

Simplifying Control Flow Graphs for Reducing Complexity in Control Flow Testing

Myint Myitzu Aung

myintmyitzuaung@gmail.com

University of Computer Studies, Mandalay, UCSM

Kay Thi Win

kthiwin11@gmail.com

University of Computer Studies, Mandalay, UCSM

Control Flow Graph (CFG) is the graphical representation that contains all possible paths in the program execution. It is very essential part of the control flow testing but there are some challenges in generating the effective CFGs. These are how to reduce the complexity and isomorphism of the CFGs and how to check the feasibility of these CFGs. In this paper, these challenges are addressed by introducing the simplifying of CFGs. In the control flow testing, the execution order is determined which is the instruction or statement order of the program through a control structure and the tester needs to select a specific part of a large program to set the testing path. The CFGs of large programs are sliced to simplify and to reduce the complexity by using a program slicing technique, Tree Slicing which is also called Path-Sensitively Sliced CFG (PSS-CFG). It is a slicing and merging technique for different sub-trees under certain conditions. By using this technique, the complexity of these CFGs is reduced due to the simplifying of these graphs. Moreover, this paper shows that the code coverage of the program of simplified CFGs is also improved according to the experimental results of the benchmark dataset that is different from other recent researches because this system is tested in Java by converting the C dataset.