenium**
License	Required	Required	Open-source
Cost	High	High	Open-source software
Customer Support	Dedicated HP support	Dedicated IBM support	Open-source Community
Hardware consumption during script execution	High	High	Low
Coding experience	Not required	Required	Ample amount of coding skills and experience needed
Environment support	Only for Windows	Only for Windows	Windows, Linux, Solaris OS X (If browser & JVM or JavaScript support exists)

v.Selenium Suite Of Tools

1. Selenium RC (Now depreciated)
2. Selenium IDE
3. Selenium Grid
4. Selenium WebDriver

- **Selenium RC (Remote Control)**

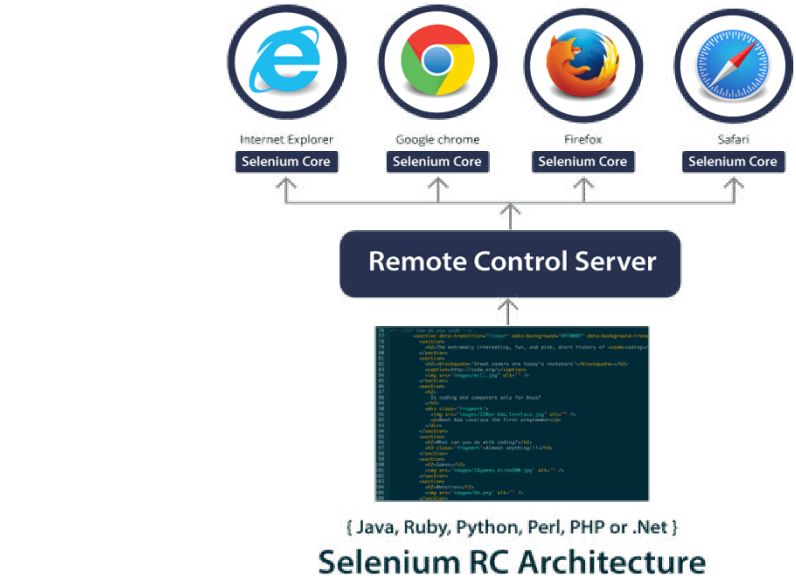
Selenium Core was the first tool. But Selenium Core hit a roadblock in terms of cross-domain testing because of the same origin policy. Same origin policy prohibits JavaScript code from accessing web elements which are hosted on a different domain compared to where the JavaScript was launched.

To overcome the same origin policy issue, testers needed to install local copies of both Selenium Core (a JavaScript program) and the web server containing the web application being tested so they would belong to the same domain. The permanent solution to this problem turned out to be Selenium RC. What does RC do then?

RC overcame the problem by involving an HTTP proxy server to "trick" the browser into believing that Selenium Core and the web application being tested come from the same domain. Thus making RC a two-component tool.

1. Selenium RC Server ,
2. Selenium RC Client - Library containing your programming language code

RC Server communicates using simple HTTP GET POST requests. Look at the below image for understanding the RC architecture



Selenium RC Architecture

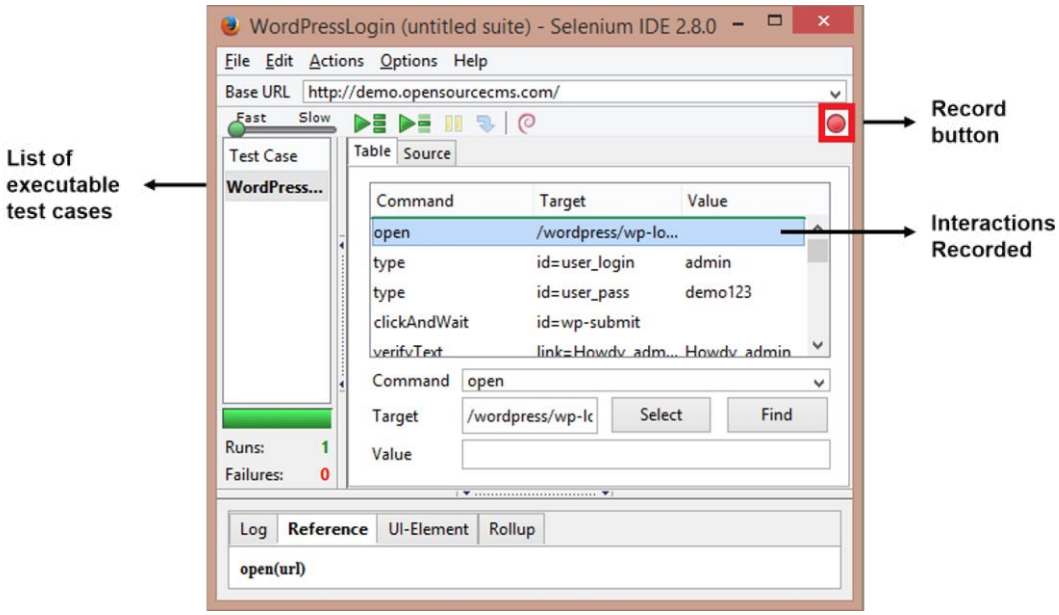
Selenium project's flagship tool was Selenium RC as it was their first tool and it could be used to write test cases in different programming languages. But the drawback with RC is that every communication with the RC server is time consuming and hence RC is very slow. So slow, that it would sometimes take hours to complete single tests.

From Selenium v3 onwards, RC has been depreciated and moved to legacy package. You can howeverdownload andwork with RC, but unfortunately you cannot avail support for it. But on the flip side, whywould you want to use a tool which is outdated, especially when there is a more efficient tool called Selenium WebDriver. Before Italk about WebDriver, let me discuss about IDE and Grid, which are theother tools that make up Selenium VI.

- **Selenium IDE (Integrated Development Environment)**

Selenium IDE is a Firefox plugin which is used to quickly and frequently, record and execute test cases.Test cases in IDE are created by recording the interactions which the user had with the web browser. These tests canthen be played back any number of times.

The advantage with Selenium IDE is that, tests recorded via the plugin can be exported in different programming languages like: Java, Ruby, Python etc. Check out the below screenshot of Firefox's IDE plugin.



But the associated shortcomings of IDE are:

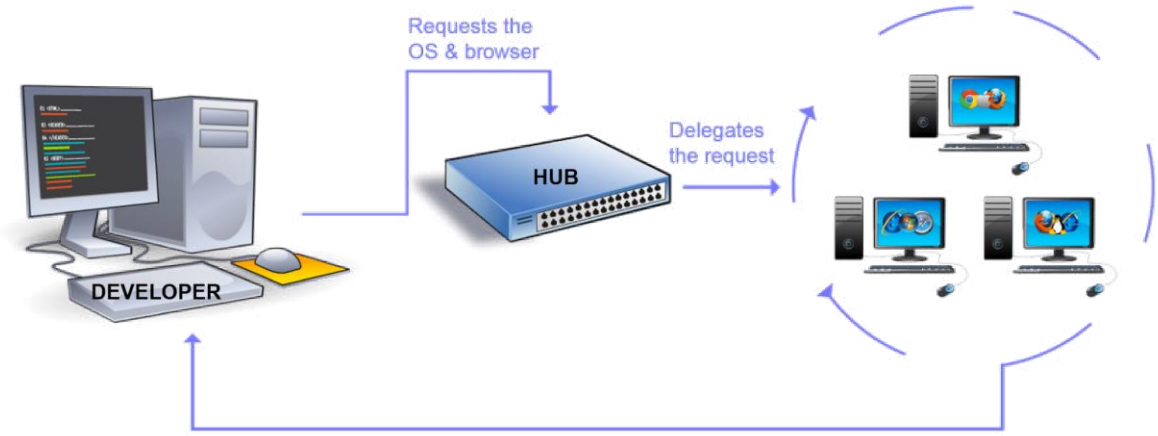
- Plug-in only available for Mozilla Firefox; not for other browsers
- It is not possible to test dynamic web applications; only simple tests can be recorded
- Test cases cannot be scripted using programming logic
- Does not support Data Driven testing

These were some of the aspects of Selenium IDE. Let me now talk about Selenium Grid.

- **Selenium Grid**

Selenium Grid was a part of Selenium VI and it was used in combination with RC to run tests on remotemachines. In fact, with Grid, multiple test scripts can be executed at the same time on multiple machines.Parallel execution is achieved with the help of Hub-Node architecture. One machine will assume the role of Hub and theothers will be the Nodes. Hub controls the test scripts running on various browsers inside

various operating systems. Test scripts being executed on different Nodes can be written in differentprogramming languages.



