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On the complexity of Hopcroft's automaton minimization algorithm

An algorithm for minimization of deterministic finite state automata that runs in time $O(n \log n)$ on automata with n states was given by John Hopcroft in 1971. It is, up to now, the most efficient algorithm known in the general case.

We address here the problem of showing that the running time $O(n \log n)$ for Hopcroft algorithms is tight. This was proved to hold for special executions of the algorithm on the binary de Bruijn words by Berstel and Carton, and for Fibonacci words by Castiglioni, Restivo and Sciortino. We proved that this behavior pertains for Sturmian words with eventually periodic directive sequence. The talk will present an overview of this and related work.

Joint work with Luc Boasson and Olivier Carton.