2009/2010 Summer Session Research Scholarship Project

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Project Title: A Study on Regression Test Case Prioritization

Project Description:
Software testing and debugging is the most expensive activity in a software development process, and accounts for 50% to 75% of the total development cost in a typical commercial software project. It has been reported that many companies such as Microsoft employ more testers than developers. How to test programs is also a frequently asked question in programmer and software engineer job interviews.

After software has been modified, it needs to be retested on the previous test cases to ensure that the modification did not bring negative impact. This is called regression testing. For large scale software products that undergo many versions and across many years, regression testing is a very expensive activity simply because it is too time consuming or even impossible to rerun all the previous test cases. It has been reported that for a product of about 20,000 lines of code, the entire test suite requires seven weeks to run.

For this reason, researchers have proposed various techniques for reducing the cost of regression testing. Two major approaches are known as test case selection and test case prioritization. The former selects a subset of the test cases to run. The shortcoming is that failure-causing test cases may be missed out. The latter allows testers to order their test cases in such a way that test cases with higher priority are executed earlier in order to meet testing goals such as to detect failures earlier.

This research develops practical techniques for regression test case prioritization to help software engineers improve the cost-effectiveness of their testing process. To successfully conduct this project, the student needs to be familiar with Linux shell programming. The Linux utility gcov will be used intensively in this project to monitor the code coverage of test case executions. The student also needs to write basic C or C++ programs to do some calculations.

Expected Outcomes:
1. A research paper in an international conference.
2. The project can be extended to an Honours, master by research, or PhD project.
3. Improve the student's competitiveness in the IT job market as the student will be trained in software testing techniques and Linux shell programming.