

Programming Techniques

A Note on Cheney's Nonrecursive List-Compacting Algorithm

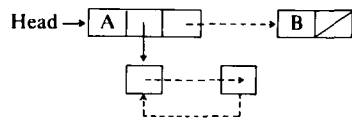
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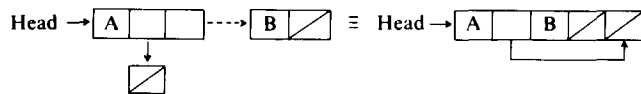
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Cheney's list-compacting algorithm [1] goes into an infinite loop when it traces a circular list consisting exclusively of non-items. While it may be reasonable to say that such lists should not exist, it would be very difficult to legislate out of existence programs which illegally create such lists because of bugs, and it would not do for the garbage collector to break down in this instance.

Actually, I feel there is a meaning for such lists which is consistent with this type of list structure. I propose that the list



means



COPYLIST steps 1 and 9 can be modified so that as long as POINTER points to a cell containing a non-item pointing to a non-item, the content of the cell containing the first non-item is replaced by the content of the cell containing the second non-item after a check is first made that the second non-item doesn't point at the first

cell. If in this process of "pulling in the non-item chain," the second cell is found to be pointing to the first cell, the content of the second cell is set to nil and a list pointer to the second cell is put in the first cell. Whenever POINTER no longer points to a cell containing a non-item pointing to a non-item, the rest of step 1 or 9 is executed.

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References

1. Cheney, C. J. A nonrecursive list-compacting algorithm. *Comm. ACM* 13, 11 (Nov. 1970), 677-678.

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