# SIT707 Software Quality and Testing Assignment 1

Trimester 2, 2016

## Objectives

- To understand the critical issues in black box testing.
- To demonstrate the ability to research and apply proper techniques to address a given bug.
- To write a proper essay for a specific topic and presenting / arguing the findings.

## Due Date: 4pm, Monday, August 8, 2016

The assignment consists of the following parts (20 marks in total):

- Test report file in PDF format including screenshots of executing test cases on Selenium.
- A ZIP file containing all source codes with comments.

Delays caused by student's own computer downtime cannot be accepted as a valid reason for late submission without penalty. Students must plan their work to allow for both scheduled and unscheduled downtime.

Submission details: You must submit an electronic copy of all your assignment files via CloudDeakin. You must include both your report and presentation file. Assignments will not be accepted through any other manner. Students should note that this means that email and paper based submissions will ordinarily be rejected.

Late submissions: Submissions received after the due date are penalised at a rate of 10% (out of the full mark) per day, no exceptions. Late submission after 3 days would be penalised at a rate of 100% out of the full mark. Close of submissions on the due date and each day thereafter for penalties will occur at 05:00 pm Australian Eastern Time (UTC +10 hours). Students outside of Victoria should note that the normal time zone in Victoria is UTC+10 hours. No extension will be granted.

It is the student's responsibility to ensure that they understand the submission instructions. If you have ANY difficulties ask the Lecturer/Tutor for assistance (prior to the submission date).

## Copying, Plagiarism Notice

This is an individual assignment. You are not permitted to work as a part of a group when writing this assignment. Plagiarism is the submission of somebody else's work in a manner that gives the impression that the work is your own. For individual assignments, plagiarism includes the case where two or more students work collaboratively on the assignment. The School of Information Technology treats plagiarism very seriously. When it is detected, penalties are strictly imposed. The University's policy on plagiarism can be viewed online at `http://www.deakin.edu.au/students/study-support/referencing/plagiarism`

# Problem Statement

Selenium is an automation testing framework widely used by the industry. You are required to demonstrate your ability of correctly using this tool to perform black box testing on the following web application.

You are required to test a user registration web application. The web application consists of two PHP pages — `signup.php` displaying the html controls and two buttons associated with a web form and `signup-process.php` displaying the results after the web form data are submitted. The web application user is supposed to supply with a genuine email address as username, fill in the nominated password twice, type in first and last names, provide date of birth and gender information. All of the input fields are mandatory. This web application is developed in PHP with an Oracle database. Legitimate registration information will be then inserted into a database table. The developer claims that this web application works correctly. It is your tasks to generate test cases, execute them, identify bugs, and recommend bug fixes. The web application is available online at `http://www.deakin.edu.au/~zoidberg/SIT707/signup.php`

Upon satisfactory completion of this assignment you will be able to conduct basic level research in software engineering, analyze gathered information, and communicate your findings. To demonstrate your achievement of these goals, you must write a 3,000 word report regarding this vulnerability.

Your report should consist of the following chapters:

1. A proper title which matches the contents of your report.
2. Your name and Deakin student number in the author line.
3. An executive summary which summarizes your findings. (You may find hints on writing good executive summaries from `http://unilearning.uow.edu.au/report/4bi1.html`.)
4. An introduction chapter which explains Selenium, web application testing, black box testing, and the organization of the rest of your report.
5. A literature review chapter which surveys the latest academic papers regarding web application testing and Selenium which include (at a minimum) all papers listed below. You are advised to identify and include more papers published by ACM and IEEE journals or conference proceedings. Your review must not simply be a summary of each paper, but rather a deep analysis of the body of work reported in the set of paper. Your aim in this part of the report is to demonstrate deep and thorough understanding of the existing body of knowledge encompassing web application testing. (Please read through the hints on this web page before writing this chapter `http://www.uq.edu.au/student-services/learning/literature-review`.)
6. A test case chapter which lists your test cases and explains why you would use each of them.
7. A test demonstration chapter which consists of fully explained screenshots when you use Selenium to conduct the testing tasks. You are required to register 100 users and document your findings.
8. A bug reporting solution chapter which outlines the identified bugs at the three levels (user interface, data model and database storage, and logic of web controllers), your proposal to fix the bugs and your justifications on the priorities of bug fixes. You may extend your answers into the security aspect.
9. A conclusions chapter which summarizes major findings of the study and indicates future work which should be conducted in the area.
10. A bibliography list of all cited papers and other resources. You must use in-text citations in Harvard style and each citation must correspond to a bibliography entry. There must be no bibliography entries that are not cited in the report. (You should know the contents from this page `http://www.deakin.edu.au/students/study-support/referencing/harvard`.)

