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Spaghetti sort

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- This article **may be confusing or unclear to readers**. *(July 2013)*
- This article's **factual accuracy is disputed**. *(July 2013)*

Spaghetti sort is a linear-time, analog algorithm for sorting a sequence of items, by Alexander Dewdney in his column, *Scientific American*.[1][2][3] This algorithm sorts a sequence of items requiring O(*n*) stack space[*citation needed*] in a stable manner. It requires a parallel processor.[*citation needed*]

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Algorithm [edit]

For simplicity, assume we are sorting a list of natural numbers. The sorting method is illustrated using uncooked rods of spaghetti:

1. For each number x in the list, obtain a rod of length x. (One practical way of choosing the unit is to let the largest number m in the list correspond to one full rod of spaghetti. In this case, the full rod equals m spaghetti units. To get a rod of length x, break a rod in two so that one piece is of length x units; discard the other piece.)
2. Once you have all your spaghetti rods, take them loosely in your fist and lower them to the table, so that they all stand upright, resting on the table surface. Now, for each rod, lower your other hand from above until it meets with a rod—this one is clearly the longest. Remove this rod and insert it into the front of the (initially empty) output list (or equivalently, place it in the last unused slot of the output array). Repeat until all rods have been removed.

Analysis [edit]

Preparing the n rods of spaghetti takes linear time. Lowering the rods on the table takes constant time, O(*1*). This is possible because the hand, the spaghetti rods and the table work as a fully parallel computing device. There are then n rods to remove so, assuming each contact-and-removal operation takes constant time, the worst-case time complexity of the algorithm is O(n).

References [edit]

1. ^ Dewdney, A. K. (June 1984), "On the spaghetti computer and other analog gadgets for problem solving", *Scientific American* **250** (6): 19–26
2. ^ Stauffer, Dietrich (May 15, 1999), *Annual Reviews of Computational Physics VI*, World Scientific, p. 260, ISBN 981-02-3563-1
3. ^ Adamatzky, Andrew (July 1, 2006), *From Utopian to Genuine Unconventional Computers*, Luniver Press, p. 96, ISBN 0-9551170-9-7

External links [edit]

- A. K. Dewdney's homepage
- Implementations of a model of physical sorting, Boole Centre for Research in Informatics
- Classical/Quantum Computing, IFF-Institute

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