

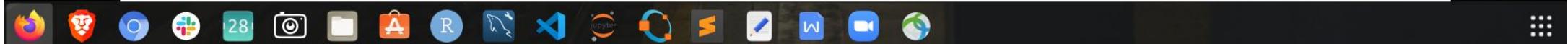
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https://docs.google.com/presentation/d/1RhkdqmQngEVi0nwaevQFXcKTdJE Oz6U_t7q4xFGIJRI/present#slide=id.g1cd748929d_0_0

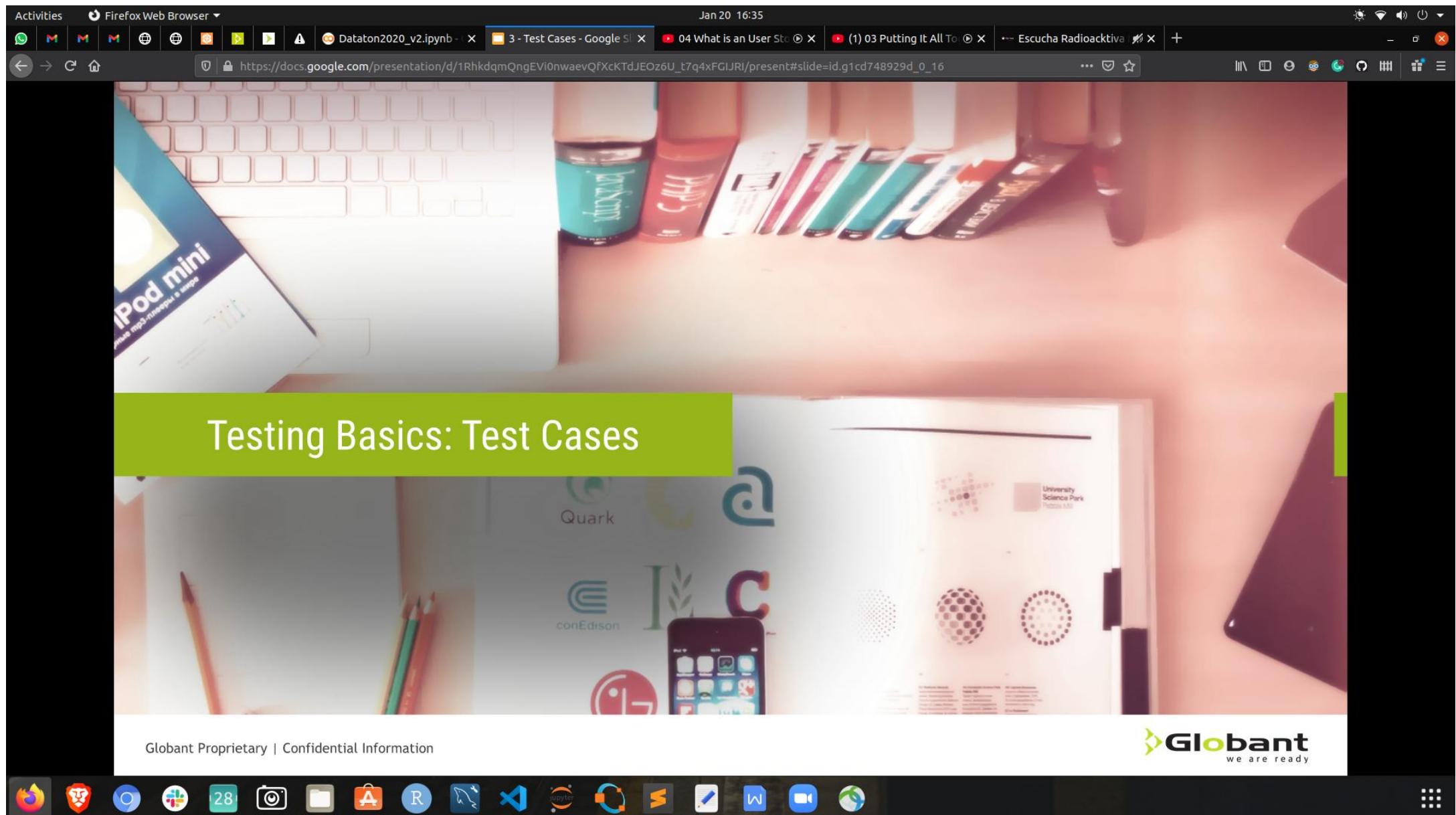
TESTING BASICS: INTRODUCTION TO TEST CASES

QUALITY  ENGINEERING



Topics

- Introduction
 - Definition
 - Objectives
 - Components
- Designing Test Cases from User Stories
- Final Considerations



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Test Case Definition

A test case is a **group of conditions** or variables under which we can determine if a **system requirement** has been partially or completely **covered**.

It predicts the **expected result** after having executed a **series of steps** starting from an **initial known state**.



It may take **many test cases** to determine that a requirement is **fully covered**.

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Test Case Objectives

- Identify and enumerate the conditions to validate
- Define the creation process of a known environment which will allow the system to be exercised (preconditions)
- Describe the combinations of data that need to be validated
 - Specify the control points
 - Define the process of evaluation of the results with respect to:
 - The goal of the test (PASS/FAIL)
 - The final state of the system (postconditions)



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Test Case Objectives

- The ultimate objective of a test case is to find bugs.
- Create test cases with the objective of exercise the code behind the feature with the aim of finding bugs in that code.
- Take into consideration the unicity of test cases. Do not create more than one expected results as verifications needed for every test case, keep the focus on the Goal of what will be validated upon the Description.



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Test Case

Now, you can see:

Test Case Management Systems

[Link a YouTube](#)

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Firefox, Docker, Google Chrome, 28, Camera, File Manager, App Store, R, Python, VS Code, Jupyter, S, Notepad, Microsoft Word, Microsoft PowerPoint, Microsoft Excel

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Test Case Components

Componente	Descripción
Test Case ID	A code to identify each test case
Description	A brief description of the test case's goal
Pre-Conditions	Description of the state of the system prior to executing the test
Test Inputs	Lists the input data to use during the execution
Steps	Each specific action to perform on the system
Expected Results	The result after the test has been executed
Post-Conditions	Description of the state of the system after executing the test

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Test Case Components

Componente	Descripción
Requirements environment	Software and hardware required (i.e. browsers, mobile device, etc.)
Result	State the actual result of the function execution. Especially in case the test case fails, the information under 'result' will be very useful to the developer to analyze the cause of the defect
Execution Time	The execution time supplied by the tester
Bug	ID allotted to the bug if there was
Execution Date	Date when test was executed
Tester	The tester who executed the test case



Test Case Components: Results



NOT TESTED

The test case has not been executed for the test run, maybe is a lower priority test case

PASSED

The expected and actual results match

FAILED

The actual result does not match the expected result

NOT APPLICABLE

The test case does not apply to the feature any more since the requirement changed

CANNOT BE TESTED

May be the prerequisite/ precondition is not met. There could be a defect in one of the steps leading up to the function under test



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X What is X-Ray?

X-Ray is a Jira's plug-in that helps you to integrate and manage the QA Tests in a software project.