Grid is still in use, and works with both WebDrivcr and RC. Now is the ideal time for me to talk about Selenium v2. Selenium v2 merged the best features of Selenium RC and WebDriver into Selenium WebDriver. WebDriver is more efficient than RC and I will tell you why that is the case in the next section of this what is selenium blog.

- **Selenium WebDriver**

In contrast to IDE, Selenium WebDriver provides a programming interface to create and execute test cases. Test cases are written such that, web elements on web pages are identified and then actions are performed on those elements.
WebDriver is an upgrade to RC because it is muchfaster, It is faster because it makes direct calls to the browser. RC on the other hand needs an RC server io interact with the web browser. Each browser has its own driver on which the application runs. The different Web Drivers are:

1. Firefox Driver (Gecko Driver)2.Chrome Driver
3. Internet Explorer Driver
4. Opera Driver
5.Safari Driver and
6.HTM Unit Driver

- **Benefits Of Selenium WebDriver**

1.Support for 7 programming languages: JAVA, C#, PHP, Ruby, Perl, Python and .Net.
2.Supports testing on various browsers like: Firefox, Chrome, IE, Safari
3.Tests can be performed on different operating systems like: Windows, Mac, Linux, Android, iOS
4.Overcomes limitations of Selenium VI like file upload, download, pop-ups & dialogs barrier

- **Short-comings Of Selenium WebDriver**

1.Detailed test reports cannot be generated

2.Testing images is not possible

No matter the challenge, these shortcomings can be overcome by integrations with other frameworks. For testing images, Sikuli can be used, and for generating detailed test reports, TestNG can be used.

So that draws the conclusion to this blog on what is Selenium. To learn more about Selenium WebDriver and TestNG, read the other blogs in this Selenium tutorial blog series. You can alternatively see the video

below delivered by an industry expert where she has shared her opinion of Selenium as an' automation testing tool.

Questions:

1.What is Automation Testing? and give any 5 name of automation tool.

2.What is Selenium and why we use it?

3.Difference between selenium ide and selenium rc and selenium grid.

Conclusion:

S/P/D									Total	Signature	Date
C			P			A					
6			8			6			20		
2	2	2	3	2	3	2	2	2			

Practical No: 9

Title: Report the bugs using Bug Tracking Tool (e.g. JIRA).

Theory:-

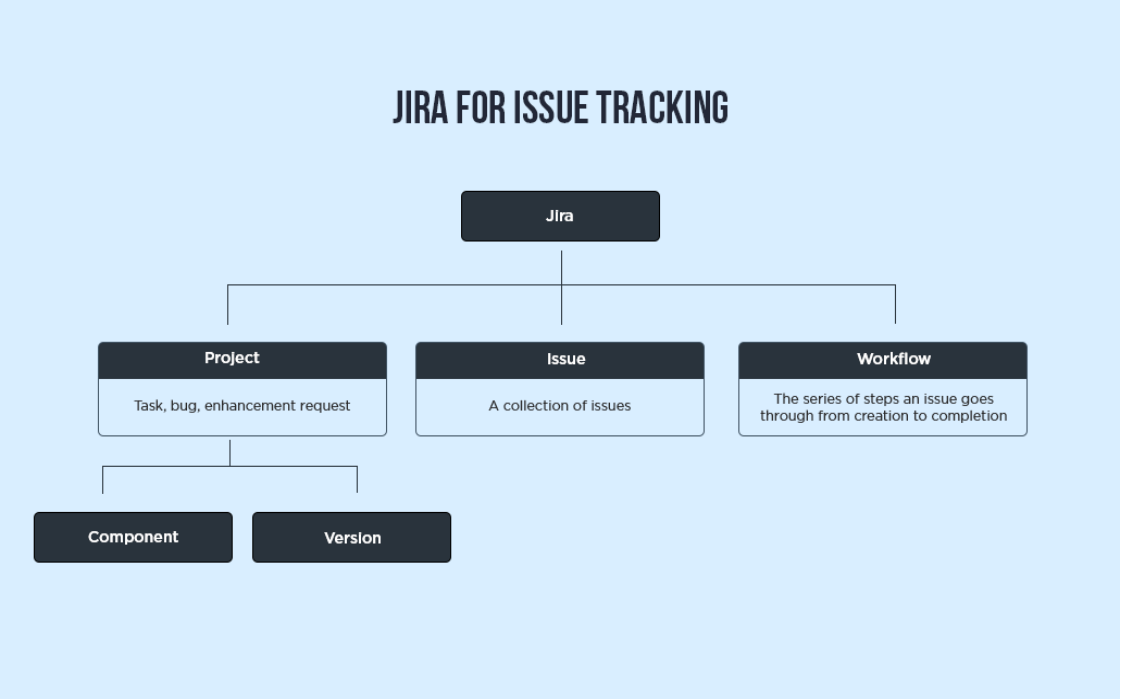
Preposition 1:

- **What is JIRA?**
  JIRA provides a centralized platform for managing tasks, bugs, and other types of issues, and it helps teams to organize and prioritize their work. JIRA is designed for **agile software development teams** and it supports multiple methodologies such as **Scrum, Kanban**, and **custom workflows.**

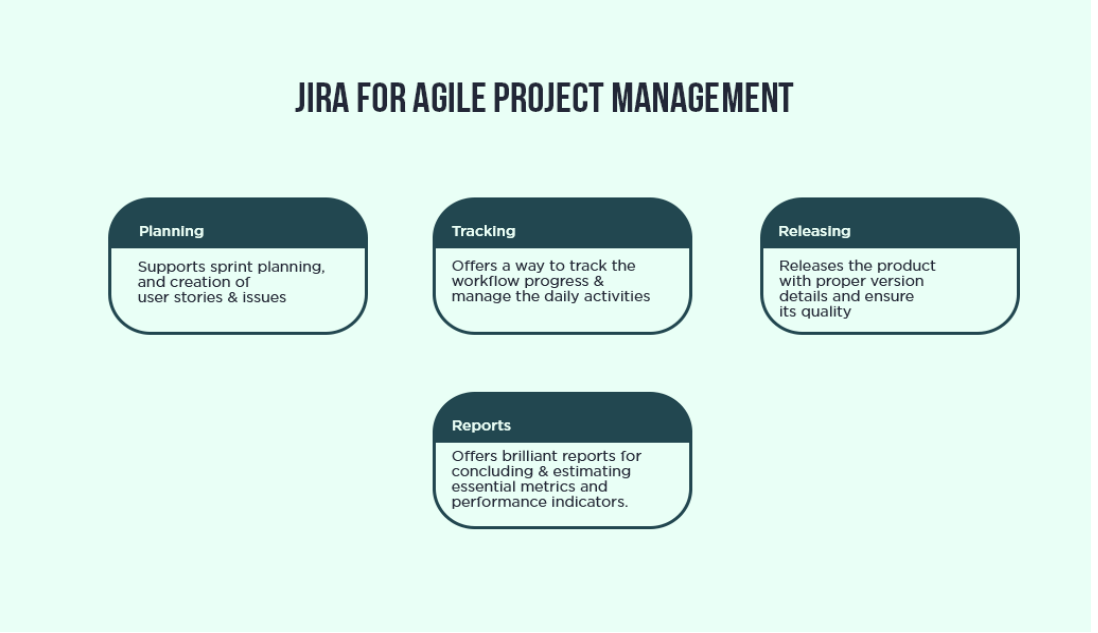
  This software makes teams work towards a common goal and facilitates planning, tracking as well as the release of the software. Begins with backlog & planning, this project management software allows you to outline the entire project progress and ensures collaboration with a multitude of tools.

  Its release management features track projects across releases and offers comprehensive reports on progress and performance. This extremely flexible software provides pre-set templates for all functionalities and enables to alter them as per your team and enterprise needs.

  Jira issue tracking software is completely based on three main concepts: Project, Issue, and Workflow.



