

# **PRACTICAL-9 TESTING METHODOLOGY**

## **A Library Information System for SE VLabs Institute**

The SE VLabs Institute has been recently setup to provide state-of-the-art research facilities in the field of Software Engineering. Apart from research scholars (students) and professors, it also includes quite a large number of employees who work on different projects undertaken by the institution. As the size and capacity of the institute is increasing with the time, it has been proposed to develop a Library Information System (LIS) for the benefit of students and employees of the institute. LIS will enable the members to borrow a book (or return it) with ease while sitting at his desk/chamber. The system also enables a member to extend the date of his borrowing if no other booking for that particular book has been made. For the library staff, this system aids them to easily handle day-to-day book transactions. The librarian, who has administrative privileges and complete control over the system, can enter a new record into the system when a new book has been purchased, or remove a record in case any book is taken off the shelf. Any non-member is free to use this system to browse/search books online. However, issuing or returning books is restricted to valid users (members) of LIS only.

The final deliverable would be a web application (using the recent HTML-5), which should run only within the institute LAN. Although this reduces security risk of the software to a large extent, care should be taken so that confidential information (eg., passwords) is stored in plain text.

Test case preparation could begin right after requirements identification stage. It is desirable (and advisable) to create a Requirements Traceability Matrix (RTM) showing a mapping from individual requirement to test case(s). A simplified form of the RTM is shown in table 1 (the numbers shown in this table are arbitrary; not specific to LIS).

Table 1: A simplified mapping from requirements to test cases

Requirement #	Test Case #
R1	TC1
R2	TC2, TC3, TC4
R3	TC5
R4	TC6

Table 1 states which test case should help us to verify that a specified feature has been implemented and working correctly. For instance, if test case # TC6 fails, that would indicate requirement # R4 has not fully realized yet. Note that it is possible that a particular requirement might need multiple test cases to verify whether it has been implemented correctly.

To be specific to our problem, let us see how we can design test cases to verify the "User Login" feature. The simplest scenario is when both username and password have been typed in correctly. The outcome will be that the user could then avail all features of LIS. However, there could be multiple unsuccessful conditions:

- User ID is wrong
- Password is wrong
- User ID & password are wrong
- Wrong password given twice consecutively
- Wrong password given thrice consecutively
- Wrong password given thrice consecutively, and security question answered correctly
- Wrong password given thrice consecutively, and security question answered incorrectly

Table 2: A test suite to verify the "User Login" feature

#		TS1				
Title		Verify "User Login" functionality				
Description		To test the different scenarios that might arise while an user is trying to login				
#	Summary	Dependency	Pre-condition	Post-condition	Execution Steps	Expected Output
TC1	Verify that user already registered with the LIS is able to login with correct user ID and password		Employee ID 149405 is a registered user of LIS; user's password is <i>this_is_password</i>	User is logged in	1. Type in employee ID as 149405 2. Type in password <i>this_is_password</i> 3. Click on the 'Login' button	"Home" page for the user is displayed
TC2	Verify that an unregistered user of LIS is unable to login		Employee ID 149405xx is not a registered user of LIS	User is not logged in	1. Type in employee ID as 149405xx 2. Type in password <i>whatever</i> 3. Click on the 'Login' button	The "Login" dialog is shown with a "Login failed! Check your user ID and password" message
TC3	Verify that user already registered with the LIS is unable to login with incorrect password					
TC4	Verify that user already registered with the LIS is unable to login with incorrect password given twice consecutively	TC3				
TC5	Verify that user already registered with the LIS is unable to login with incorrect password given thrice consecutively	TC4				
TC6	Verify that a registered user can login after three consecutive failures by correctly answering the	TC5				

	security question					
TC7	Verify that a registered user's account is blocked after three consecutive failures and answering the security question incorrectly					