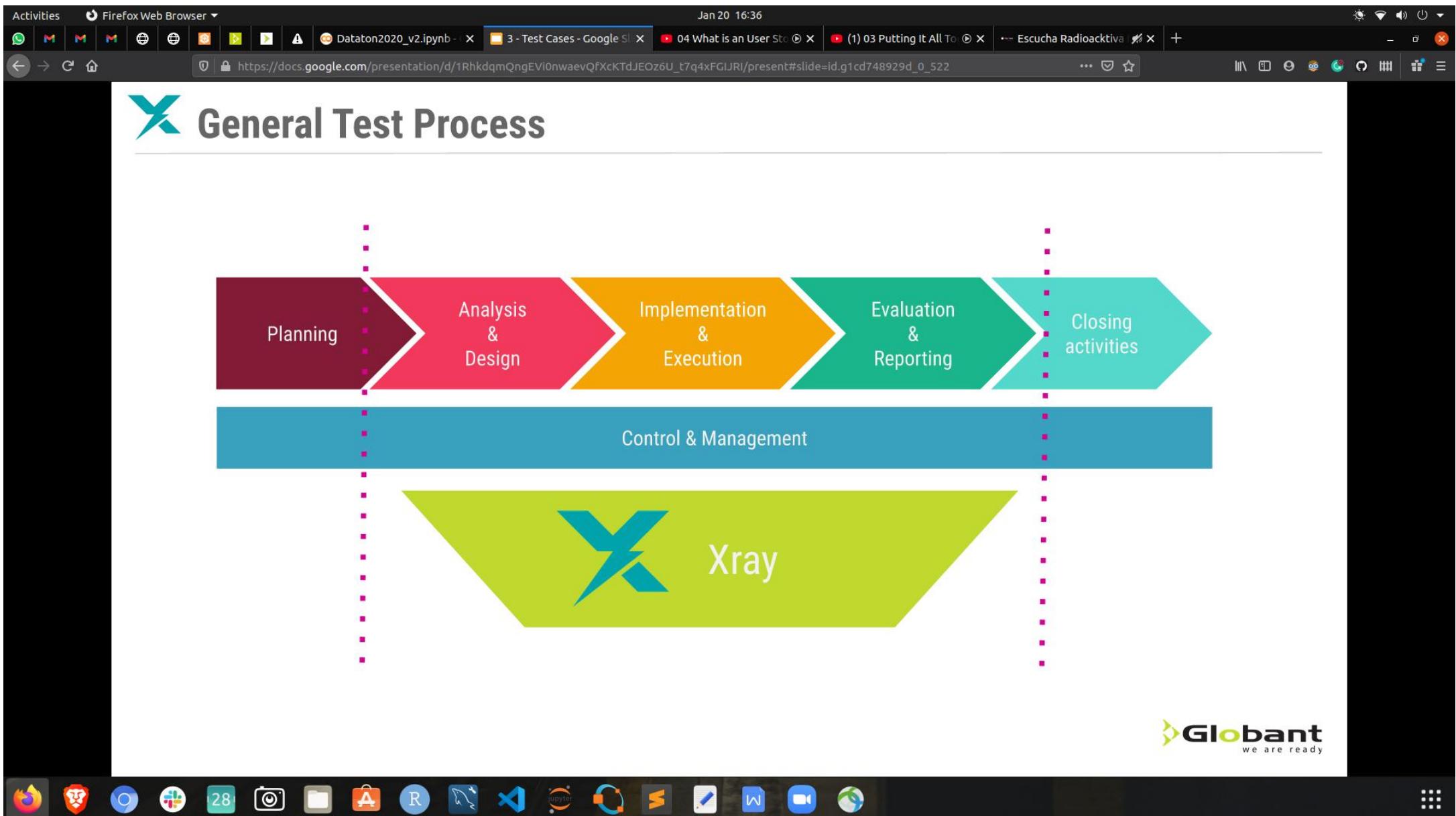
Their key features are:

- Full integration with Jira projects.
- Easy to create Test Cases and Test Sets.
- Have a simple way to record, manage and control your Test Executions.
- Useful reports to track the quality and coverage of projects.

