

A New Concept of Effective Regression Test Generation in a C++ Specific Environment

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Abstract

During regression testing test cases from an existing test suite are run against a modified version of a program in order to assure that the underlying modifications do not cause any side effects that would demolish the integrity and consistency of the system. Since the ultimate goal of a regression test set is to effectively test all modifications and reveal errors in the earliest possible stage, the maintenance of a relevant test set containing effective test cases is of utmost importance. In this paper we present an efficient, C++ specific framework to automatically manage the regression test suite. Our two main contributions are a new interpretation of reliable test cases and a dynamic forward impact analyzer method that eases the transformation of existing tests to meet the definition of reliability. Using this approach we complement the test set with test cases that pass through a modification and have an impact on at least one output. Our approach is designed to be applicable to large-scale applications.

Keywords: regression testing, dynamic impact analysis, software maintenance, C++

1 Introduction

Regression testing is an important tool of software engineers to successfully manage issues rising during the evolution of software systems. During the lifetime of large systems numerous modifications are performed over possibly many years, yet it is of vital importance that none of these modifications is allowed to remain untested, or cause unwanted and undiscovered side effects to other previously tested parts.

In order to achieve this goal, a regression test set that covers the whole system has to be maintained and adjusted according to the modifications performed. Therefore, it is desirable to find a test selection method that selects those and only

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