Fuchs, Michael; Lee, Chung-Kuei
A general central limit theorem for shape parameters of \(m\)-ary tries and PATRICIA tries. (English) Zbl 1300.68021

Summary: Tries and PATRICIA tries are fundamental data structures in computer science with numerous applications. In a recent paper, a general framework for obtaining the mean and variance of additive shape parameters of tries and PATRICIA tries under the Bernoulli model was proposed. In this note, we show that a slight modification of this framework yields a central limit theorem for shape parameters, too. This central limit theorem contains many of the previous central limit theorems from the literature and it can be used to prove recent conjectures and derive new results. As an example, we will consider a refinement of the size of tries and PATRICIA tries, namely, the number of nodes of fixed outdegree and obtain (univariate and bivariate) central limit theorems. Moreover, trivariate central limit theorems for size, internal path length and internal Wiener index of tries and PATRICIA tries are derived as well.

MSC:
68P05 Data structures
05C05 Trees
60F05 Central limit and other weak theorems
68R10 Graph theory (including graph drawing) in computer science
68W40 Analysis of algorithms

Keywords:
digital trees; nodes of fixed out-degree; total path length; Wiener index; moments; multivariate limit laws

Software:
PATRICIA

Full Text: Link

References:


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