

Towards Test Case Generation for Context-Oriented Software via Colored Petri-Nets

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Abstract: In this presentation, we discuss how to generate test cases from Context-Oriented Software(COS) that is an abstraction of Context-Oriented Programming(COP). The feature of COP is to change behavior at runtime by (de-) activating layers. Thus, in COP, the layer activation or deactivation makes a change the whole software. The feature causes to conflict and deadlock problems. To solve these problems, several kinds of literature proposed simulation methods on Petri-Nets, because those problems are similar to concurrent software problems. In previous our work, we introduced a simulation method on Colored-Petri Nets(CPN). CPN aims to detect deadlock or conflict problems for concurrent software and is one of graphical based formal language extended Petri-nets. In CPN, the colored token creation and deletion can express dynamic property, such as creation/deletion of objects/tasks. For checking such dynamic properties, one of the most difficult problems is the state explosion problem. In CPN, the colored tokens contribute to solving this problem, because the color can make a group for reducing state spaces. Thus, CPN is suitable for checking the runtime property of software. Accordingly, we have applied CPN to simulate COP. In industry area, testability is one of the most significant problems. However, in related works, test case generation methods for COP or COS have not proposed. In this presentation, we discuss a test case generation method for COS based on CPN. In this method, we analyze a state space graph that is a simulation result of CPN. We can obtain test cases from tracing the state space graph.

Keywords: Context-Oriented Programming, Petri-Nets, Colored Petri-Nets, Software Testing

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