Editor's Introduction to the Special Issue

System Modeling and Transformation Principles

Development of information systems results in high demands on efficiency of software engineering processes, as well as correctness and good performance of the designed and implemented products. Therefore, different solutions dealing with system modeling and precise specification of transformation principles of various artifacts are important research subjects. In this mini-special issue, three contributions on selected areas on principles of information technology are presented.

The first paper, entitled "Simulation and Performance Analysis of Distributed Internet Systems Using TCPNs" was written by S. Samolej and T. Rak. It concerns a method of modeling and analysis of distributed Internet systems. The method is based on the concept of Timed Coloured Petri Nets (TCPN). A distributed system described in terms of classical Queueing Theory is mapped onto TCPN structure, then executed and analyzed. The paper provides the results of simulation experiments and comparison of some results of experiments on real Internet environment.

The second paper is entitled "Transformation of XML data into XML normal form" and was proposed by T. Pankowski and T. Pilka. The paper tackles the problem of a "tradeoff" between dependencies and redundancy while normalizing relational schemes in XML schemes. The language to express functional dependencies and algorithms is proposed. The authors present algorithms that are used to define procedure to transform a class of XML instances into XML normal form. The transformation is processed by XQuery programs which are automatically generated for a given XML schema together with a class of XFDs defined over this schema.

In the third paper, "Realization of UML class and state machine models in the C# Code Generation and Execution Framework", A. Derezinska and R. Pilitowski present selected issues of the "Framework for eXecutable UML (FXU)". FXU is the tool designed to verify UML class and state machine models for correctness, to generate corresponding program code using C# as a target language, and to execute this code with the help of the runtime library. One of particular qualities of the tool is exploitation of C# constructs to create concise representation of state machines, including all complex concepts of UML behavioral state machines. Additionally, the correctness rules for UML models are presented, aimed at transformation of class and state machine models into C# applications.

This special issue has extended versions of the best papers from the *International Conference on Principles of Information Technology and Applications* PITA'08 (http://www.pita.imcsit.org). It was one of events organized within *International Multiconference on Computer Science and Information Technology* IMCSIT held in Wisla, Poland in October 20-22, 2008. The authors of four papers were asked to thoroughly review their papers and extend them for journal publication. The rewritten papers were reviewed once more, and finally three accepted for this special issue.

The guest editor wishes to thank Professor Matjaz Gams (Editor-in-Chief of Informatica) for providing the opportunity to edit this special issue on System Modeling and Transformation Principles. Finally, I would like to thank the authors of the papers for their contributions and all referees for their critical and valuable comments. Their efforts helped to ensure the high quality of the material presented here.

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