From the perspective of project management tool, Jira is designed to plan, track, release & report agile software development activities as explained below:



- **Key Features:**
  1. Agile Development
  2. Project Tracking
  3. Mobile Applications
  4. Unparallel Connectivity
  5. Great Product Integrations
  6. Time Tracking with Color Indication
  7. Real-Time Notification
  8. Security

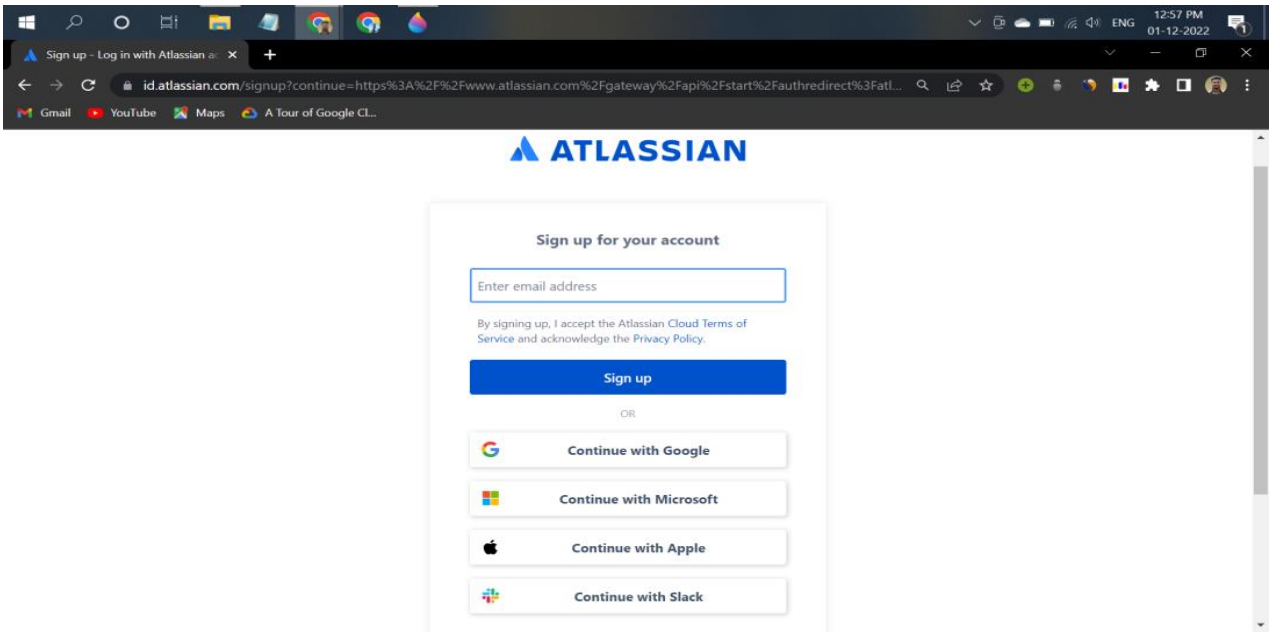
- **JIRA is used for:**
  - **Project Management:** JIRA provides a centralized platform for managing software development projects, with support for multiple projects and workflows.
  - **Task Management:** Teams can create, assign, and track tasks, bugs, and other types of issues.
  - **Agile Planning:** JIRA supports agile methodologies such as Scrum and Kanban and provides tools for planning and tracking sprints, backlogs, and releases.
  - **Reporting and Dashboards:** JIRA provides various reports and dashboards that help teams to get a real-time view of their work and make data-driven decisions.
  - **Collaboration:** JIRA allows teams to collaborate and communicate effectively, with features such as comments, notifications, and alerts.

- **How to use JIRA?**

Let's see how to use JIRA, from the very beginning(creating an Atlassian account).

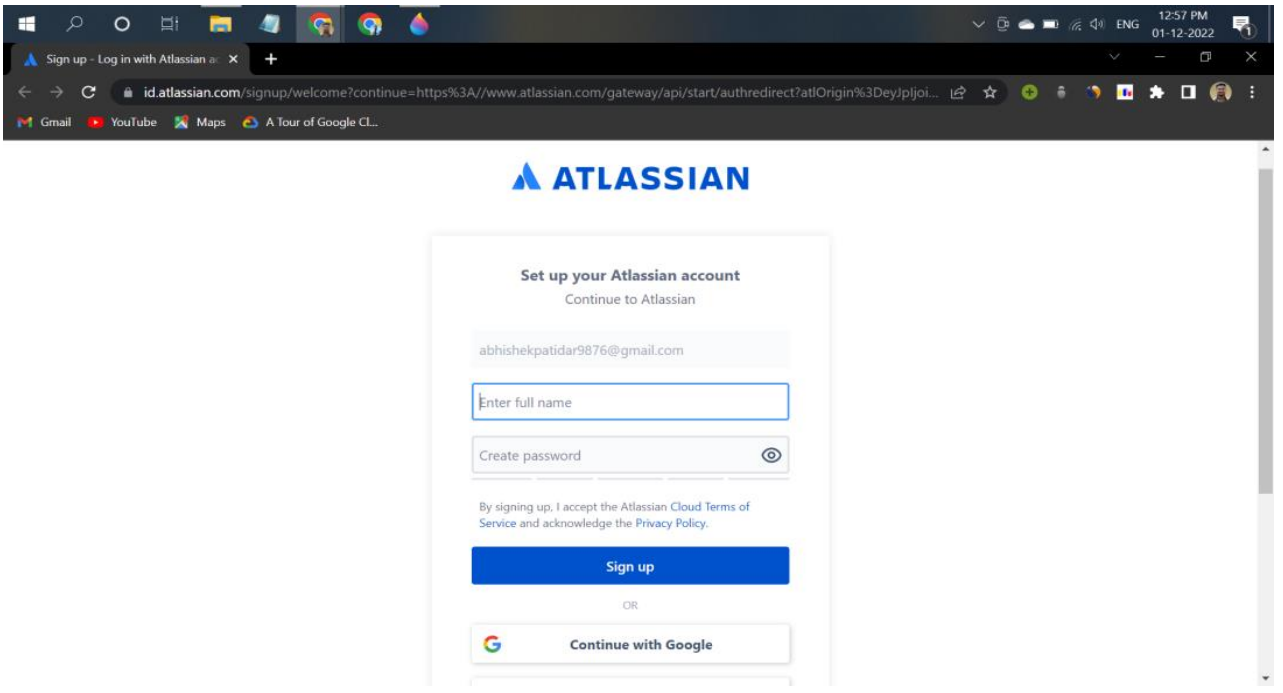
Step 1: Creating an Atlassian Account

1. Go to the signup page of Atlassian and enter the required user credentials asked on the site and then click on the SignUp button.

