Chapter 84
T-Way Testing Strategies:
Issues, Challenges, and Practices

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ABSTRACT

In line with the advancement of hardware technology and increasing consumer demands for new functionalities and innovations, software applications grew tremendously in term of size over the last decade. This sudden increase in size has a profound impact as far as testing is concerned. Here, more and more unwanted interactions among software systems components, hardware, and operating system are to be expected, rendering increased possibility of faults. To address this issue, many useful interaction-based testing techniques (termed t-way strategies) have been developed in the literature. As an effort to promote awareness and encourage its usage, this chapter surveys the current state-of-the-art and reviews the state-of-practices in the field. In particular, unlike earlier work, this chapter also highlights the different possible adoptions of t-way strategies including uniform interaction, variable strength interaction, and input-output-based relation, that is, to help test engineers make informed decision on the actual use of t-way strategies.

1. INTRODUCTION

As an activity to ensure conformance and quality, software testing is an important phase in the software development lifecycle. Although desirable, exhaustive testing is practically impossible owing to the resource and timing constraints. As a result, many sampling strategies have been developed including that of equivalence partitioning, boundary value, cause and effect graphing as well as decision table mapping. While these traditional static and dynamic sampling strategies are useful for fault detection

DOI: 10.4018/978-1-5225-3923-0.ch084