External-memory linked list

6.897
L15.2
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- operations:
  - Insert an element between 2 given elts.
  - Delete a given element
  - Traverse from given element for K steps. (K may be computed on-the-fly)
- goal: Traversal(K) in $O(\lceil K/B \rceil)$ transfers.
- simple solution using $O(1)$ memory transfers per update:
  - cluster list into consecutive chunks of size $\Theta(B)$ ($\geq$ & $\leq B$)
  - store each chunk in one memory block
    (arbitrarily order the elements from a common chunk)
  - store blocks in arbitrary order in memory

  Updates:
  - when block fills, split it into 2 blocks
    put new block at the end
  - when block shrinks, merge with logical neighbor
    fill created hole by moving last block
    resplit if necessary
  - in either case, update $O(1)$ pointers
- crucial to know B.

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