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MADALGO seminar by Andrew McGregor, University of Massachusetts, Amherst

Data Streams, Dyck Languages, and Detecting Dubious Data Structures

Abstract:

In this talk, we present algorithms and lower bounds for recognizing various languages in the data stream model. In particular, we resolve an open problem of Magniez, Mathieu and Nayak [STOC, 2010] concerning the multi-pass complexity of recognizing Dyck languages. This results in a natural separation between the standard multi-pass model and the multi-pass model that permits reverse passes. We also present the first passive memory checkers that verify the interaction transcripts of priority queues, stacks, and double-ended queues. We obtain tight upper and lower bounds for these problems, thereby addressing an important sub-class of the memory checking framework of Blum et al. [Algorithmica, 1994]. A key contribution of our work is a new bound on the information complexity of AUGMENTED-INDEX.

Joint work with Amit Chakrabarti, Graham Cormode, and Ranganath Kondapally