Introduction to the Minitrack on Engineering Complex Computer Systems

EMERGING TECHNOLOGIES TRACK - HICSS'98

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Dear Reader,

welcome to the HICSS'98 Minitrack on Engineering of Complex Computer Systems!

In the 1820s, a Englishman named Charles Babbage designed and partly built a forerunner of the modern computer. His difference engine embodied many of the principles that were to become commonplace in our modern equivalents.

A century or more later, with the advent of modern computer systems, it was clear that designing and building a computer system that would always work as intended would be no easy task. Moreover, the power of machines that were built at that time would soon be insufficient for the great demand that would be placed on them.

Nowadays it seems natural to place great demands on computing systems in terms of the time deadlines that they must meet, massively parallel or distributed processing, interoperability, etc. Yet, we require computer systems to be cost-efficient, easy to maintain, composed of reusable components, secure, and reliable. All of these desired aspects interact in complex manners, making some modern computer systems amongst some of the most complex artifacts ever built.

The IEEE Computer Society Technical Committee on Complexity in Computing (formerly the Technical Segment Committee on Engineering Complex Computer Systems) was established with the remit of encouraging interaction and research amongst researchers and developers in government, industry, and academia in determining mechanisms that can be exploited in reducing the amount of, and ideally conquering, complexity in computer systems.

Complexity is inherent in many systems by their nature, but our goal is to uncover techniques that will aid in overcoming this complexity so that we can produce reliable, dependable computer systems that will operate as intended, to strict timing constraints, interoperate with other systems, and are yet produced on-time, to budget, and are maintainable.

This minitrack is organized in conjunction with the TC on Complexity in Computing and is devoted to the TC's remit. We hope that the papers will aid in understanding complexity, provide guidance for its control, and point to relevant techniques in controlling complexity in the engineering of complex computer systems.

Structure of the Minitrack

This minitrack, in its second year at HICSS, brings together a seemingly diverse set of 18 papers which deal with complexity in different ways, in different parts and components of computer systems, and during different stages of system lifecycle. These papers have survived a barrage of most rigorous and tough reviews, generated by a large number of reviewers. We are delighted to have witnessed such significant interest and are sure that the minitrack will be long remembered, positively, by all participants. We hope you too enjoy reading these papers, in the proceedings.

The papers accepted for presentation in this Minitrack have been divided into six 90 min. sessions in order to provide each author with a sufficiently long time slot for a detailed presentation and to allow a strong interaction with the audience. The six sessions address some of the major topics of ECCS, such as software engineering, communication, and design of application-oriented systems.

The large number of submissions to the ECCS Minitrack and the high quality of the accepted papers allowed for the selection of two candidates for the best paper award within the Emerging Technologies Track.

Acknowledgements

The Minitrack coordinators would like to thank the large number of reviewers who provided constructive comments on the content and presentation of the papers. Obviously we also recognize the authors, whose work is the substance of this minitrack.

Moreover, we are indebted to the General Chairman, Ralph Sprague, for the opportunity to bring the ECCS topic to HICSS for the second time, and to Eileen Dennis for all professional support that we received in the organization of this event. Finally we want to acknowledge the financial support we received from the Dipartimento di Ingegneria dell'Informazione, University of Parma, Italy, for the administration of the whole Minitrack.

Now, let us proceed with the Minitrack....
With best regards,
Alberto Broggi, Mike Hinchey, and Alex Stoyen.