 Xray
for JIRA

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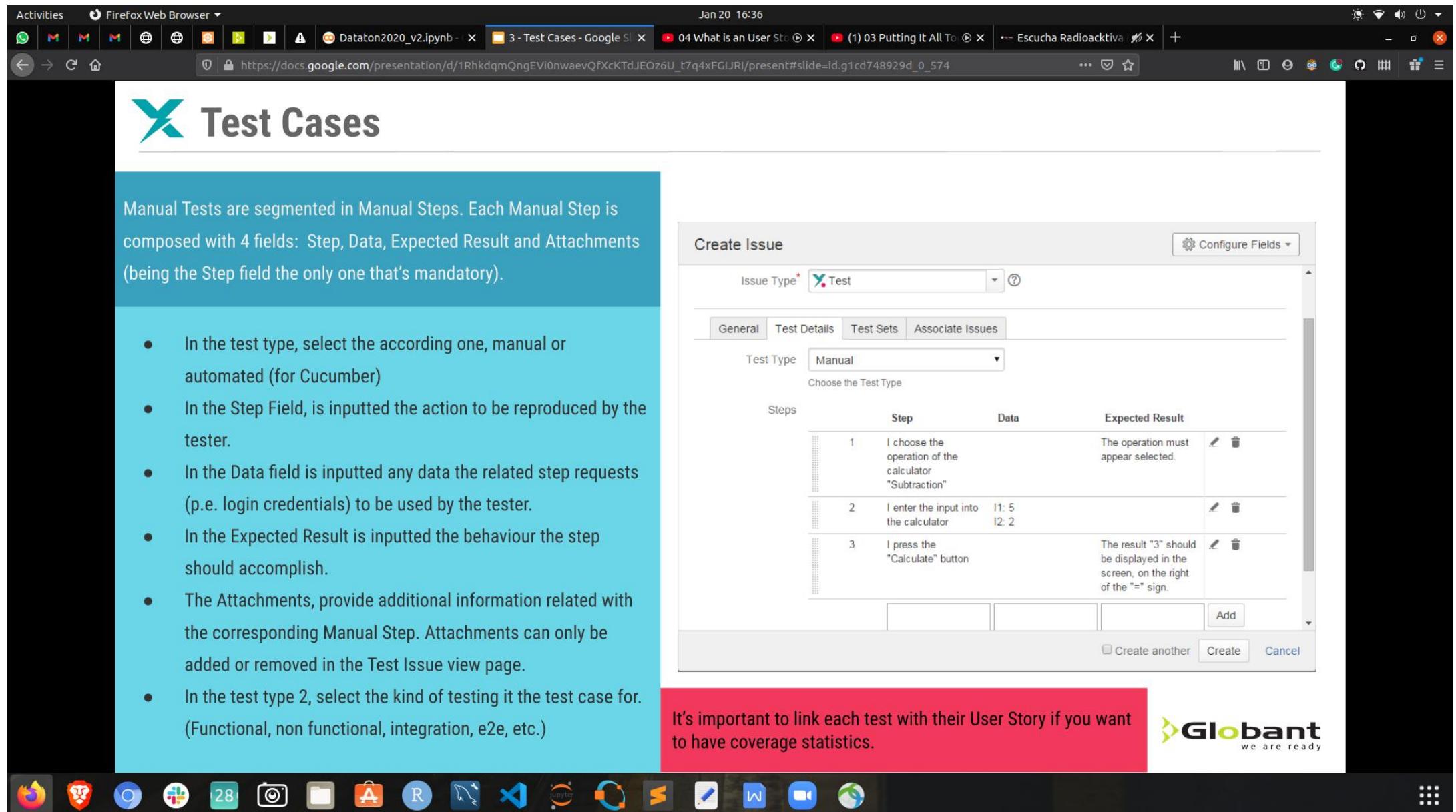
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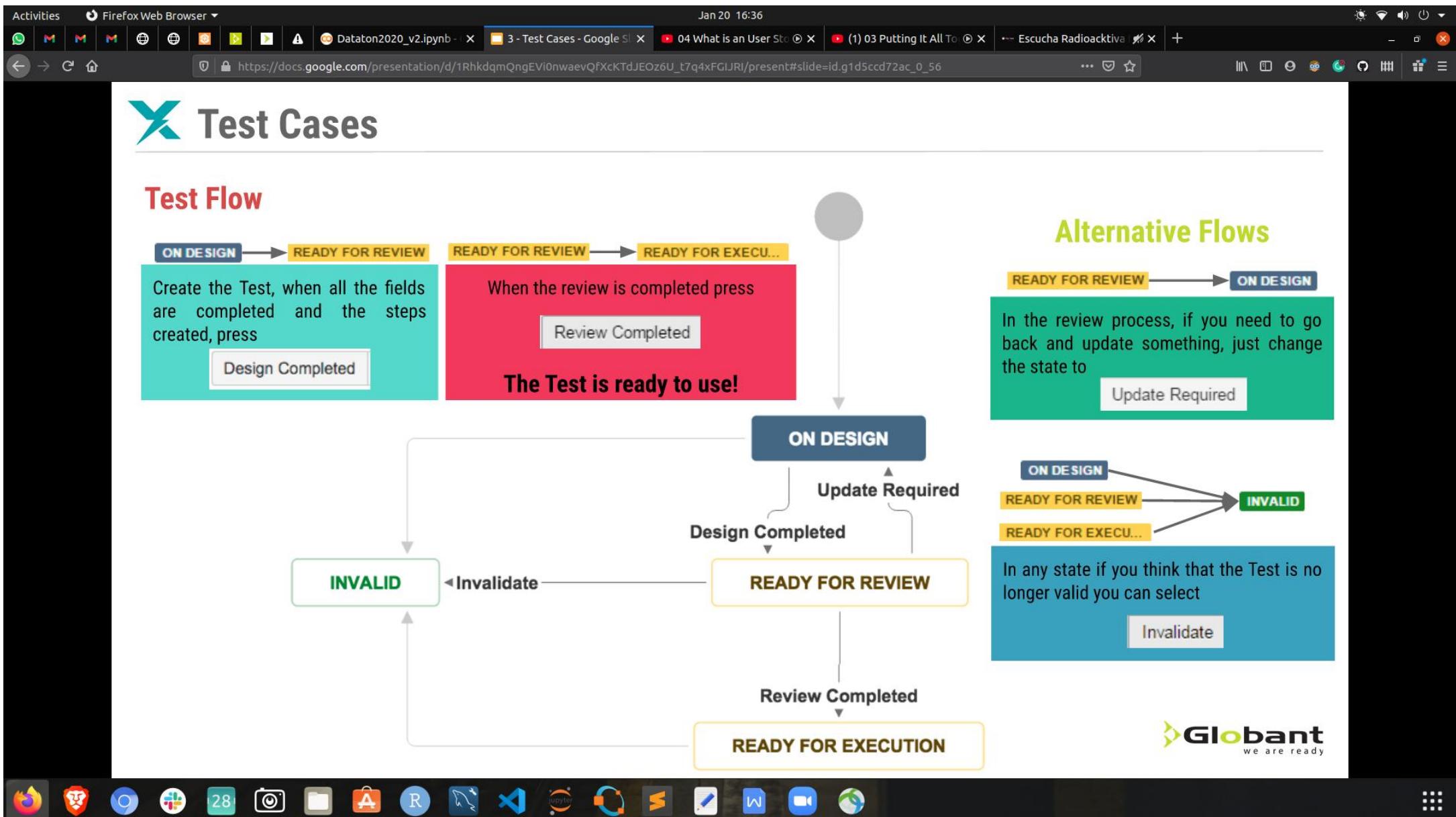
X Testing Definitions

The diagram illustrates the components of testing. At the top left is a green circle divided into three concentric segments: 'Pre condition' (light green), 'Test' (yellow-green), and 'Test Set' (dark green). To the right of this are four separate circles: a light blue circle labeled 'Test Execution (plan)', a dark red circle labeled 'Execution', and a pink circle labeled 'Report'. Below these components are five colored boxes corresponding to the terms:

Precondition	Test	Test Set	Test Execution	Report
A precondition indicates a previous state that system has to be before execute the test case	Is a set of steps and conditions under which a tester can validate an expected result about the behavior of an application or software system, based on their requirements.	Is a set of test cases grouped according a common characteristic.	Is the testing task where implement, execute and records the test sets and/or test cases.	The reports helps you to manage and control the progress of the test phase and also helps you to have a measure of the software quality.

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X Test Precondition

To create a new Pre-Condition issue:

- **Step 1:** Click the Create Issue at the top of the screen to open the Create Issue dialog box.
- **Step 2:** Select the relevant Project and on Issue Type select Pre-Condition.
- **Step 3:** Type a Summary for the Pre-Condition and complete any appropriate fields
- **Step 4:** On the Pre-Condition Details tab select the **Pre-Condition Type** and complete any appropriate fields.
- **Step 5:** Click the **Create** button.

Calculator / CALC-10 Divide two numbers

Type: Automated[Ducumber]

Cucumber Type: Scenario Outline

Steps:

```
Given I have entered <input_1> into the calculator
And I have entered <input_2> into the calculator
When I press <button>
Then the result should be <output> on the screen
```

Examples:

input_1	input_2	button	output
8	4	divide	2
12	3	divide	4
3	1	divide	3

Pre-Condition

This test is not associated with Pre-Condition yet.

Associate Pre-Condition

To associate existing Test issues with a Pre-Condition issue:

- **Step 1:** Open the Test issue view screen you wish to associate a Pre-Condition with.
- **Step 2:** Click the Associate Pre-Condition button
- **Step 3:** Select the **Pre-Condition**.
- **Step 4:** Click **Add**.

