6.897
L12.5
Mar. 15, 2005

Partial sums:

- maintain an array $A[1 \cdots n]$ of integers subject to
  - update$(A[i], \Delta)$, $\lg|\Delta| \le S$
  - prefix-sum$(k) = \sum_{i=1}^{k} A[i]$
  - select$(\sigma) = k$ for which prefix-sum$(k) \le \sigma <$ pr.sum$(k+1)$
- $\Omega(\lg n)$ LB via dynamic connectivity LB when $S = w$
- $\Theta\left(\frac{\lg n}{\lg(w/S)}\right)$ [Demaine & Pătraşcu – SODA 2004]
- if $S = w^{1-\varepsilon}$ then $O\left(\frac{\lg n}{\lg w}\right) = O\left(\frac{\lg n}{\lg \lg n}\right)$

Priority queues

- $O(\sqrt{\lg \lg n})$ [Han & Thorup – FOCS 2002 and Thorup – FOCS 2002]