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ON THE STATE COMPLEXITY OF k-ENTRY DETERMINISTIC FINITE AUTOMATA [1, 2]

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ABSTRACT

A k-entry deterministic finite automaton is a deterministic finite automaton (DFA) which has exactly k initial states. We show tight upper bounds on the state complexity of these automata, proving that the transformation of a k-entry DFA to an equivalent ordinary DFA increases the number of states by a polynomial of degree k. This improves a result of KAPPES [8] to the case of binary languages. For unary languages, i. e, languages over a single letter alphabet, we only have an upper bound, which is not known to be sharp. Finally, we investigate the complexity of the minimization problem for k-entry DFA's showing that it is PSpace-complete.

Keywords: finite automata, nondeterminism, descriptional complexity, minimization.

1. Introduction

Regular languages and their implementations have received more and more attention in recent years due to the many new applications of finite automata and regular

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