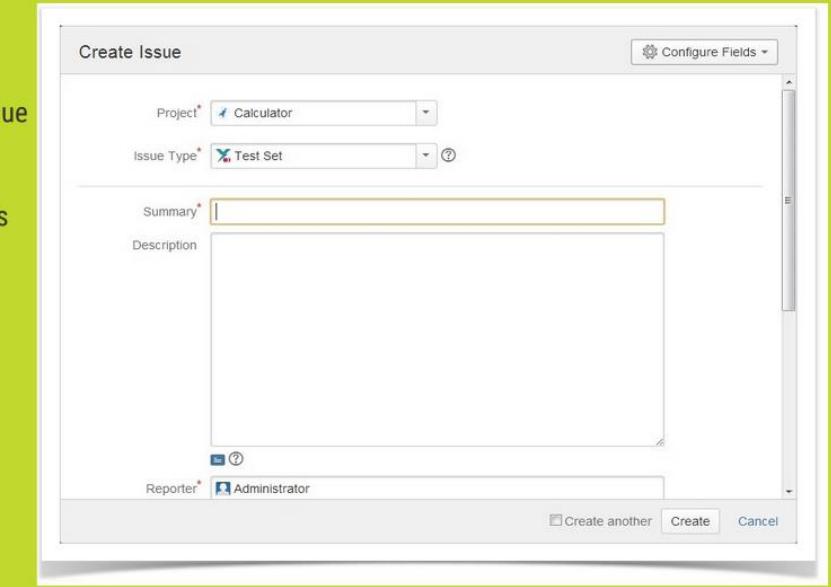
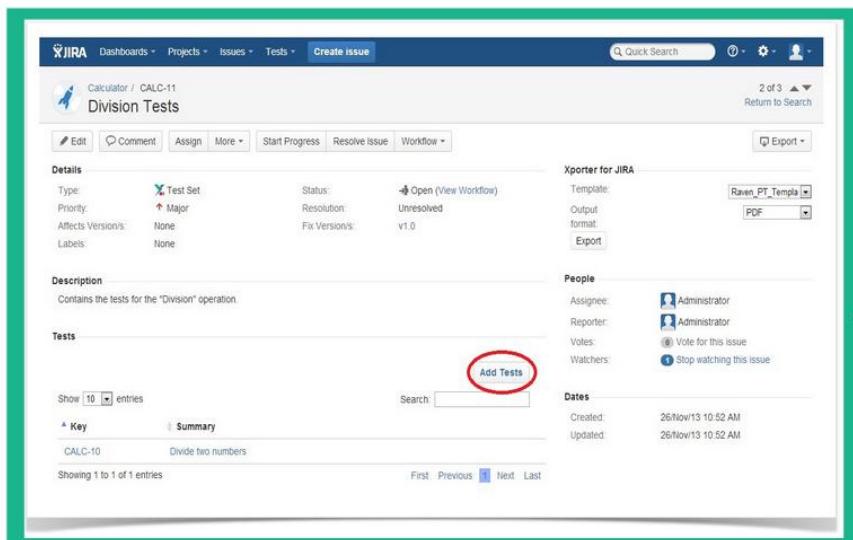
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X Test Set

To create a new Test Set issue:

- Step 1:** Click the Create Issue at the top of the screen to open the Create Issue dialog / page.
- Step 2:** Select the Project and on Issue Type select Test Set.
- Step 3:** Type a Summary for the Test Set and complete any appropriate fields
- Step 4:** When you are satisfied with the content of your Test Set, click the Create button.

To associate Tests with a Test Set from the Test Set issue view screen:

- Step 1:** Open the Test Set you wish to associate a Test with.
- Step 2:** Click the Add Tests button (under the Tests tab on the view page) to open the Add Tests dialog box.
- Step 3:** Select or search the Test issues to be associated with the Test Set
- Step 4:** Click Add.

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X Test Execution

Calculator / CALC-4
Execution Addition 1

Type: Test Execution Status: Open (View Workflow)
Priority: Major Resolution: Unresolved
Affects Version/s: None Fix Version/s: v1.0
Labels: None

Description

Test Execution

Start Date: 26-11-2013 09:44
End Date: 28-11-2013 09:44
Revision: 35762

Test Execution custom fields are:

- **Start Date**, where is inputted the date when the Test Execution is planned to start;
- **End Date**, where is inputted the date when the Test Execution is planned to end;
- **Fixed version**, indicates the version where the test going to run.
- **Sprint**, in which sprint this test execution will be tested.

The Tests section provides the following views:

- **Overall Execution Status:** Is a coloured progress bar where users can clearly see the status of a Test Execution.
- **Test Run Filters:** A filter section to allow users to filter Test Runs.
- **Test Runs Table:** The Tests section provides a table with all Test Runs created for the Test execution issue.

Tests

OVERALL EXECUTION STATUS

Total Tests: 7

FILTERS

Test Set: Assignee Status Search Clear

Show 10 entries Columns

Key	Summary	Test Type	#Req	#Def	Test Sets	Assignee	Status
1	CALC-59 As a valid user I can log into my app	Automated[Cucumber]	1	0	Pedro	 	
2	CALC-68 Add two numbers	Automated[Cucumber]	1	0	Pedro	 	
3	CALC-2 Subtract two numbers	Manual	2	2	CALC-5	 	
4	CALC-12 Multiply two numbers	Manual	1	0	CALC-14	 	
5	CALC-16 Multiple Operations	Automated[Cucumber]	0	0	Pedro	 	
6	CALC-61 Test Scientific Mode	Automated[Generic]	0	0	Pedro	 	
7	CALC-10 Divide two numbers	Automated[Cucumber]	1	0	CALC-11	 	

Showing 1 to 7 of 7 entries First Previous Next Last

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X Test Execution

Create Issue

Project: Calculator

Issue Type: Test Execution

Summary:

Description:

Reporter: Administrator

Create another Create Cancel

Create a new Test Execution:

- **Step 1:** Click the Create Issue at the top of the screen to open the Create Issue dialog box
- **Step 2:** Select the Project and on Issue Type select Test Execution.
- **Step 3:** Under the General tab, type a Summary for the test execution and fill any appropriate fields.
- **Step 4:** Click the Create button.

Calculator / CALC-4
Execution Addition 1

Test Execution

Type: Test Execution Priority: Major Status: Open (View Workflow)

Affects Version/s: None Resolution: Unresolved

Labels: None Fix Version/s: V1.0

Description

Test Execution

Start Date: 26-11-2013 09:44 End Date: 26-11-2013 09:44 Revision: 35762

Tests

+ Add Tests Test Sets

OVERALL EXECUTION STATUS Total Tests: 2

Xporter for JIRA

Template: Raven_PT_Templa Output format: PDF Export

People

Assignee: Reporter: Votes: Watchers:

Administrator Administrator Vote for this issue Stop watching this issue

Dates

Created: 26-Nov-13 9:49 AM Updated: 26-Nov-13 10:11 AM

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Associate Tests and Test Sets can be associated with Test Execution:

- **Step 1:** Open the Test Execution
- **Step 2:** Select Add > Tests (under the Tests tab on the view page) to open the Add Tests/ Test Set dialog box.
- **Step 3:** Select or search the Test/ Test Set issues to be associated with the Test Execution:

Firefox, Google Chrome, Microsoft Edge, Opera, Vivaldi, 28, Camera, File Manager, App Store, R, Python, VS Code, Jupyter, S, WPS Office, Video Player, System Monitor, Globalization Services logo.

