Topic 06
Complexity Theory and Algorithms

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The complexity theory and algorithms topic focuses on the theoretical foundations of parallel computing, especially the exploration of fundamental problems and issues from an algorithmic perspective and the formulation, investigation and evaluation of the appropriate computational models that allow such issues to be addressed in a rigorous, quantitative manner. Following a thorough reviewing process in which each paper was assessed by four referees, two papers have been selected for presentation as regular papers. An additional paper that was originally submitted to Topic 09 (and accepted as a research note) was also moved to this session for presentation. The committee would like to extend its sincere thanks to all those who contributed papers and to the many colleagues who helped with the reviewing process.

The paper "Beyond External Computing: Analysis of the Cycle Structure of Permutations" by J. Keller and J. Sibeyn studies the problem of determining the cycle structure of a permutation in parallel given an oracle for the permutation π that for any x returns $\pi(x)$. The theoretical results are nicely complemented by experimental work.

The paper "Heaps Are Better than Buckets: Parallel Shortest Paths on Unbalanced Graphs" by U. Meyer presents a parallel algorithm for solving the single-source shortest path problem on an arbitrary graph in which the weight on every edge is chosen at random between 0 and 1. The algorithm is work-efficient and fast for a natural class of graphs that includes power-law graphs (which have been suggested as a model for the structure of the Internet).

The short paper "Efficient Synchronization of Asynchronous Processes" by S. Lodha, P. Chandra, A. Kshemkalyani and M. Rawat presents a refinement of Bagrodia's algorithm for the efficient implementation of a CSP-like communication/synchronization primitive among asynchronous processes. Experimental results are presented that suggest a significant reduction in message overhead when compared with Bagrodia's original algorithm.

R. Sakellariou et al. (Eds.): Euro-Par 2001, LNCS 2150, pp. 332–332, 2001.