Pointer-based Data Structures (4/5)

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PDMI CS Club,
Sep-Oct 2019

Dynamization of data structures

	Original DS	Resulting DS
Space	$S(n)$	$O(S(n))$
Preprocessing time	$P(n)$	$O(P(n))$
Query time	$Q(n)$	$O(\log n Q(n))$
Insert	–	$O(\log n \frac{P(n)}{n})$
Delete	–	$O(\frac{P(n)}{n})^*$
		$O\left(\log n \frac{D(n)}{n} + \frac{P(n)}{n}\right)^{**}$

Queries should be decomposable

* if queries are invertible

** if a weak deletion can be made in time $D(n)$

—— worst-case time

Reading on Dynamization

- Jeff Erikson's lecture notes: http://jeffe.cs.illinois.edu/teaching/datastructures/notes/01-statictodynamic.pdf
- original 1: J. L. Bentley and J. B. Saxe. Decomposable searching problems I: Static-to-dynamic transformation. J. Algorithms 1(4):301–358, 1980.
- original 2: M. H. Overmars. The Design of Dynamic Data Structures. Lecture Notes Comput. Sci. 156. Springer-Verlag, 1983
- original 3: M. H. Overmars and J. van Leeuwen. Worst-case optimal insertion and deletion methods for decomposable searching problems. Inform. Process. Lett. 12:168–173, 1981.