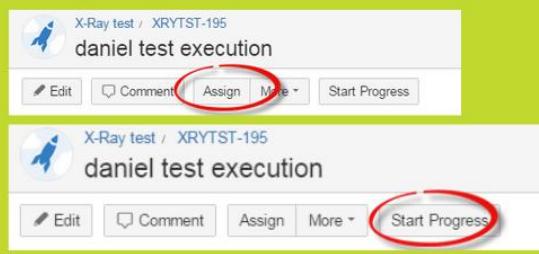
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X Test Execution - Execute Tests

To start execution:

1. Assign the test cases and/or the execution to a QA
2. Start progress when you are ready

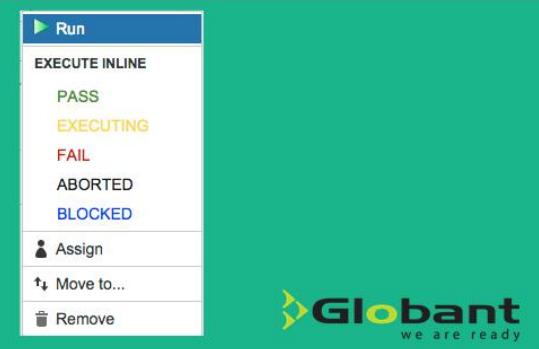


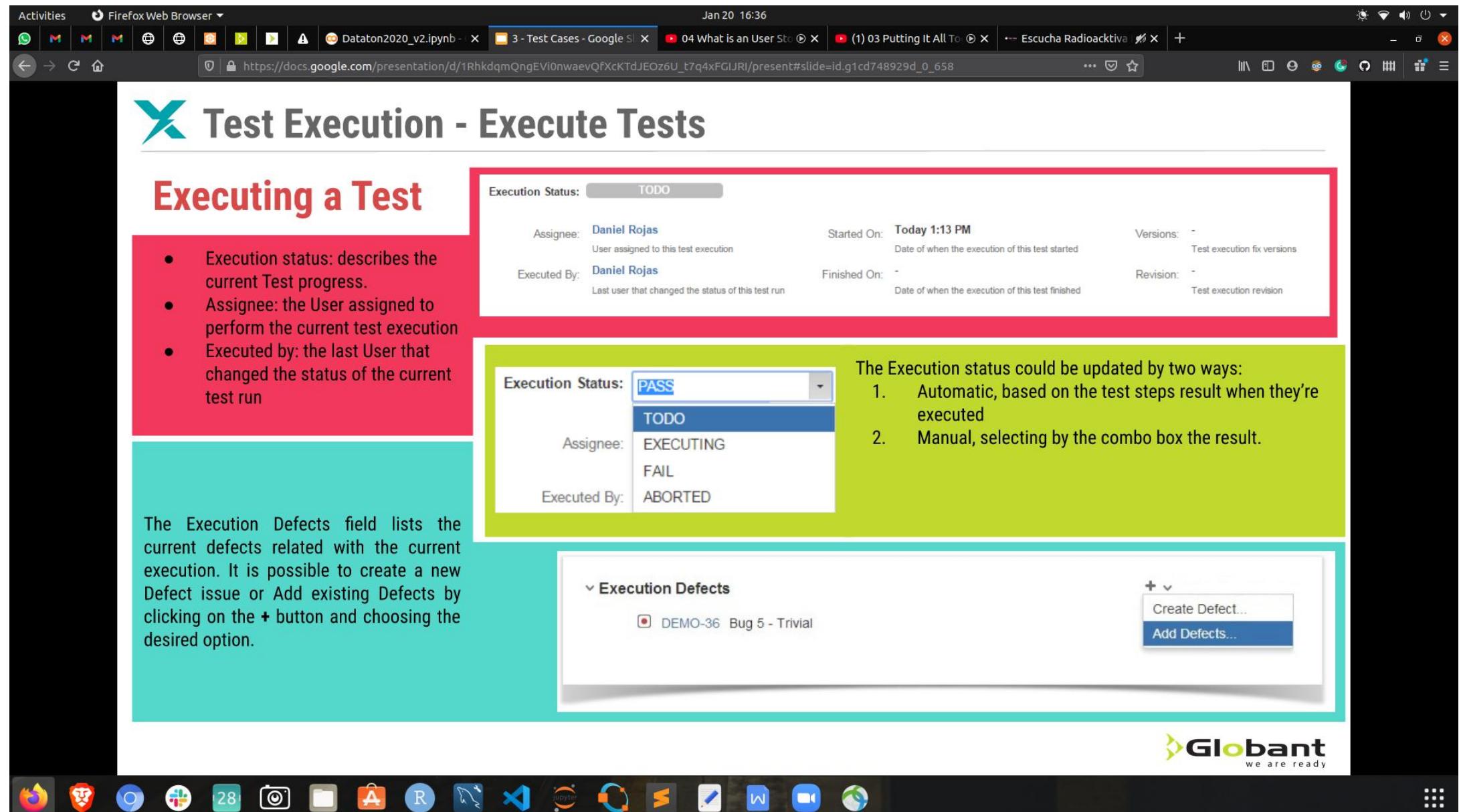
3. Click the gear that appears in the last column. The actions menu should popup with the available actions

Key	Summary	Test Type	#Req	#Def	Test Sets	Assignee	Status
1 XRAY-17	Test Prueba 2	Manual	0	0	XRAY-18		
2 XRAY-16	Test prueba 1	Manual	0	0	XRAY-18		

4. Click Run action to open the Execution page start the execution.

- Run: enter in the test case detail and execute each step.
- Execute Inline: If you want to give an overall result for the test case (excluding the test steps execution)
- Assign: allows you to assign the specific test case.
- Move to: you can move up or down the test case in the list.
- Remove: remove the test case from the execution





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X Test Execution - Execute Tests

Executing a Test

The Execution Evidences field lists the attachments related with the current execution and clicking on the + button, opens the Attach Files dialog box.

Execution Evidences

Evidence 3.jpg 29 kB Today 10:24 PM

Test Description

This tests the square root operation of integers

This section includes the current Test issue description. The Test issue description often contains useful information for testers to execute the Test.

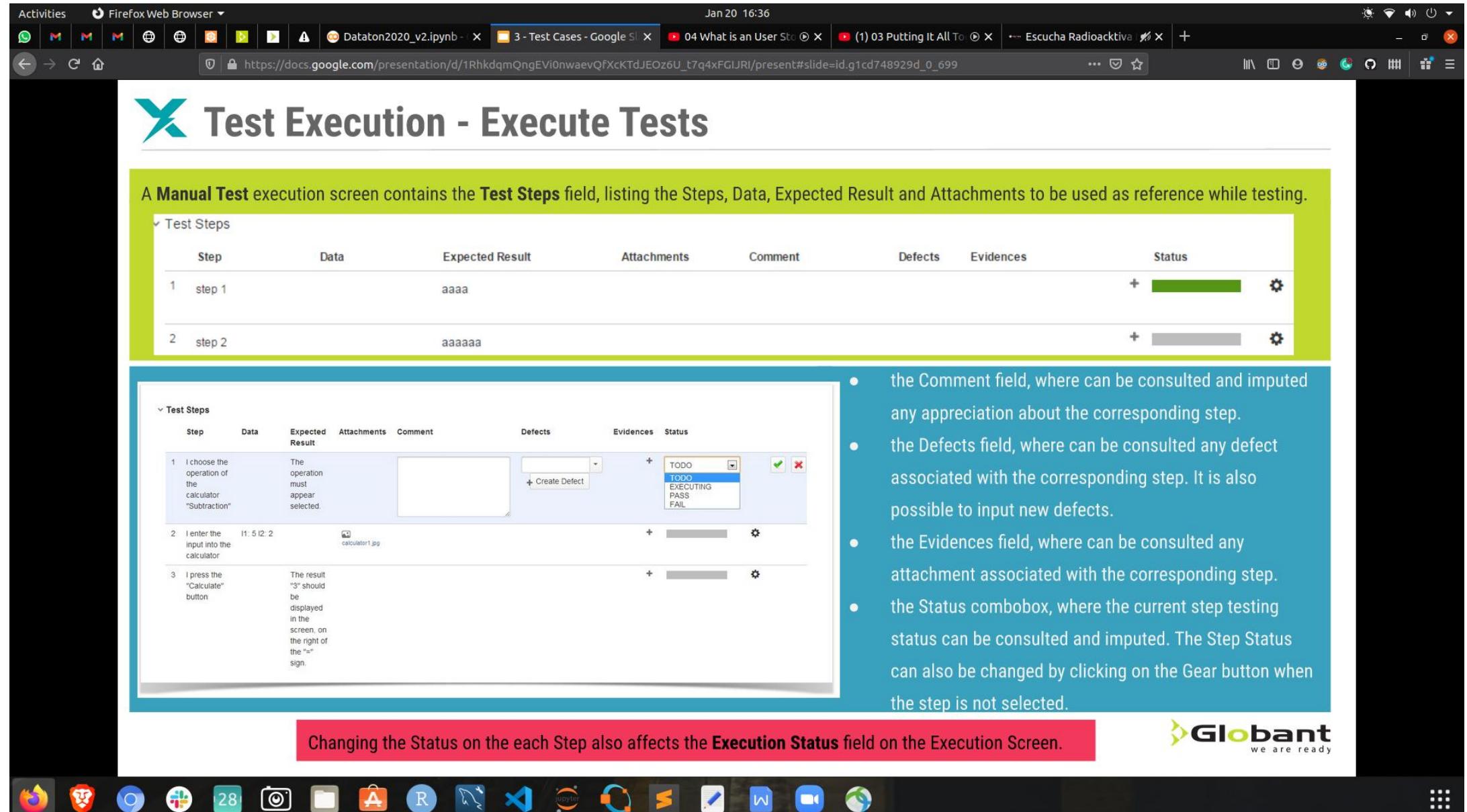
The Pre-Condition field shows the Pre-Condition issue associated with the current Test, if present.

