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Theoretical Computer Science 302 (2003) 497–498

Theoretical
Computer Science

www.elsevier.com/locate/tcs

Erratum

Errata to: "Finite Automata and Unary Languages" [Theoret. Comput. Sci. 47 (1986) 149–158]

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Received 29 January 2003; accepted 11 February 2003
Communicated by G. Ausiello

In [1], I presented several results on the state complexity of different types of finite automata for unary languages. The following function $F : N \to N$ plays a crucial role in that paper:

$$F(n) = \max\{\mathrm{lcm}(x_1, x_2, \ldots, x_k) \mid x_1 + x_2 + \cdots + x_k = n\},$$

where $x_1, x_2, \ldots, x_k \in N$, and lcm() denotes the least common multiple.

In Theorem A, the estimate on $F(n)$ from [2] is quoted incorrectly. Due to this error, the upper bounds in Theorems 4.4 and 5.1 are not valid as stated, and the statements of matching lower bounds in Theorems 4.5, 5.2 and 6.1 are weaker than what is actually shown in the proofs.

The abstract of the paper should be corrected as follows:

Abstract. Let $F(n)$ denote the maximum order of a permutation of n letters. It is known that $F(n) = e^{\Theta(\sqrt{n \log n})}$. We prove that $O(F(n))$ states are sufficient to simulate an n-state 1 nfa recognizing a unary language by a 1 dfa. The lower bound is the same. Similar tight bounds are shown for the simulation of a 2 dfa by a 1 dfa and a 1 nfa. We also show that $O(n^2)$ states are sufficient and necessary to simulate an n-state 1 nfa recognizing a unary language by a 2 dfa.

The statement of Theorem A on p. 151 should be corrected as follows:

Theorem A (Szalay [2]).

$$F(n) = \exp\left[\sqrt{n\left(\log n + \log\log n - 1 + \frac{\log\log n - 2 + o(1)}{\log n}\right)}\right].$$

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0304-3975/03/$ - see front matter
doi:10.1016/S0304-3975(03)00136-1

In the statements of Theorems 4.4, 5.1, 4.5, 5.2 and 6.1, function $F(n)$ should be used instead of $H(n)$. All the proofs remain valid, since they are based on the number-theoretic interpretation of $F(n)$, and function $H(n)$ is used only in the statements of the theorems as an asymptotic approximation to $F(n)$.

Acknowledgements

I would like to thank Jeff Shallit for pointing out this error and suggesting the above correction.

References

[1] M. Chrobak, Finite automata and unary languages, Theoret. Comput. Sci. 47 (1986) 149–158.
[2] M. Szalay, On the maximal order in S_n and S_n^*, Acta Arith. 37 (1980) 321–331.