

Annuncio di Seminario
Prof. Dr. G. Rozenberg
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MODELS OF COMPUTATION INSPIRED BY NATURAL COMPUTING

31 Ottobre 2018
Aula Magna di Sociologia (Via Salaria 113, Piano Terra) – ore 14.00

INFORMATICS is THE science of information processing. NATURAL COMPUTING is an interdisciplinary research field that investigates human-designed computing inspired by nature as well as computation taking place in nature, i.e., it investigates models, computational techniques, and computational technologies inspired by nature as well as it investigates phenomena / processes taking place in nature in terms of information processing. Although the research in Natural Computing is genuinely interdisciplinary, a preponderance of this research is centered in informatics.

One of active research areas of Natural Computing is a computational understanding of the functioning of the LIVING CELL. We view this functioning in terms of computational processes resulting from INTERACTIONS between individual reactions, where each reaction is seen as an individual processor. These interactions are driven by two mechanisms, facilitation and inhibition: reactions may (through their products) facilitate or inhibit each other.

We present a formal model for the investigation of these interactions, called REACTION SYSTEMS, and motivate the framework of reaction systems by explicitly stating a number of assumptions that hold for processes resulting from these interactions, and we point out that these assumptions are very different from the ones underlying traditional models of computation.

Reaction systems turned out to a novel and attractive model from the informatics point of view, especially as a foundational model of INTERACTIVE COMPUTATION.

The lecture is of interest to mathematicians and computer scientists interested in models of computation as well as to researchers interested in foundational/formal understanding of biological processes. The lecture is of a tutorial style and self-contained. In particular, no prior knowledge of biochemistry or cell biology is required.

The presented framework was developed jointly with A.Ehrenfeucht from University of Colorado at Boulder.

SHORT CV of G. ROZENBERG (<http://www.liacs.nl/~rozenber/>)

G.Rozenberg is a Professor of Computer Science at Leiden University, The Netherlands, and an Adjoint Professor at the Department of Computer Science of University of Colorado at Boulder, U.S.A.

He has published more than 500 papers, 6 books, and is a (co-)editor of about 100 books and special issues.

His current research interests are:

- * natural computing, including molecular computing, computation in living cells, self-assembly, and theory of biochemical reactions,
- * theory of concurrent systems, in particular theory of Petri nets,
- * theory of transition systems, and theory of traces,
- * theory of graph transformations,
- * formal language and automata theory.

He is/was an editor-in-chief of a number of journals and book series. He is a member of an editorial board of about 20 journals and book series. He edited four handbooks in the areas of theoretical computer science and natural computing.

He was President or Steering Committee Chairman of a number of renowned organizations and conferences in the areas of computer science, natural computing, and nanoscience (among others, President of the European Association for Theoretical Computer Science; President of the International Society for Nanoscale Science, Computation and Engineering; Chairman of the Steering Committee for DNA Computing Conference; and Chairman of the Steering Committee for the International Conference on Theory and Applications of Petri Nets). He has been a member of the program committees and invited speaker for practically all major conferences in theoretical computer science and natural computing in Europe.

He is a Foreign Member of the Finnish Academy of Sciences and Letters, a member of Academia Europaea, and he received Honorary Doctorates from the University of Turku, Finland, the Technical University of Berlin, Germany, the University of Bologna, Italy, the Swedish University Abo Akademi, Finland, the Warsaw University of Technology, Poland, and the University of Bucharest, Romania. He has received the Distinguished Achievements Award of the European Association for Theoretical Computer Science "in recognition of his outstanding scientific contributions to theoretical computer science". He is a Highly Cited Researcher by ISI.