Split-and-Refine Cache-Oblivious Layout

[Alstrup, Bender, Demaine, Farach-Colton, Munro, Rauhe, Thorup – manuscript 2002] on arXiv.org

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- decrease B through powers of 2
- apply black box for external-memory layout
- notice when cost of solution changes by const. factor

Levels of detail

0 = one big block, $B = \Pi N \Pi \Rightarrow$ cost = 1
1 = when cost between 2 & 4.
2 = when cost between 2 & 4 × cost at level 1
i = when cost between 2 & 4 × cost at level $i-1$
(using smoothness)
l = when $B = 1$
(cost might not be $\geq 2 \times$ level $l-1$)

Refined levels of detail:

cut each block in level of detail i
according to partition at levels of detail $< i$.
$\Rightarrow$ levels form recursive structure

Recursive layout:

each block at any refined level of detail is stored in a consecutive chunk of memory.

Layout algorithm:

sort nodes by key < block label @ level 0, block label @ level 1, ... > } $O(\lg N)$ components

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