

FROM P SYSTEMS TO SOFTWARE SYSTEMS BY DESIGN PATTERNS

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We investigate here P Systems from a software engineering perspective. One of the many research topics in the membrane computing area is simulating/implementing P Systems on electronic computer, which can be used as a tool for analyzing and understanding different models of membrane systems. We describe how can be used several design patterns in the process of designing extensible, flexible and highly maintainable software systems. On the other hand, the paper introduces the testing problem, especially coverage analysis and defines two coverage criteria from this perspective.

Key words: coverage criteria, design patterns, P systems.

1. Introduction

One of the many research topics in the membrane computing area is simulating/implementing P Systems on electronic computer, which can be used as a tool for analyzing and understanding different models of membrane systems. There are many existing programs for simulating P systems. For instance, the books from the bibliographical items [3] and [5] contain comprehensive chapters devoted to this topic. Information about P system software can also be found at the area website ([10]). There also is a programming language, P-lingua, available for programming P systems (details can be found at [10]). The current membrane systems implementations are mostly custom written ad-hoc applications developed for a particular family of membrane systems. The rapid development and enlargement of the research in the membrane computing impose designing of an extensible, flexible and highly maintainable software system. The design should be specific to the problem at hand but also general enough to address future problems and requirements. The key to maximizing extensibility and flexibility of a software system lies in anticipating new requirements and changes to existing requirements, and in designing out system so that they can evolve accordingly. A design that doesn't take change into

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