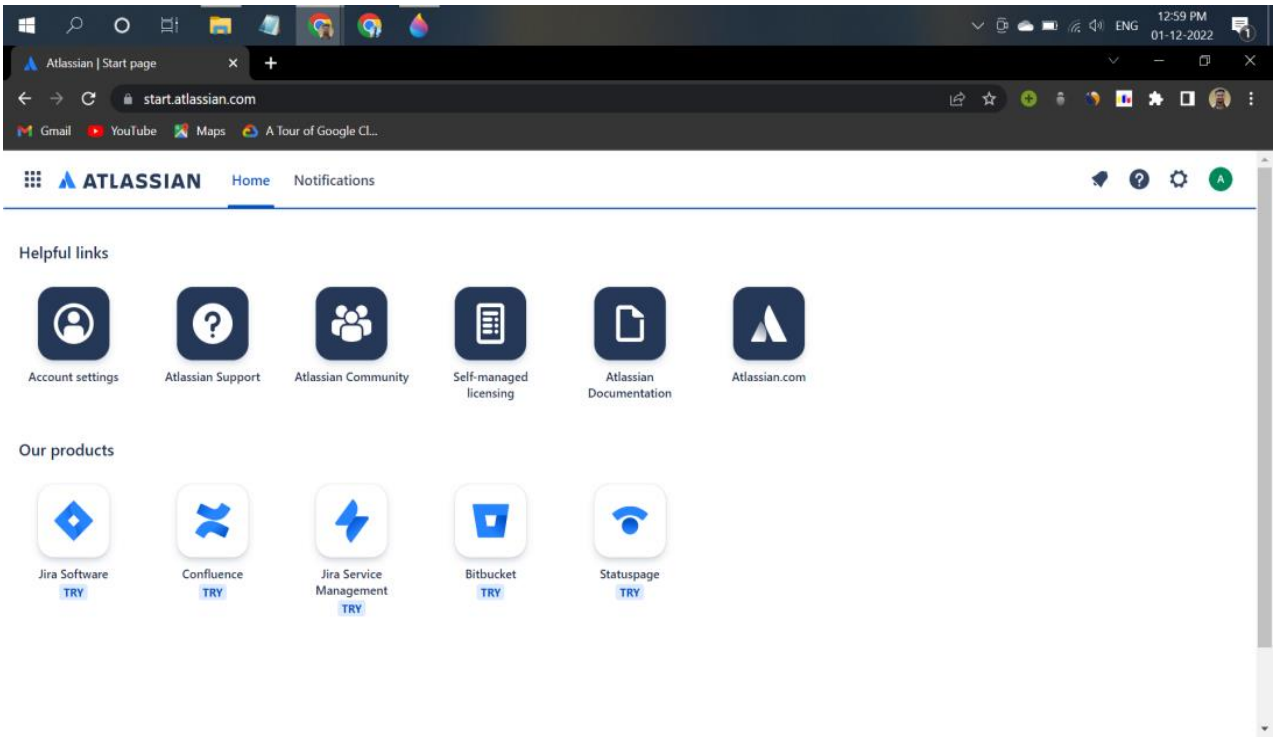


2. To complete the setup and login, click the verification link in the email box.

3. Set up your Atlassian account.



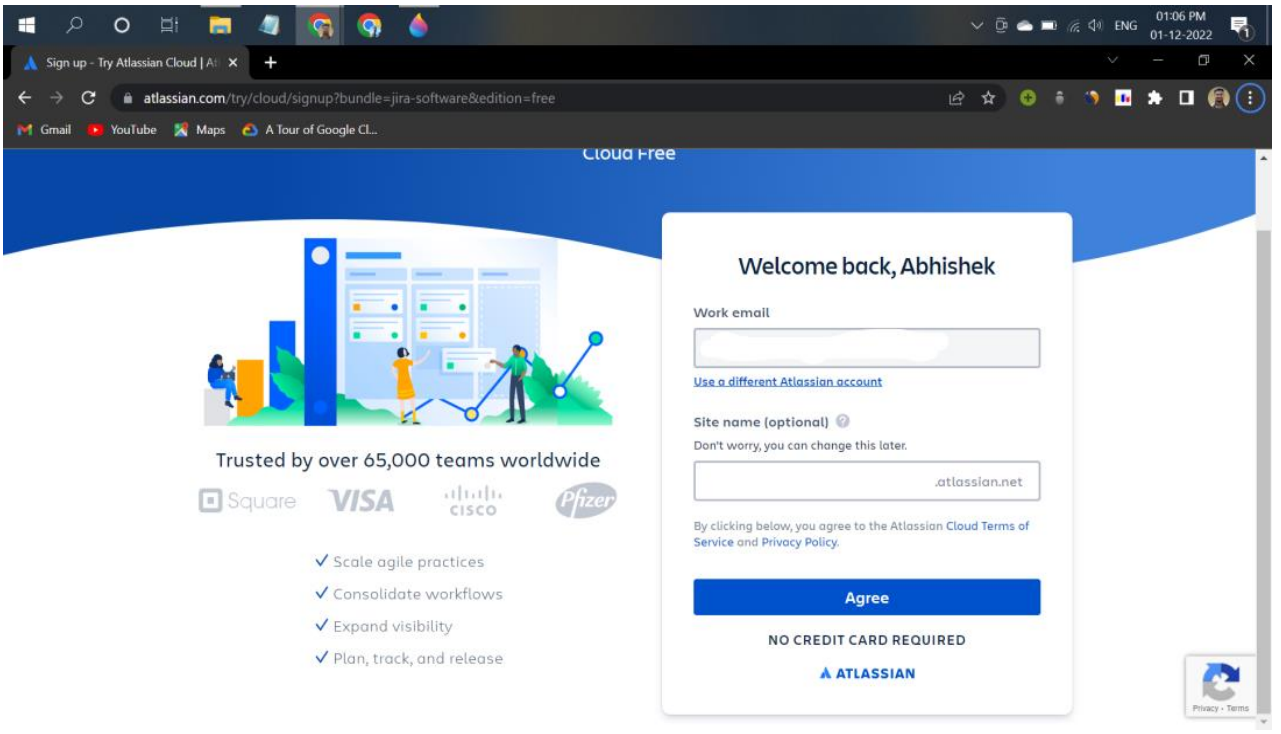
4.Click on signup after filling details. The account has been created. The user is automatically redirected to the home page.



Step 2: Creating a new Project

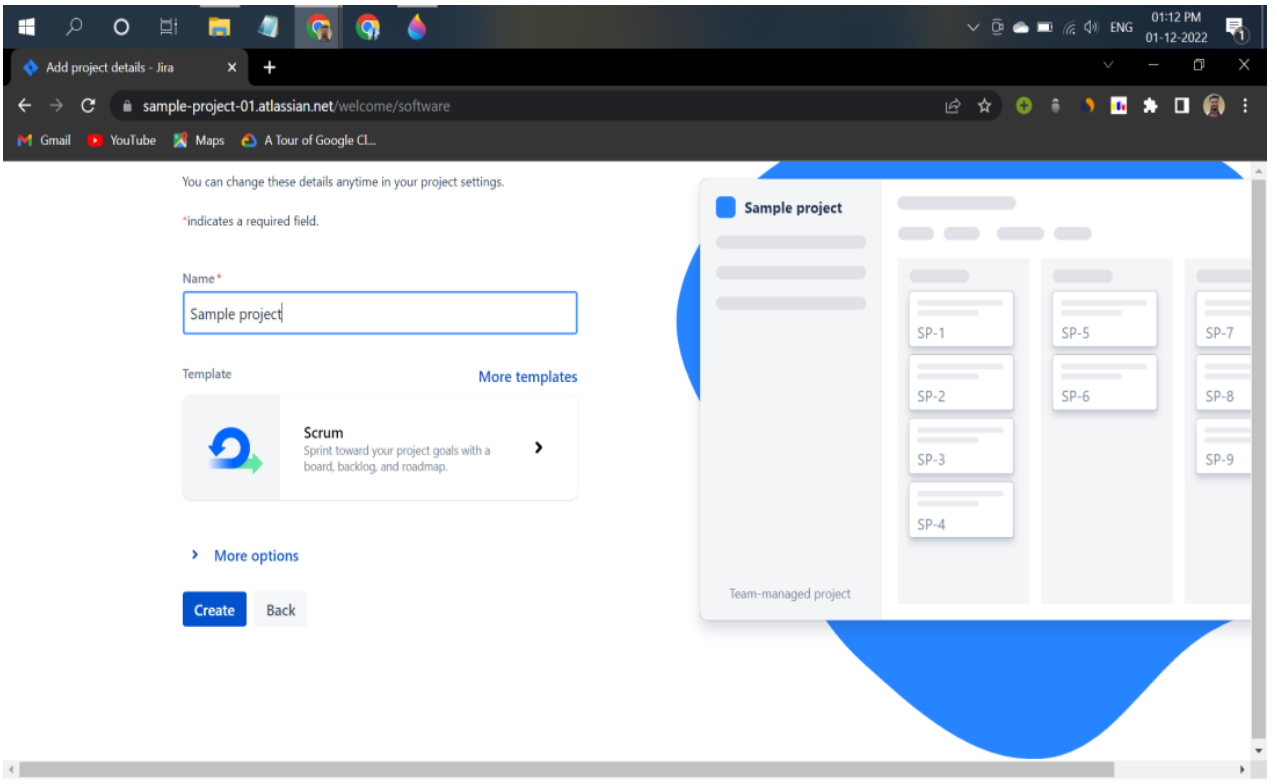
1. Log in to your Atlassian account.