Pre-Condition

Key: CALC-6
Summary: Initialize Calculator
Condition: Open the calculator program.
Choose the calculator mode: Basic, Advanced or Programmer.

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X Test Execution - Execute Tests

Test Run Table

The Tests section provides a table with all Test Runs created for the Test execution issue. Each row in this table represents a Test Run and contains a set of actions that can be performed over a Test Run.

Overall Execution Status

TOTAL TESTS: 7

FILTERS

Test Set	Assignee	Status	Search
All	All	All	Contains text Clear

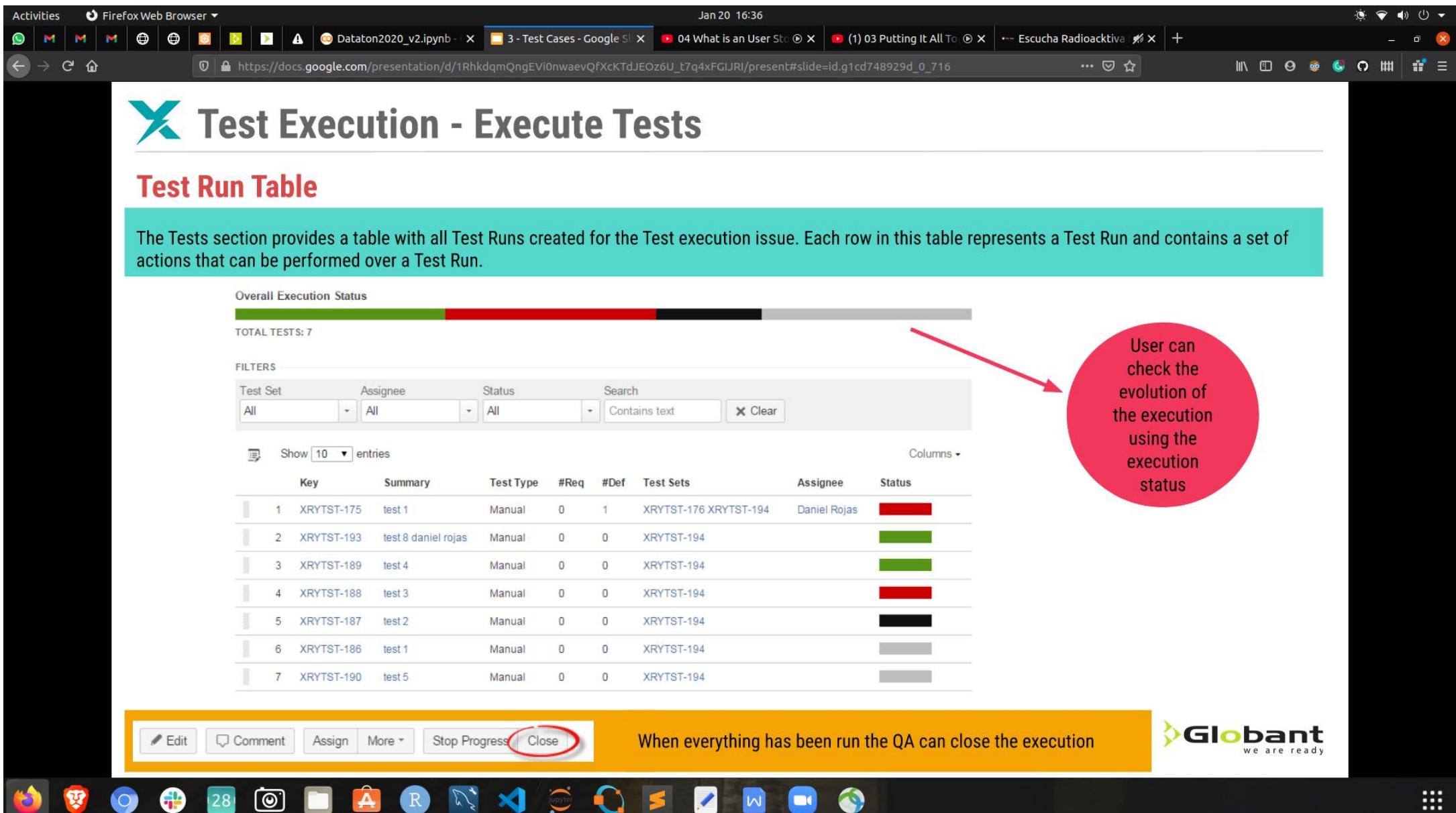
Show 10 entries

Key	Summary	Test Type	#Req	#Def	Test Sets	Assignee	Status
1 XRYTST-175	test 1	Manual	0	1	XRYTST-176 XRYTST-194	Daniel Rojas	Red
2 XRYTST-193	test 8 daniel rojas	Manual	0	0	XRYTST-194		Green
3 XRYTST-189	test 4	Manual	0	0	XRYTST-194		Green
4 XRYTST-188	test 3	Manual	0	0	XRYTST-194		Red
5 XRYTST-187	test 2	Manual	0	0	XRYTST-194		Black
6 XRYTST-186	test 1	Manual	0	0	XRYTST-194		Grey
7 XRYTST-190	test 5	Manual	0	0	XRYTST-194		Grey

User can check the evolution of the execution using the execution status

When everything has been run the QA can close the execution

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Reports

Xray provides gadgets for Requirement Coverage. Other gadgets, provided by JIRA, can be very easily added and configured to use Xray custom fields to show lists of Test Executions and Test Sets with their current status.

