6.897
L23.5
May 3, 2005

So far: searches in $O(\lg_{B+1} N)$ memory transfers
insert/delete in $O(\lg_{B+1} N + \frac{\lg^2 N}{B})$ am.
bad if $B = o(\lg N \lg\lg N)$

Indirection:

- previous structure on $N/\lg N$ elts:
  min. from each group of $\Theta(\lg N)$ consecutive elts.

- update in top structure only every $\lg N$ updates when group grows/shrinks by constant factor
  $\Rightarrow O(\frac{\lg N}{B})$ am. cost/update in top structure
  $(= O(\lg_{B+1} N))$
- until then, just updating group @ bottom — rewriting entirely costs just $O(\frac{\lg N}{B})$ memory transfers
- ditto for searching in bottom group

$\Rightarrow O(\lg_{B+1} N)$ am. memory transfers for insert, delete, search
(includes searching)