2. On the home page click on the **Jira software** and fill required details.



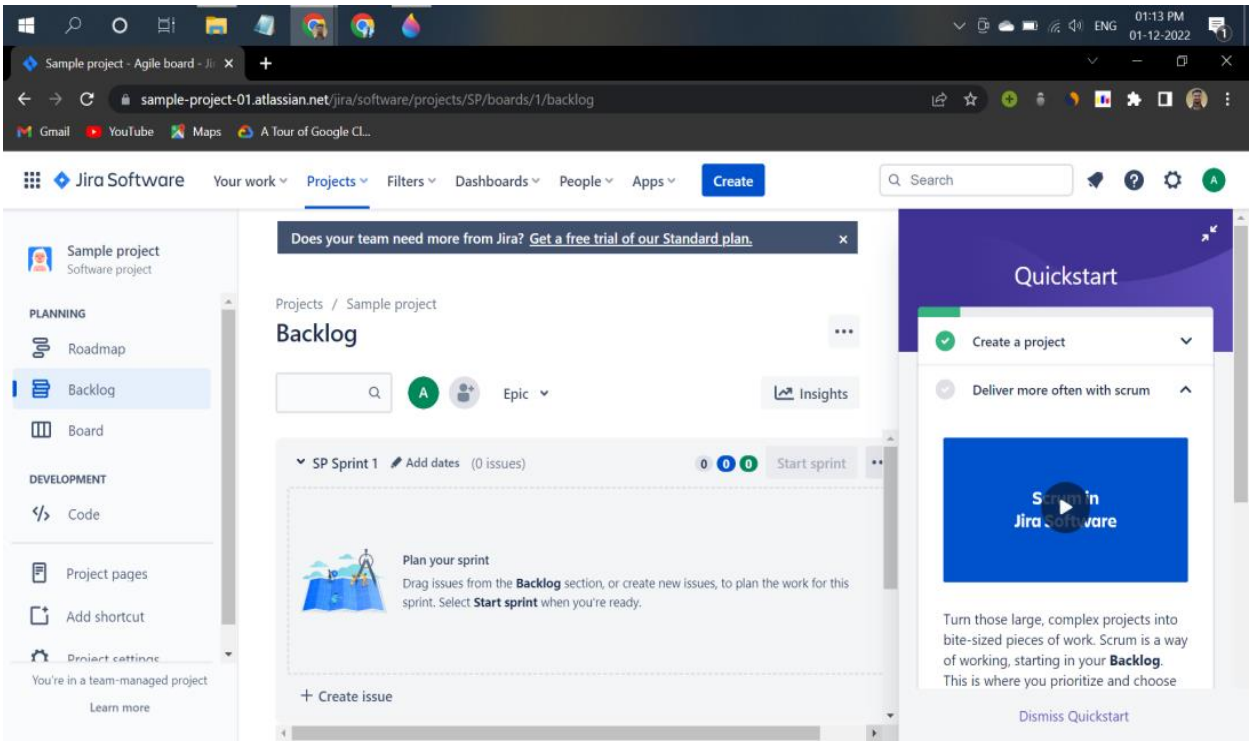
Jira Software

3. Answer some basic questions asked there to set up JIRA personally for your team.
4. Select your project name and template framework like scrum or kanban, etc. for your project.



Project Details

5. After completing the above steps, the following screen will be displayed:



Questions:

1. **What is Jira?**

2. **Write down any 4 key features of Jira.**

3. **Write down advantages and disadvantages of Jira.**

Conclusion: -

S/P/D									Total	Signature	Date
C			P			A					
6			8			6			20		
2	2	2	3	2	3	2	2	2			

Practical No.10

Title:- Automate any application for test management tool.

Theory:-

Proposition 1:

Introduction

In the last chapter, we discussed writing requirements in Test link tool. In this chapter, we are going to discuss linking requirement to a test case and Executing A Test Case in Test link tool. Linking requirement to test cases is a ver}-' important feature in Test link tool which helps to track down the test coverage based on requirements. Also, you can verifyin the test report which all requirements are not covered and those uncovered requirements can be appended to test suites which can ensure maximum test coverage.

Steps to Link Requirements To Test Case In Test link:

We can link the requirement to a test case in Test link after following these steps.

Step 1: Bring up the Test Link application

Open the XAMPP console and click on Start buttons for Apache Web Server and MySQL. After Apache Web server andMySQL database are started, you can sec their status on XAMPP control panel as shown below. Apache and MySQL elements on XAMPP control Panel have turned green which demonstrate the port number.

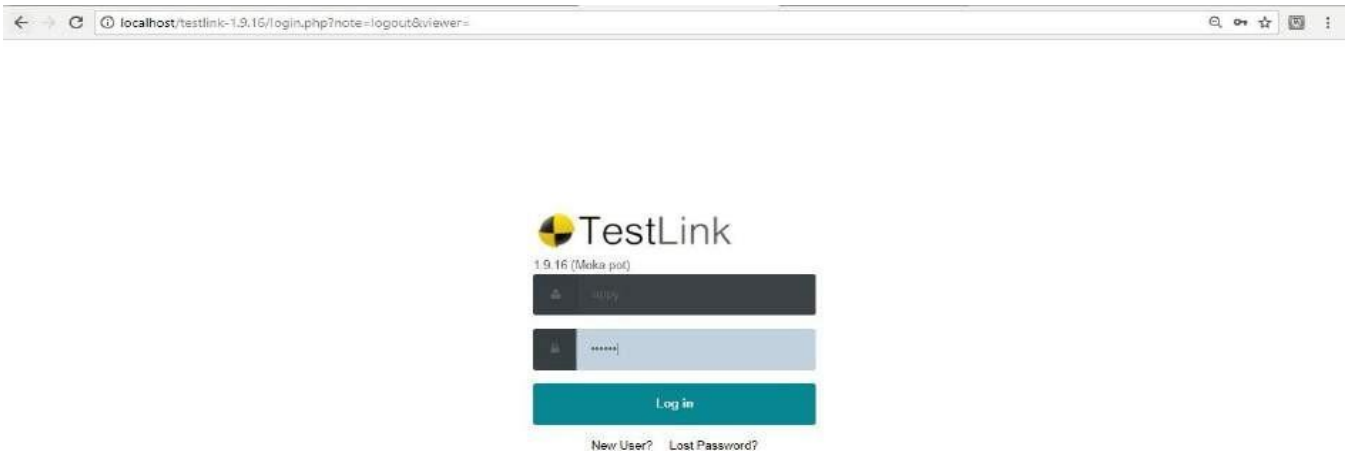
Note: When you want to stop or restart the Apache Web Server and MySQL database then you can simply click onthe Stop button to complete the required action.

Step 2: Login to the Test Link application with admin or appropriate role

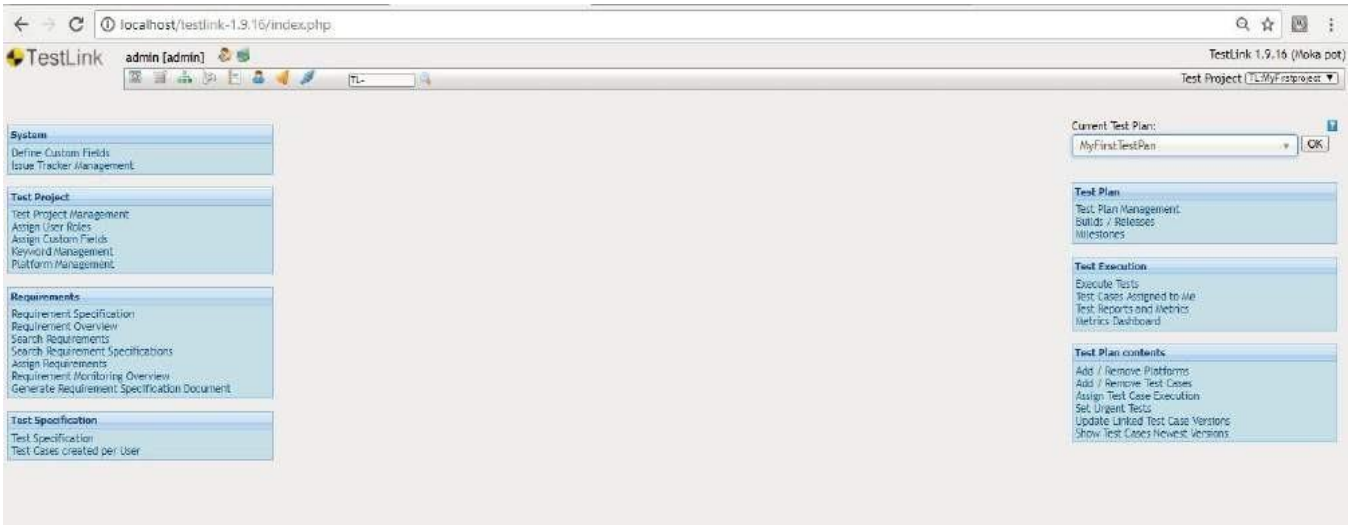
Make sure that the role with which you are going to login into Test link tool should have appropriate access to write requirements. Once Apache Web server and MySQL database are up and running, you canaccess the Test Link application at the below URL on your local machine.

http://localhost/testlink-1.9.16/login.php

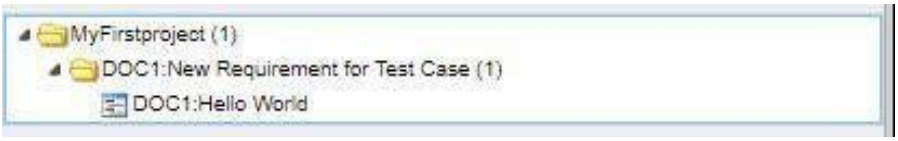
Shown below is the login page for Test Link tool. Enter username and password as admin and admin respectively in order to log into the application.