- Test Sets Gadget
- Test Executions Gadget
- Overall Requirement Coverage Gadget
- Historical Daily Requirement Coverage Gadget

Test Sets Gadget:

A gadget for showing a set of Test Set issues can be easily added using a "Filter Results" JIRA gadget.

First we create a saved filter with all relevant Test Sets issues. Then in the gadget configuration, we choose this saved filter as the source.

Additional columns can be appended to this gadget like:

Test Set Status: shows the last execution status for all the Test issues in a Test Set

T	Key	Begin Date	End Date	Summary	Test Execution Status
Y	CALC-27	28/Nov/13 9:44 AM	29/Nov/13 9:44 AM	CLONE - Addition Test Execution for Release 1.0	
Y	CALC-21	04/Dec/13 4:15 PM	06/Dec/13 4:15 PM	Execution 02	No tests
Y	CALC-17	28/Nov/13 11:03 AM	28/Dec/13 11:03 AM	Sprint 1 Test Execution 2	

Overall Requirement Coverage: Calculator (v1.0)

Legend: OK (Green), NOK (Red), Not Run (Yellow), Uncovered (Blue)

Category	Status	Count
Major	OK	20% (1)
	Not Run	40% (2)
	Uncovered	40% (2)
Blocker	OK	100% (1)

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More information...

You can also see these information:

Xray for JIRA Plugin Documentation Home:

<http://confluence.xpand-it.com/display/XRAY/About+Xray+for+JIRA>

QCI Site- Xray:

<https://sites.google.com/a/globant.com/qci/tools/xray-test-management>

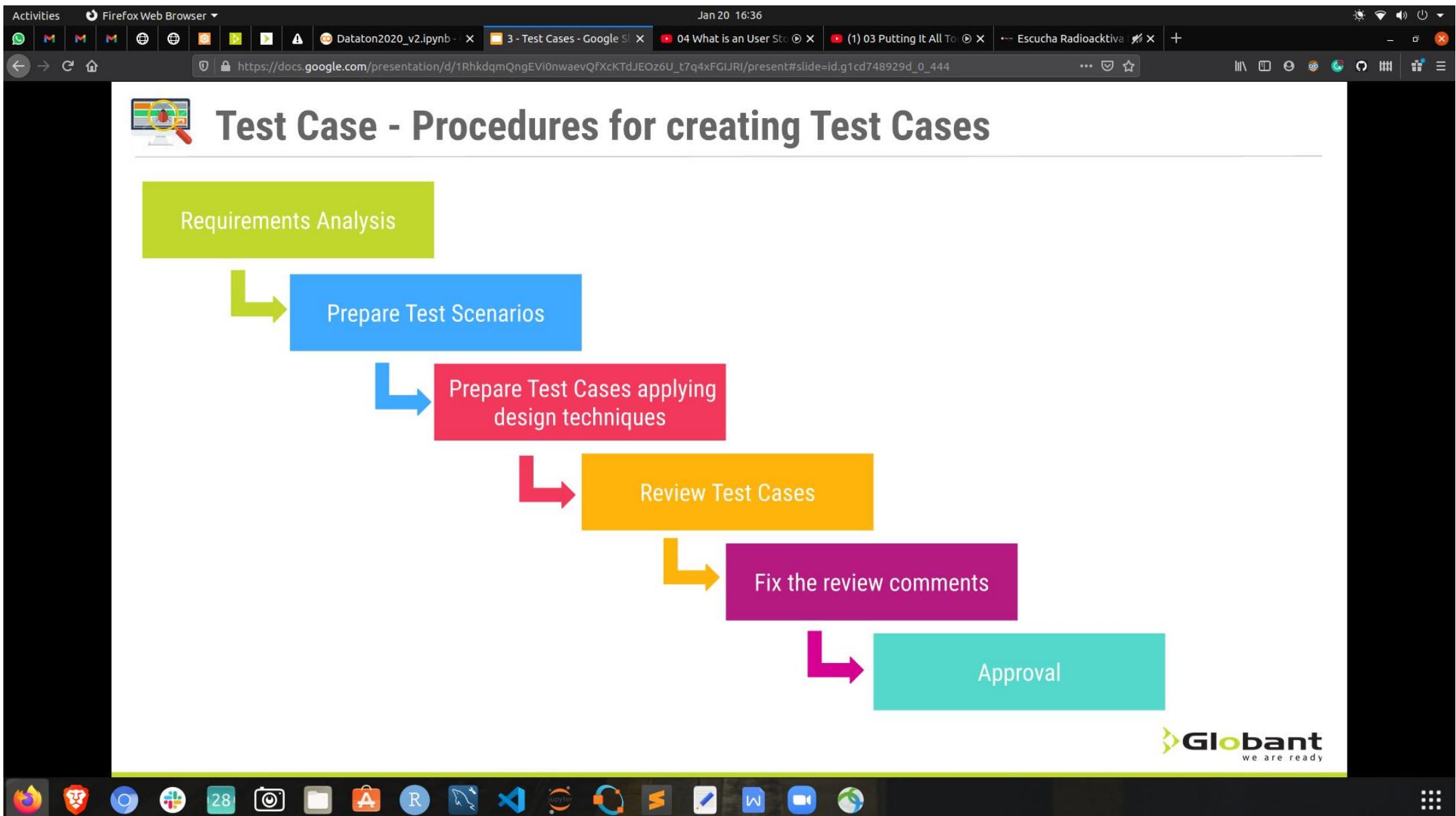
<https://sites.google.com/a/globant.com/qci/tools/xray-test-management/xray-faq>



Note: for more information about X-Ray, please join **X-Ray training** (Acamica)

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Positive Test Case

- Operate application or software as it should be operated.
- Use proper variety of test data, including data values at boundaries to test if it fails.
- Oftentimes they're known as "**happy paths**".
- Check actual test results with the expected and see
- Does it behave normally?
 - Are results correct?
 - Does the software function correctly?



Example: testing a Login page with valid credentials, the user should get a successful login in the system.



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Negative Test Case

- Test for abnormal operations.
- Test with illegal/abnormal test data.
- Intentionally attempt to make things go wrong and to discover/detect and see
 - Does the system fail / crash?
 - Does the program do what it should not?
 - Does it fail to do what it should?



Example: the system shouldn't crash when invalid data is given or restricted users shouldn't access forbidden areas.

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How to write a Test Case

Now, you can see:

How to write a Test Case

[Link a YouTube](#)

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Relations Example

Now, you can see:

Putting It All Together

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User Stories

- A user story is one or more sentences in the everyday or business language of the user that captures what a user does or needs to do as part of his or her job function.
- User stories have:
 - Actor (who?)
 - Goal (what?, why?)
 - Other info
 - Owner, estimate, ...



"As a <type of user>, I want <some goal> so that <some reason>."

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User Stories

- Main aspects of a user story:
 - A description of the story used for planning.
 - Conversations about the story to discuss its contents and details.
 - Acceptance tests to be able to determine if a story is complete.
- User stories generally fit the following template:
 - "As a <role>, I want <goal/desire> so that <benefit>"

As a <role>
I want <goal/desire>
So that <benefit>

Acceptance criteria:
...

