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Construct a Perfect Word Hash Function in Time Independent of the Size of Integers

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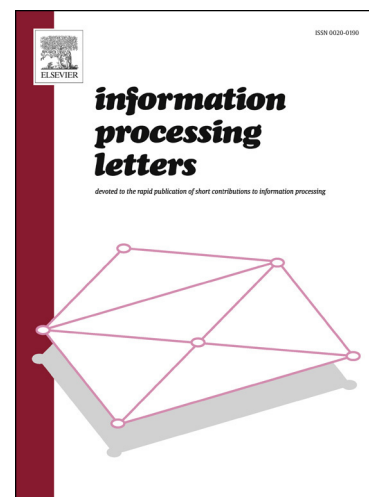
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Highlights

- We construct perfect word hash functions, that is, perfect hash functions that can hash multiple integers packed in a word in constant time.
- Word hash property is indispensable in the current best deterministic and randomized algorithms for integer sorting.
- This paper presents a method to convert the previous known perfect word hash algorithm with construction time $O(n^2 \log m)$ to a perfect word hash algorithm with construction time $O(n^4 \log n)$. We present a scheme to extract $n - 1$ bits from an integer for any values of $\log m$ and a scheme to pack these $n - 1$ bits. Thus we made the construction time for a perfect hash function independent of the number of bits in an integer and it allows multiple integers packed in a word to be hashed in constant time. Although previously $O(n(\log \log n)^2)$ construction time for perfect hash functions is known, it is not a word hash function and it cannot hash multiple integers packed in a word in constant time.

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