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Guest Editors' Introduction: Special Issue on Computer Science Engineering Education

Nowadays most of human activities are based on the direct or indirect use of computers. Thus, most enterprizes need technicians and engineers with a solid knowledge on the use and application of computer-based systems. Dramatic changes in the delivery of engineering education are needed to keep pace with such a rapid progress in technology. Our ultimate goal as universities educators is to guide students through these new ways of efficient organization of teaching process and lab practicing activities. The principal challenges associated with achieving this goal, for computer science students, are to teach them the engineering fundamentals and specializations they need to involve and integrate various software and hardware components into complex systems.

With aim to track the mentioned tendencies in Western Balkan countries, according to acquired positive experiences and implemented educational models in EU countries that relate to Bologna declaration, the Commission for Education of the European Union in Brussels started in 2001 to finance the Tempus project CD_JEP_16160_2001 under the title Computer Science Curriculum in Higher Education. The consortium of the project consisted of the following five institutions: Computer Science Department, University of Dortmund, Technological Educational Institute of Athens, Department of Informatics, Faculty of Electronic Engineering and Faculty of Science and Mathematics both from University of Niš, and Faculty of Natural Science and Mathematics, University of Cyril and Methodius, Skopje.

The primary goals of this three-year project were to improve the knowledge in the field of computer science, promote student and staff mobility, start discussion on the harmonization of curricula and degrees in the partner countries, innovate the current and involve new curricula, disseminate the developed material, and evaluate the quality of the achieved results according to Bologna declaration. To implement these goals, numerous thematic Symposiums and Workshops were established, dedicated to various academic disciplines and other issues of common interest for all partners.

In developing this special issue, we had the following goal in mind: To introduce the Facta University readers with some of the results achieved in this project

by presenting some of university-based educational concepts, approaches, or technologies that have been developed during support of Computer Science curricular and associated educational innovations. To that end, we have assembled a collection of seventeen papers authored by leading engineering educators. Each article introduces a new concept or technology.

Referring to the contents of this special issue, we now offer snapshot overviews of each of the sixteen papers.

In ”Scaffolding Answer Explanation in a Data Normalization Tutor” A. Mitrovic discusses how constraint-based tutor that teaches data normalization, called NORMIT, supports self-explanation.

A. Breiter, G. Fey and R. Drechsler in ” Project-Based Learning in Student Teams in Computer Science Education” introduce a student-centered, project-based learning approach with a student team project, which tries to support these learning processes.

G. Armenski and M. Gušev in ”Infrastructure for e-Testing” analyze different methods used for e-testing and present new frontiers, especially in cases where the number of students is very big (several hundreds), and in cases in which students can take exams every month.

D. Kehagias, M. Grivas and G. Pantziou in ”Using a Hybrid Platform for Cluster, NoW and GRID Computing” show how structures of types Clusters, Networks of Workstations (NoW) and Grids can offer a new, highly-available and cost-effective parallel computing paradigm.

E. I. Milovanović and N. M. Stojanović in ”Teaching Tools for Parallel Processing ” deal with models associated with parallel processing and show how they can be introduced in a course of Parallel computer systems.

T. Alevizos, P. Belsis, C. Skourlas V. Tsoukalas and J. Varnas in ”Distance Learning Experiments Between two Technological Education Departments of Informatics in Greece” propose a non-prescriptive methodology framework for the instructional planning and tutoring of online distance courses and its application to a Distance Learning experiment between two Technological Education Informatics Departments in Higher Education.

A. Mišev and M. Gušev in ”Simulators for Courses in Advance Computer Arhcitecture” present several simulators used to teach ILP (Instruction Level of Parallelism) courses.

M. Gušev in ”Improved Learning Methodology System” establishes an e-learning system that supports the education process and report the results from using these innovations as improved learning methodology.

I. Kantzavelou in ”A Virtual Lab Model for an Introductory Computer Science Course” presents an effective model of a virtual laboratory for an introductory computer science course.

M. Stankovic, M. Rajkovic, P. Rajkovic and I. Petkovic in ”Supervising Student Projects Using Content Management Systems” explain the concept of web content management systems (web CMS) and present a CMS called Centura, developed at the Faculty of Electronic Engineering in Niš.

K. Georgouli , M. Grivas and P. Zahariou in ”Different Uses of an Open Code LMS for Educational Support” present different ways of adopting and expanding an open source learning management system to facilitate learning and educational processes in the Department of Informatics of the T.E.I. of Athens.

M. Ćirić and S. Rančić in ”Parsing in Different Languages” show how a compiler as a translator that accepts as input formatted source file or files can produces as output a file that may be run directly on a computer.

S. Đorđevic-Kajan, D. Stojanović and A. Stanimirović in ”Advanced System Software Curricula” concentrate on an advanced System Software curricula developed at the Faculty of Electronic Engineering in Niš. The system software track consists of two important themes of Computer Science and Computing in General organized now as two separated courses: Operating Systems course and System Software Development and System Programming course.

C. Moraga in ”Introduction to Fuzzy Logic” introduces basics and reviews some classical as well as new applications of fuzzy logic. The paper can be used as an example for a well organized set of introductory lectures, because it is based on carefully selected examples.

M. Tasić , P. Stanimirović , I. Stanimirović , M. Petković and N. Stojković in ”Some Useful MATHEMATICA Teaching Examples” show how a computer algebra system in MATHEMATICA can be used in several elementary courses in mathematics for students.

T. Tokić, I. Milentijević, M. Stojčev, O. Vojinović and A. Vucetić in ”Implementation of Student Mobility Program within the Frame of TEMPUS Project CD-JEP 16160/2001” describe student mobility program implementation according to the proposed procedure covering preparatory activities, selection procedure, realization of travels and follow-up activities.

In this issue devoted to Computer Science education, the authors tried to offer some additional insights in educational process, and some analysis of its impact on our students, and some guidance to others undertaking this task. We are happy to write that we have been immensely successful in what we sought to do. This is evident in the rich mix of topics in this issue.

Most important, our special thanks to those who contributed to papers of this special issue and the numerous reviewers who spent much of their precious time but must remain anonymous.

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