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Preface

This volume contains the papers presented at the 13th Scandinavian Symposium and Workshops on Algorithm Theory (SWAT 2012), held during July 4–6, 2012, in Helsinki, Finland, co-located with the the 23rd Annual Symposium on Combinatorial Pattern Matching (CPM 2012).

A total of 127 papers were submitted, out of which the Program Committee selected 34 for presentation at the symposium. Each submission was reviewed by at least three members of the Program Committee. In addition, invited lectures were given by Joseph S.B. Mitchell, from State University of New York at Stony Brook and Roger Wattenhofer from ETH Zürich. The program of the co-located CPM 2012 included a further 33 contributed papers and two invited lectures, by Ron Shamir from Tel Aviv University and by Gonzalo Navarro from University of Chile in Santiago.

This year, the Steering Committee decided to initiate the Best Student Paper Award. The Program Committee decided to grant the award to Marek Cygan for the paper titled "Deterministic Parameterized Connected Vertex Cover."

SWAT is held biennially in the Nordic countries; it alternates with the Algorithms and Data Structures Symposium (WADS) and is a forum for researchers in the area of design and analysis of algorithms and data structures. The call for papers invited submissions in all areas of algorithms and data structures, including but not limited to approximation algorithms, parameterized algorithms, computational biology, computational geometry, distributed algorithms, external-memory algorithms, exponential algorithms, graph algorithms, online algorithms, optimization algorithms, randomized algorithms, streaming algorithms, string algorithms, sublinear algorithms, and algorithmic game theory. Starting from the first meeting in 1988, previous SWAT meetings have been held in Halmstad, Bergen, Helsinki, Aarhus, Reykjavík, Stockholm, Bergen, Turku, Humlebæk, Riga, Gothenburg, and Bergen. Proceedings of all the meetings have been published in the LNCS series, as volumes 318, 447, 621, 824, 1097, 1432, 1851, 2368, 3111, 4059, 5124, and 6139.

We would like to thank all the people who contributed to making SWAT 2012 a success. We thank the Steering Committee for selecting Helsinki as the venue for SWAT 2012, and for their help and guidance in different issues. The meeting would not have been possible without the considerable efforts of the local organization teams of SWAT 2012 and CPM 2012. We thank Aalto University, University of Helsinki, and the Federation of Finnish Learned Societies (Tieteellisten seurain valtuuskunta) for their financial and organizational

support. The EasyChair conference system provided invaluable assistance in coordinating the submission and review process. Finally, we thank the members of the Program Committee and all of our many colleagues whose timely and meticulous efforts helped the committee to evaluate the large number of submissions and select the papers for presentation at the symposium.

April 2012

Fedor V. Fomin
Petteri Kaski

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Invited Talks

Visibility Coverage Tours

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The watchman route problem is a classic optimization problem in computational geometry: Determine a shortest path/tour for an observer to be able to view all points within a given geometric domain. The problem combines aspects of the traveling salesperson problem and the set cover problem. While some special cases have polynomial-time exact solutions, most versions of the problem are NP-hard, so attention focuses on approximation algorithms. The problem comes in many varieties, depending on the nature of the domain being searched, assumptions about the searcher(s), and the objective function. We briefly survey the research area of visibility coverage tours and describe some recent advances in approximation algorithms.

Think Global, Act Local

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The title of my presentation is a motto originally coined in urban design about 100 years ago, but used in various different contexts since. The motto can also be applied to many areas in computer science. For instance, in computational game theory, each agent tries to maximize his/her own (local) benefit, and we analyze the (global) social welfare. Also, computer architecture is designed for locality of reference. Recently, the distributed computing community has made tremendous progress towards understanding the complexity of distributed message passing algorithms. In networks, a rich selection of upper and lower bounds regarding how much time it takes to solve or approximate a problem have been established; we now have a good understanding how local actions and global goal influence each other. This *distributed complexity theory* may ultimately help to give the "think global, act local" motto a mathematical foundation. In my talk I will introduce the message passing model, present a few selected results, mention prominent open problems, and discuss some of the most exciting future research directions. Upcoming applications may not necessarily lie in computer science but rather in other areas that deal with networked systems, e.g. biology or social sciences.

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