## A Minimal List of Papers


- I. Altaf, J.A. Dar, F.u. Rashid and M. Rafiq, "Survey on selenium tool in software testing," Green Computing and Internet of Things (ICGCIoT), 2015 International Conference on, Noida, 2015, pp. 1378–1383.
- A. Holmes and M. Kellogg, "Automating functional tests using Selenium," AGILE 2006 (AGILE'06), Minneapolis, MN, 2006.
- A.M.F.V. de Castro, G.A. Macedo, E.F. Collins and A.C. Dias-Neto, "Extension of Selenium RC tool to perform automated testing with databases in web applications," Automation of Software Test (AST), 2013 8th International Workshop on, San Francisco, CA, 2013, pp. 125–131.
- Radu Banabic and George Candea. 2012. "Fast black-box testing of system recovery code." In Proceedings of the 7th ACM european conference on Computer Systems (EuroSys '12). ACM, New York, NY, USA, pp. 281–294.
- E. Murphy-Hill, T. Zimmermann, C. Bird and N. Nagappan, "The Design Space of Bug Fixes and How Developers Navigate It," in IEEE Transactions on Software Engineering, vol. 41, no. 1, pp. 65–81, Jan. 1 2015.
- D. Xu, W. Xu, B.K. Bavikati and W.E. Wong, "Mining Executable Specifications of Web Applications from Selenium IDE Tests," Software Security and Reliability (SERE), 2012 IEEE Sixth International Conference on, Gaithersburg, MD, 2012, pp. 263–272.
- J. Bau, E. Bursztein, D. Gupta and J. Mitchell, "State of the Art: Automated Black-Box Web Application Vulnerability Testing," 2010 IEEE Symposium on Security and Privacy, Oakland, CA, USA, 2010, pp. 332–345.
- A. Leff and J.T. Rayfield, "Web-application development using the Model/View/Controller design pattern," Enterprise Distributed Object Computing Conference, 2001. EDOC'01. Proceedings. Fifth IEEE International, Seattle, WA, 2001, pp. 118-127.

| Facets | Proficient (above 80%) | Average (60-79%) | Satisfactory (50-59%) | Below Expectation (0-50%) | Score |
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| Literature Review | Collect and record self-determined information from self-selected sources, choosing or devising an appropriate methodology with self-structured guidelines; Organize information using student-determined structures and management of processes; Generate questions/aims/hypotheses based on literature | Collect and record self-determined information/ data from self-selected sources, choosing an appropriate methodology based on structured guidelines; Organize information/data using student-determined structures, and manage the processes, within the parameters set by the guidelines; Generate questions/aims/ hypotheses framed within structured guidelines | Collect and record required information/data from self-selected sources using one of several prescribed methodologies; Organize information/data using recommended structures. Manage self-determined processes with multiple possible pathways; Respond to questions/tasks generated from a closed inquiry. | Fail to collect required information or data from the prescribed source; Fail to organize information/data using prescribed structure; Fail to respond to questions/tasks arising explicitly from a closed inquiry | out of 4 marks |
| Evaluation and Reflection in Test Cases and Results | Evaluate information/data and inquiry process rigorously based on the latest literature. Reflect insightfully to renew others' processes. | Evaluate information/data and the inquiry process comprehensively developed within the scope of the given literature. Reflect insightfully to refine others' processes. | Evaluate information/data and reflect on the inquiry process based on the given literature. | Fail to evaluate information/data and to reflect on inquiry process. | out of 6 marks |
| Analysis in Testing Demonstration and Bugs | Analyze and create information/data to fill student-identified gaps or extend knowledge. | Analyze and create information/data to fill knowledge gaps stated by others. | Analyze and synthesize information/data to reorganize existing knowledge in standard formats. That is, ask relevant, researchable questions emerging from the research. | Fail to analyze and to synthesize information/data to reproduce existing knowledge in prescribed formats. | out of 6 marks |
| Scientific writing in Executive Summary, Introduction, and Conclusions | Use appropriate language and genre to extend the knowledge of a range of audiences. | Use discipline-specific language and genres to address gaps of a self-selected audience. Apply innovatively the knowledge developed to a different context. | Use some discipline-specific language and prescribed genre to demonstrate understanding from a stated perspective and for a specified audience. Apply to different contexts the knowledge developed. | Fail to demonstrate understanding for lecturer/teacher as audience. Fail to apply to a similar context the knowledge developed. | out of 2 marks |
| Reference | More than 20 bibliographic items (all of them are academic papers) are correctly presented and inline citations are correctly used. | More than 20 bibliographic items (most of them are academic papers) are presented, but there are a few errors. Inline citations are used but with a few errors. | More than 10 bibliographic items (most of them are academic papers and all given papers are presented) are presented. Inline citations are often used incorrectly. | Less than 10 bibliographic items (some provided papers are missing) are presented. There are more than 7 errors in the bibliographic list and inline citations. | out of 2 marks |

Table 1: SIT707 Assignment 1 Rubrics