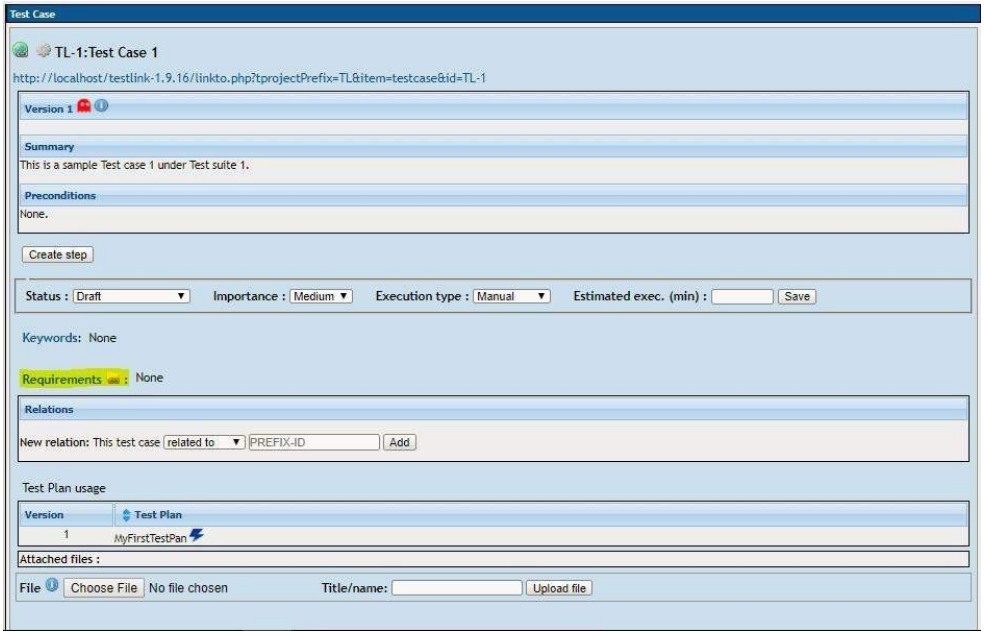
After successful login, it will take you to the home page of the Test Link tool as shown below.



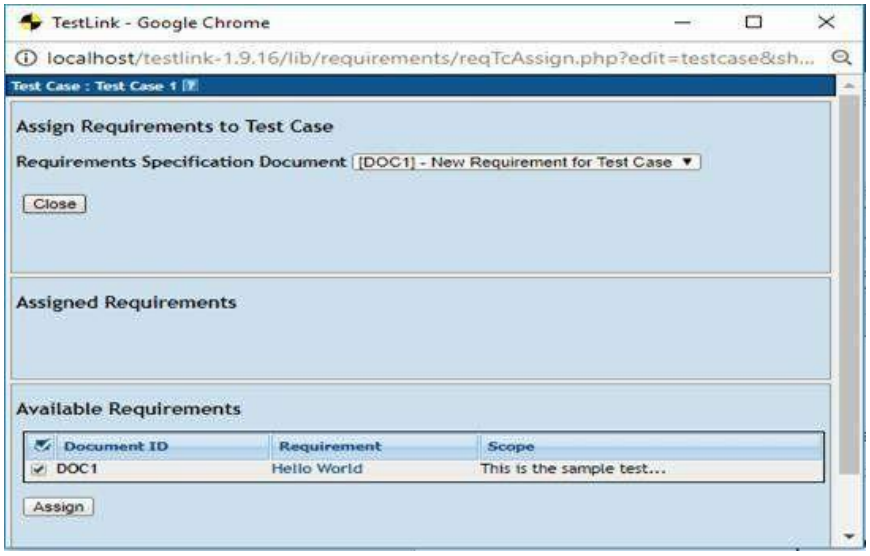
Step 3: On the home page click on the “Test specification” link which willopen up a page fromwhereselect a single Test Case “TL-1; Test Case 1” from the left-hand panel as shown below.



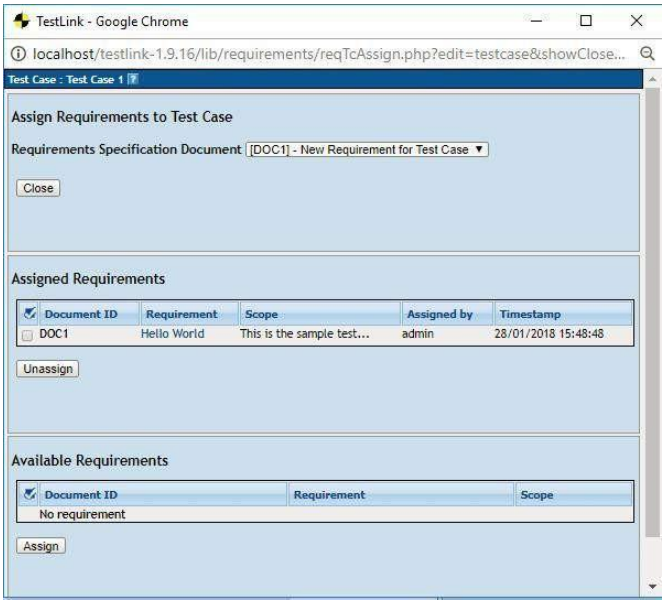
Step 4: On the right-hand side panel, a Test case page will get opened where you will notice a "Requirements ' icon to unlink/unlink a requirement to a test case as shown below. Click on this link.



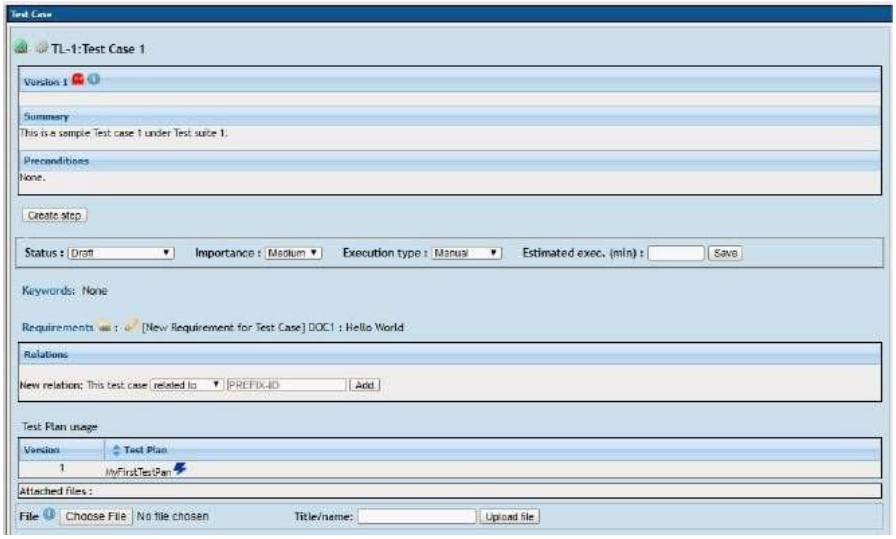
Step 5: When you hit the "Requirements" icon link, it will open a small pop-up window where you can check the checkboxes for the available requirements. Here, we are going to link "Hello World" requirement to the current test case "TL-1: Test Case 1 ". After checking the checkbox, click on the "Assign" button to complete the assignment of the requirement to a test case.



Step 6: Next, you can notice that "Hello World5' requirement is now appearing under Assigned requirements as shown below. Anytime, the requirement can be unassigned by checking the checkbox ofthat requirement and clicking in the "Unassign" button as shown below.



When you click on the "Close" button then the popup will be closed and you can notice that therequirement has successfully assigned to the Test case page as shown below.

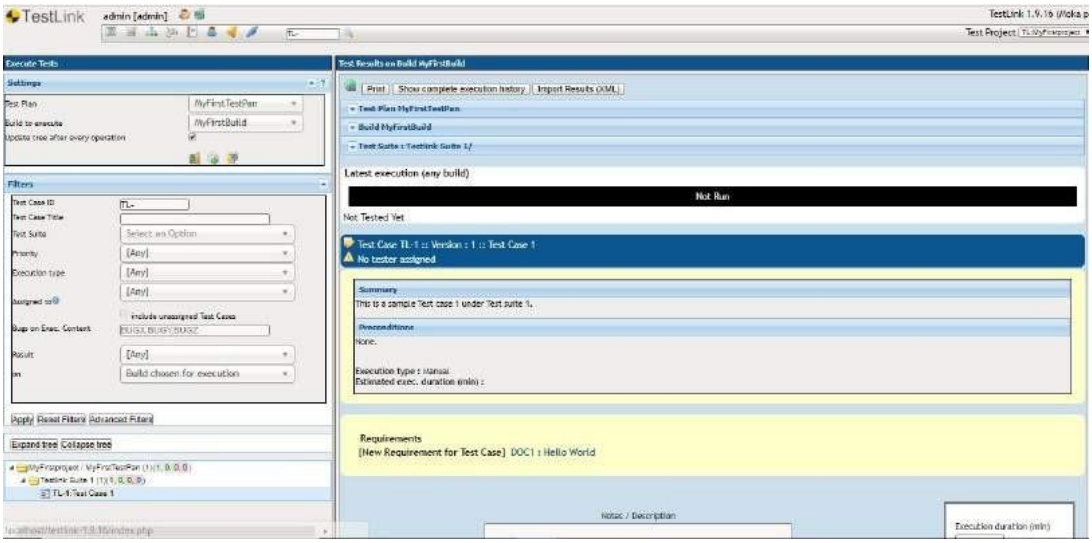


Executing A Test Case In Test Link Tool:

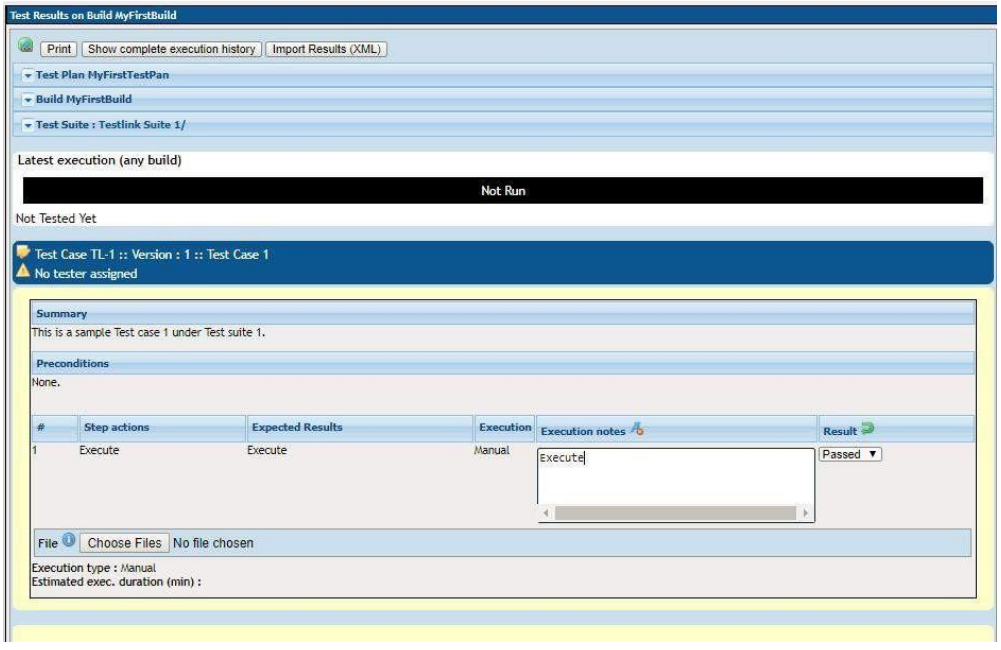
Test Link tool allows executing a test case with which we can change the status of a test case. Test Link tool has the available status as “blocked” “Passed”, or “failed”. The default status of a test case is “not run” status and once this status has changed and updated to “blocked” “Passed”, or “failed”, it cannot be changed back to “nor run” status again. The following are the steps to execute a test case in Test Link tool.

Step 1: From the top navigation bar present on the page, click on the “Test Execution” link (highlightedand shown below). It will open a new “Execute Tests” panel.

Step 2: Shown below is “Execute Tests” panel where you can pick a test case which you want torun from the left side panel.When you click on the “Close” button then the popup will be closed and you can notice that therequirement has successfully assigned to the Test case page as shown below.

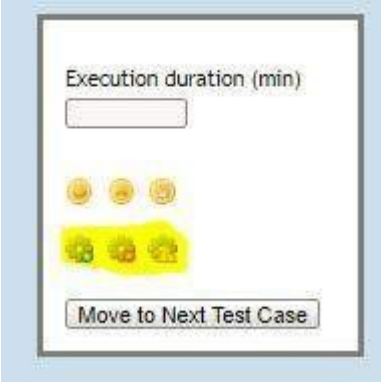


Step 3: Your test case is required to have stepped into it for execution. If you haven't added any step to your test case, then take a step back and add at least one step to your test case which you want to execute.This step will be required in order to execute your test case. In the example below, we have added step "execute" to the test case "TL-1: Test Case 1". When you are preparing to execute the test case then you need to enter the execution note to one of more steps associate with the current test case and you have to.select an appropriate status (here we have selected "Passed" as shown below).

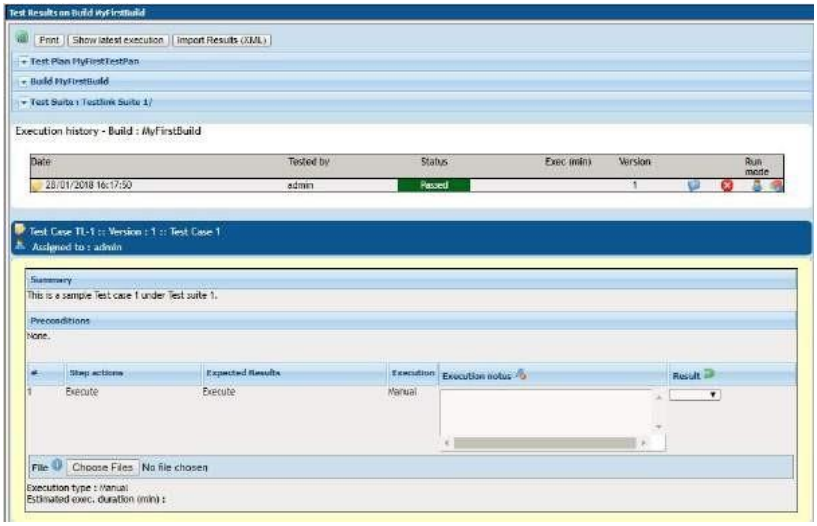


At the bottom of the same page, you need to enter Notes or description about the attached requirement and once it is completed you need to click on the execution icons present on the right-hand side of "Notes / Description" field as shown below.

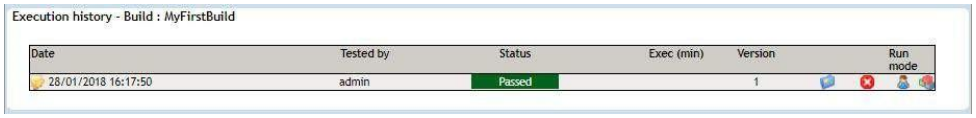
Using the icons below, you can quickly execute the test case and assign it the status as “blocked”“Passed”, or “failed”.



Since we have clicked on the “Passed” execution link. Our current test case has executed successfully and it has been assigned status as “Passed” as shown below.

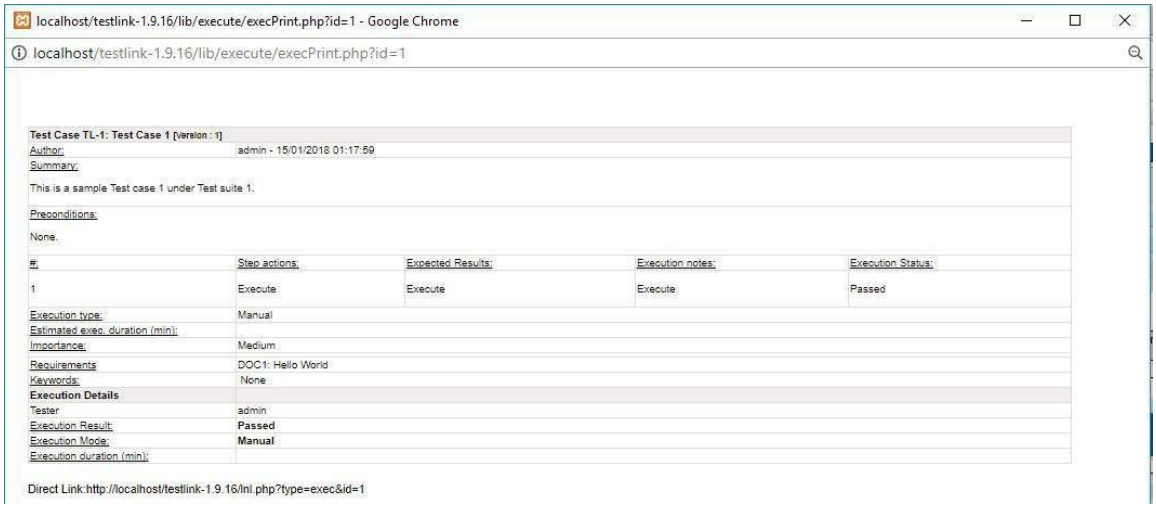


Explanation of Execution History:



When the test case has executed successfully, we can see the execution history on thesame page as shown above. We may also notice the following icons which serve the specific purpose as explained below.

