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Due: 04/19/16

Lightweight Automated Testing for TSTL

-------Proposal for CS569 Project

Abstract:

In this project, I want do something about lightweight automated testing for TSTL. First of all, I introduce the ideas about this generalizable approach. And then there are two automated testing methods I am going to use in my project: random testing (RT) and non-backtracking model checking with shape abstraction (SA)[9].

Background

First of all, TSTL, Template Scripting Testing Language, is a domain-specific language, using the source language of the Software Under Test (SUT) to support more operations, but adding declarative idioms for testing [2]. Second, lightweight automated testing method can be used for the testing problem about container class or other modestly-complex APT-based software system. Third, lightweight automated testing methods is based on RT and SA, because it is easy to code basic RT harness or SA "model checker" with ease by almost any language for programmers.

Introduction

In this project, I am going to implement the testing by lightweight automated testing method. First, there are three basic requirements to do this method: 1) it is easy to implement by all programming language and environment; 2) it is easy to use, which means it is easy to code the small, moderate-complexity modules of test harness; 3) it is fast to test so that testing can be generated and examined[1]. Second, the related work is adaptation-based programming (ABP) that it is useful for user to implement the hard algorithms. ABP-based testing is a similar method with generation test and supports all oracle methods that might be used in RT or SA. It satisfies the requirements of lightweight automated test generation method.

Next, I need to find the subjects and test cases for container classes. And then using the testing methods such as random testing to continue work. The random testing method is an effective and easy way for testing API-based SUTs. I think I also need try to do the evaluation methods and fixed duration testing But I need to do my related work to support these.

Process Plan of Project

First, before May 1st, I must research more related work about lightweight automated testing method and learn Python well.

Second, between May 1st and May 15th, I should simply implement with TSTL. Such as analysis the detail of function first, and then define the specific function.

Third, before May 20th, try to implementation more efficient.

Last, between May 25th and June 5th , finish the project and write the final report.

Summary

I think I do not have experiences about this topic. Thus, I want to mention the problems I may meet to remind me. First, I need more related work to reinforce my understanding about this topic. Second, I need more support about algorithms for my implementation.

References

[1] A. Groce, A. Fern, J. Pinto & T. Bauer etl. “Lightweight Automated Testing with Adaptation-Based Programming” in Iternational Conference on Software Engineering, 2007.

[2] A. Groce, J. Pinto, P. Azimi & P. Mittal. “TSTL: A Language and Tool for Testing”.

[3] C.Pacheco,S.K.Lahiri,M.D.Ernst,andT.Ball,“Feedback- directed random test generation,” in *International Conference on Software Engineering*, 2007, pp. 75–84.