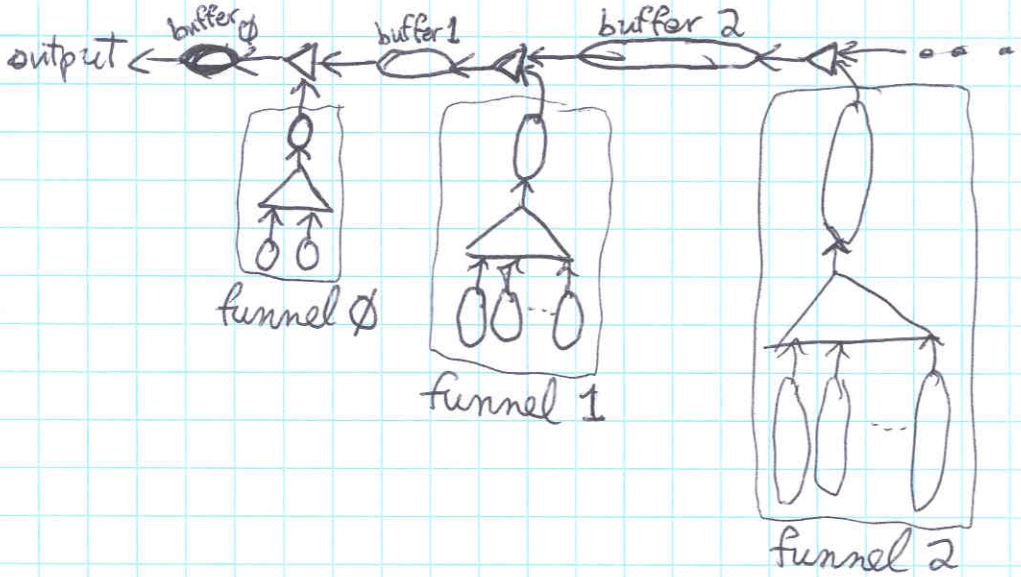
Priority queues

6.897
L17.4
Apr. 28, 2003

- external-memory: buffer trees [Arge 1995]
  - Insert, Delete, delayed Search: $O(\frac{1}{B} \log_{M/B} \frac{N}{B})$ amortized memory transfers
    (< 1 !)
  - OPEN: can this be done cache-obliviously?
- cache-oblivious:
  - Arge, Bender, Demaine, Holland-Minkley, Munro - STOC 2002:
    Insert, Delete, Delete-Min
    ↳ uses sorting as a subroutine (as do buffer trees)
  - Brodal, Fagerberg - ISAAC 2002:
    Insert, Delete-Min
    ↳ simpler

Funnelheap

- funnels of doubly increasing size
- buffers & 2-funnels (binary merger) connecting the funnels



Invariant: elements in smaller buffers $\leq$ elements in {larger buffers / larger funnels}

Delete-Min: - if buffer ∅ empty: fill it (as in funnels)
- extract first element from buffer ∅.

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