6.897
L17.5
Apr. 28, 2003

Insert:

- allow funnels to have missing input streams
- suppose funnel i is the smallest funnel with ≥ 1 missing input
- sweep buffer 0, funnel 0, buffer 1, funnel 1, ..., buffer i
  & root-to-empty-input path in funnel i
  & inserted element
  into buffer 0, buffer 1, ..., buffer i, & root-to-empty-input path in funnel i
  ↳ empties funnels $0, 1, \ldots, i-1$ ⇒ long time till i again
  ↳ concatenate buffers $0, 1, \ldots, i$ (⇒ sorted)
  & root-to-empty input path (also sorted)
  into auxiliary buffer & erase originals
  ↳ sort funnels $0, 1, \ldots, i-1$ by repeatedly calling Delete-Min
  ↳ merge these two sorted lists
  ↳ fill buffers $0, 1, \ldots, i$ as full as before
  & put rest along root-to-empty-leaf path & the empty leaf. (most elements go here.)

- input stream to funnel i is large enough to store this
  - size $\approx 2^{(4/3)^i}$
- # inputs to funnel $i \approx 2^{(4/3)^i/3}$
- amortized cost of input $= O\left(\sum_{j=0}^{\infty} \frac{1}{B} \log_{M/B} N^{(3/4)^j}\right) = O\left(\frac{1}{B} \log_{M/B} N\right)$

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