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User Stories

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Actor

Goal

NHP member executes a search
that displays, on a map, the areas
where T+E species overlap with highly
ranked invasive species

Owner

Douglas Sellers
douglas.sellers@natureserve.org

Rating

(3)

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```
graph TD; Actor --- Box[ ]; Goal --- Box[ ]; Box[ "NHP member executes a search that displays, on a map, the areas where T+E species overlap with highly ranked invasive species"]; Owner --- Email[douglas.sellers@natureserve.org]; Rating --- Score((3))
```

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User Stories

Now, you can see:

What is an user story

[Link a YouTube](#)

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User Stories



Six main characteristics of a good user story:

- INDEPENDENT** To avoid problems at the time of planning and estimating an iteration
- NEGOTIABLE** Stories details are negotiated
- VALUABLE** Each story must add value to the business
- ESTIMABLE** It is necessary that developers/testers be able to estimate stories. To do it the team needs from business and technical knowledge. The story can't be too big
- SMALL** The size of the story is important at planning time
- TESTABLE** Stories must be written in a way that acceptance tests can be defined, this is the only way to validate the story is complete

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User Story Example

Formato: "As a <role>, I want <goal/desire> so that <benefit>"

For example:

As an Account Holder
I want to withdraw cash from an ATM
So that I can get money when the bank is closed

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User Story Example

As a **Library Administrator**

I **can enter a new book into the system**

So that **I can get available a new book when an user request it**

- Mandatory data to be able to enter a new book into the system:
 - **Name:** String 30 chars. Only accepts characters.
 - **Genre:** String 30 chars. Only accepts characters.
 - **Author:** String 30 chars. Only accepts characters.
 - **Editorial:** String 30 chars. Only accepts characters.
 - **Entry Date:** It is automatically completed with the current date stamp and is non editable.

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User Story Example

- Optional data:
 - Year of edition: 4 digits.
 - Subjects: String 50 chars. Only accepts characters.
- Additional Information:
 - The data is registered in the database table LIBRARY.BOOKS, see database design document.
 - Once the operation is completed a book code is automatically generated which gets stored in the DB and is displayed to the administrator to document on the book.

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Main Flow Example

- The **administrator** enters the menu option Enter Book.
- The **system** displays the Enter Book screen which includes the fields Name, Genre, Author, Editorial, Year of Edition and Subjects.
- The **administrator** completes the mandatory fields and presses the button "Save".
- The **system** saves the data in the DB including the generated book code.
- The **system** shows a "Successful Operation" message, the new generated code and a "Print Label" button.
- The **administrator** presses the "Print Label" button and the process which calls the printer is started.

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Positive Test Case Example

ID → 0001

DESCRIPTION → Validate the process to enter a new book into the system entering the mandatory data only

PRE-CONDITIONS → The administrator is logged into the system

INPUTS → Name, Genre, Author, Editorial


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Positive Test Case Example

STEPS

#	Step	Expected Results
1	Click on the Enter Book menu option	The system displays the Enter Book screen which includes the fields Date (autocompleted with the current date), Name, Genre, Author, Editorial, Year of Edition and Subjects. See mockup 0001.
2	Enter Name, Genre, Author and Editorial and press the button “ Save ”.	A successful operation message is displayed on screen as well as the generated book code and the “Print Label” button. See mockup 0002.
3	Execute the following query: SELECT * FROM LIBRARY.BOOKS WHERE CODIGO='xxxx' ‘xxxx’ is the newly generated book code.	Verify the data in the database matches the one entered in step 2.



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Positive Test Case Example

EXPECTED RESULT The operation is confirmed and a book code is generated

POST CONDITIONS The book's data is saved into the DB table LIBRARY.BOOKS under the assigned book code

Consider that in the example, the detailed description of what is expected per step was included just for educational purpose to understand that every action has a reaction.

If you are writing the set of tests for some functionality, is important that you identify all the actions that should be validated and design a specific Test Case with a clear goal in the Description and a clear expected result.



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Alternative Flow Example

- The **administrator** enters the menu option Enter Book
- The **system** displays the Enter Book screen which includes the fields Name, Genre, Author, Editorial, Year of Edition and Subjects
- The **administrator** completes the mandatory fields and presses the button "Save"
- The **system** finds the book in the DB and displays an error message on screen

The following negative test case is proposed...

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Positive Test Case Example

ID 0002

DESCRIPTION Validate the error message displayed when a new book is entered into the system and it's found in the book database

PRE-CONDITIONS The administrator is logged into the system. There is a book in the book database for name "A name", author "An author", editorial "An editorial", year 2000

INPUTS Name, Genre, Author, Editorial and Year

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Negative Test Case Example

STEPS

#	Step	Expected Results
1	Click on the Enter Book menu option	The system displays the Enter Book screen which includes the fields Date (autocompleted with the current date), Name, Genre, Author, Editorial, Year of Edition and Subjects. See mockup 0003.
2	Enter Name, Genre, Author and Editorial and press the button " Save ".	An error message is displayed on screen indicating that the specified client identification code is not valid. See mock up error_03
3	Execute the following query: SELECT * FROM LIBRARY.BOOKS WHERE Name='A name' and Author='An author' and Editorial='An editorial' and Year='2000' .	The number of rows returned is one.

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Negative Test Case Example

EXPECTED RESULT

The operation is not confirmed and a book code is not generated. An error message is displayed instead

POST CONDITIONS

The system displays the Enter Book screen

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Mock Up Example

Mock Ups allow the testers to **visualize the system's user interface** and help them be able to start designing the test cases. Mock ups **do not guarantee** test cases won't need to be added, edited or deleted later on.

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Final Considerations

Often other types of logic must be covered by test cases other than that included in functional documentation. For example the following for a web application:

- Page not found errors
- Security Problems
- Browser dependent functionality
- Timeouts
- Refresh, Back and Forward browser buttons use
- Cookies



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Final Considerations

- Assume someone other than you will be executing your test cases
 - The level of detail in the test cases must match the acceptance criteria of the client previously approved.
 - Test cases should be short and easy to follow
 - Every click must be documented
 - Don't leave anything to chance
 - Use bullets to distinguish tasks or steps
 - Use correct names to reference menus, screens, options, buttons etc.
 - Follow the same criteria for all your test cases
 - Make certain texts like buttons, links or screen names, stand out by using capital letters, bold or underlined text.



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Tips For Test Case Creation



- It must be assumed that readers of a test case may have other knowledge or fill other roles.
- Test cases should not be long and tedious. They must be simple to follow and easy to execute.
- When the location of the cursor in the screen is important, it must be exactly detailed where. Nothing must be left out.
- Test cases should also include negative scenarios (those tests that show errors).
- It is advisable that errors are shown in bold and between quotes, to ease identification.
- If possible, use entry data. For example:

Enter following data:
Name:Test Phone:075748949

- Use the Globant TC template or set a Test Management tool (Xray) using this template as reference to customize the needed fields.

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More information...

Globant "Xray" Guide:
<https://confluence.corp.globant.com/display/QCIORG/Agile+Testing+Guideline>

 Note: for more information about **Xray** by joining the **Xray training** (Acamica)


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A Little Humor



- If my test cases are long, that's a padding
- If my team mates do not understand my test cases, that's a padding
- If I forget pre-conditions or any other part of the test case, that's a padding
- If my test case is ambiguous, that's a padding.
- If my test case is not complete, that's a padding
- If my test case use colloquial language, that's a padding

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