linear hashing

(data structure)

Definition: A *dynamic hashing* table that grows one slot at a time. It has a family of *hash functions*, h_i, where the *range* of h_{i+1} is twice the range of h_i. Slots below a pointer, p, have been split. That is, *key*, k, is in slot $h_i(k)$ if $h_i(k) > p$. Otherwise it is in $h_{i+1}(k)$. To maintain the *load factor*, slot p can be split (rehashed with h_{i+1}) and p incremented. When p reaches the end, the ranges are doubled (i is incremented), and p starts over.

Also known as incremental hashing.

Generalization (I am a kind of ...)
dynamic hashing.

See also *linear hash*, *spiral storage*.

Note: This is called incremental hashing in P. J. Plauger, "Hash It", ("STATE OF THE ART" column) Embedded Systems Programming, September 1998, 117-120. The article has a nearly complete implementation in C++.

Stefan Edelkamp uses "incremental hashing" to mean a hash function where subsequent characters are independent.

Author: PEB

More information

W. Litwin, *Linear hashing: A new tool for file and table addressing*, Proc. 6th Conference on Very Large Databases, pages 212-223, 1980.

Per-Åke Larson, *Dynamic Hash Tables*, CACM 31(4):446-457, April 1988.

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If you have suggestions, corrections, or comments, please get in touch with Paul E. Black.

Entry modified 25 July 2006.
HTML page formatted Mon Sep 11 09:46:04 2006.

Cite this as:
Paul E. Black, "linear hashing", in *Dictionary of Algorithms and Data Structures* [online], Paul E. Black, ed., U.S. National Institute of Standards and Technology. 25 July 2006. (accessed TODAY)
Available from: http://www.nist.gov/dads/HTML/linearHashing.html

linear hash

(algorithm)

Definition: A numeric function that maintains the order of input *keys* while changing their spacing.

Formal Definition: A *hash function* f for keys in S such that k1, k2 □ S □ k1 > k2 → f(k1) > f(k2).

Also known as order preserving hash.

Generalization (I am a kind of ...)
hash function.

Specialization (... is a kind of me.)
order preserving minimal perfect hashing.

Aggregate parent (I am a part of or used in ...)
grid file, *hash heap*.

See also *linear hashing*.

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Entry modified 2 February 2005.
HTML page formatted Mon Sep 11 09:46:04 2006.

Cite this as:
Paul E. Black, "linear hash", in *Dictionary of Algorithms and Data Structures* [online], Paul E. Black, ed., U.S. National Institute of Standards and Technology. 2 February 2005. (accessed TODAY) Available from: http://www.nist.gov/dads/HTML/linearhash.html