

# EFFICIENT IMPLEMENTATION OF THE FIRST-FIT STRATEGY FOR DYNAMIC STORAGE ALLOCATION

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## ABSTRACT

We describe an algorithm that efficiently implements the first-fit strategy for dynamic storage allocation. The algorithm imposes a storage overhead of only one word per allocated block (plus a few percent of the total space used for dynamic storage), and the time required to allocate or free a block is  $O(\log W)$ , where  $W$  is the maximum number of words allocated dynamically. The algorithm is faster than many commonly used algorithms, especially when many small blocks are allocated, and it has good worst-case behaviour. It is relatively easy to implement and could be used internally by an operating system, or to provide run-time support for high-level languages such as Pascal and Ada. A Pascal implementation is given in the Appendix.

## COMMENTS

Only the Abstract is given here. The full paper appeared as [2], and a preliminary version appeared as [1].

## REFERENCES

- [1] R. P. Brent, "Efficient implementation of the first-fit strategy for dynamic storage allocation", *Proc. Fourth Australian Computer Science Conference*, special issue of *Australian Computer Science Communications* 3 (1981), 25–34. rpb068.
- [2] R. P. Brent, "Efficient implementation of the first-fit strategy for dynamic storage allocation", *ACM Trans. on Programming Languages and Systems* 11 (1989), 388–403. Also appeared as Report CMA-R33-84, August 1984, 26 pp. rpb089.

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