- **Attachment Icon:** When it is clicked, it allows to attach documents to the current execution.
- **Delete Icon:** When it is clicked, we can delete this execution by clicking the delete button.
- **"human" icon**: When we mouse hover over the "human" icon, there we may notice whether it wasexecuted manually or automatically.
- **Print View Icon**: The last icon will provide the complete print view of the test execution step when itis clicked as shown below.
-



Questions:

1.What is Test Link?

2.Why we use Test Link ?

Conclusion:

S/P/D									Total	Signature	Date
C			P			A					
6			10			4			20		
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Practical No: 11

Title: Perform unit Testing on s/w unit automated tool (eg. junit)

Theory:

What is JUnit?

JUnit is a unit testing open-source framework for the Java programming language. Java Developers use this framework to write and execute automated tests. In Java, there are test cases that have to be re-executed every time a new code is added. This is done to make sure that nothing in the code is broken.

JUnit has several graphs that represent the progress of a test. When the test runs smoothly, the graph displays a green color, and it turns red if the test fails. JUnit Testing enables developers to develop highly reliable and bug-free code.

JUnit plays a huge role when it comes to regression testing. Regression Testing is a type of software testing that checks if the recent changes made to the code do not adversely affect the previously written code.

To have a better answer to the question 'What is JUnit', let's have a look at what Unit Testing is.

What is Unit Testing?

Unit testing, as the name suggests, refers to the testing of small segments of code. Here, a unit indicates the smallest bit of code that can be fetched out of the system. This small bit can be a line of the code, a method, or a class. The smaller the chunk of code, the better it is, as smaller chunks will tend to run faster. And this provides a better insight into the code and its performance.

When the chunk is small, it is easy to identify the defects from the dormant phase itself. The developers now spend more time reading the code than writing it. A successful code boosts the confidence of the developer and makes them work better.

The top reasons to take up JUnit Testing are:

- To find bugs early in the development phase, which increases the code's reliability
- The framework enables the developer to invest more time in reading the code than writing it
- This makes the code more readable, reliable, and bug-free

- It boosts the confidence of the developer and motivates them immensely

Features of JUnit

There are several features of JUnit that make it so popular. Some of them are as follows:

1. **Open Source Network:**

   JUnit is an open-source network that enables developers to write codes fast and with better quality.

2 Provides Annotations:

It provides several annotations to identify test methods.

3 Provides Assertions:

There are assertions to test expected results.

4 Provides Test Runners:

JUnit has test runners to run tests.

5 Improves Code Quality:

JUnit is the most popular testing framework for efficient testing. It allows faster code writing, which results in an increase in the code's quality.

6 Automated Test Running:

The test results do not require manual checking. All the tests run automatically on JUnit, the results obtained again automatically checked, and it provides feedback.

7 Easily interpretable results:

The test results are represented interactively by showing test progress in a bar, thus making them easily interpretable.

Moving on, let's have a look at JUnit Annotations.

JUnit Annotations

- JUnit Annotations refer to the syntactic meta-data added to the Java source code for better structure and readability. Here, syntactic meta-data refers to the type of data representing the structure of a file with references to bytes, data types, and data structures.
- The main point of difference between JUnit4 and JUnit3 is the introduction of Junit Annotation

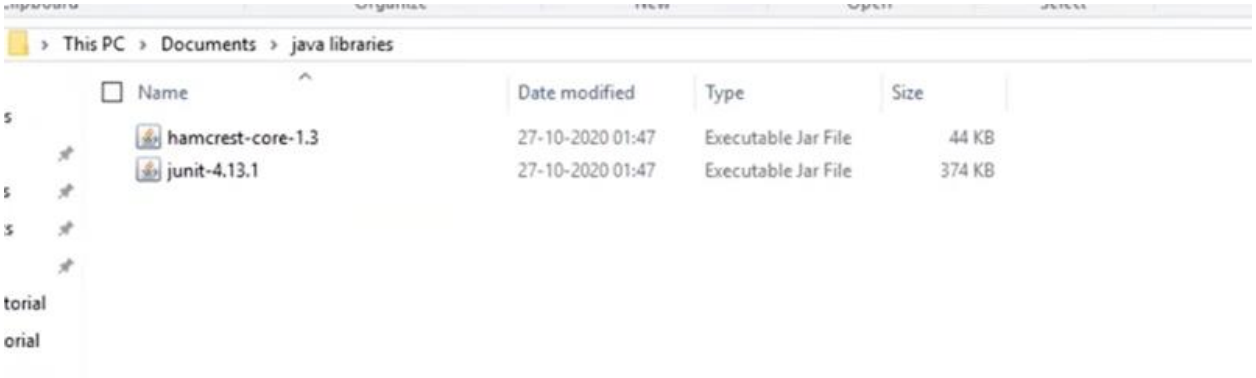
@BeforeClass	Used to execute a statement before all the test cases
@AfterClass	Used to execute a statement after all the test cases
@Test (time out =500)	Used to set some timeout while executing the test
@Test (expected=Illegal ArgumentException.class)	Used to handle some exception during test execution
@BeforeClass	Used to execute a statement before all the test cases
@AfterClass	Used to execute a statement after all the test cases
@Test (time out =500)	Used to set some timeout while executing the test
@Test (expected=Illegal ArgumentException.class)	Used to handle some exception during test execution

- **Installation steps of Junit :**

Step 1: Search Junit on Browser and On Junit Offcal website go on about inside there is Download and Install

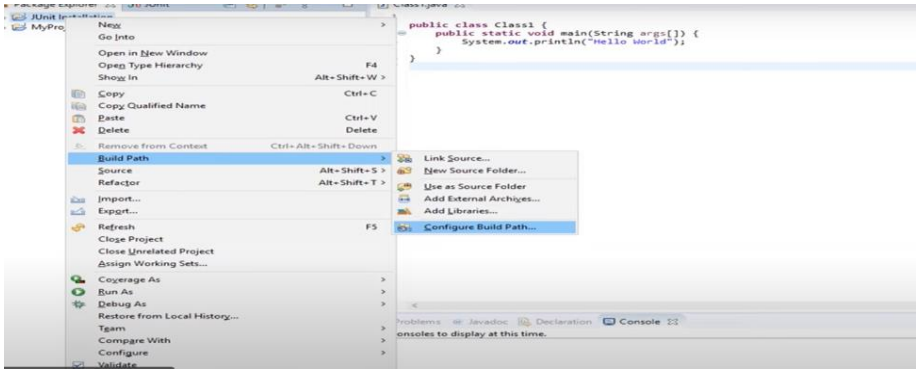
Step 2: You will Find two JAR File Download Both the JAR file

Step 3: Go to Location where the JAR files are downloaded Copy JAR files into the documents or where your respective Java libraries and paste the JAR files there

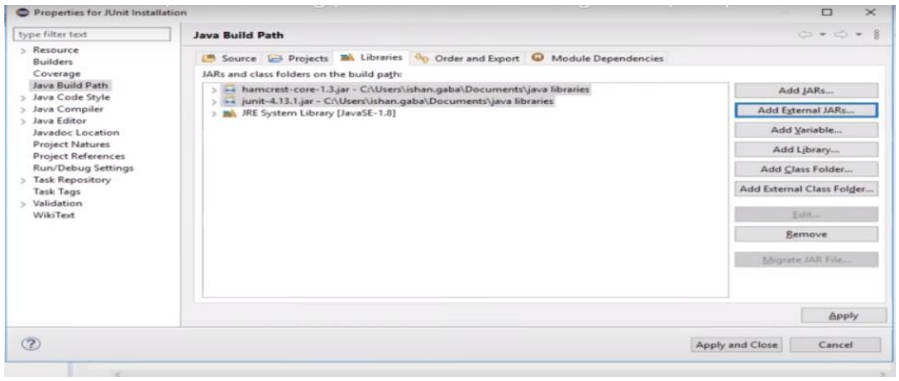


Step 4: Open eclipse in your pc ,Firstly create a java project

Step 5: Right Click on the java project which was created earlier Right click on the Build path option go to Configure build path



Step 6: Go to Tab library click on Add External JAR file and open the JAR file once you open it it will appear there Click on apply



Step 7:Right on the project Refresh after that Right click on SRC folder and create package name it as JUnit Install

Step 8: In that package create new class Junit Install and click on finish

Question:

1 What is JUnit?

2 What is Unit Testing ?

3 What is need for Junit Testing ?

4 What are the features of Junit ?

Conclusion:

S/P/D									Total	Signature	Date
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