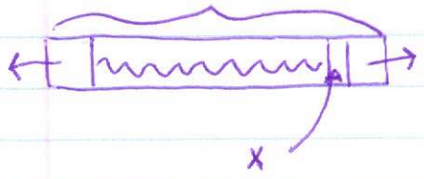
Space Efficient Linked List

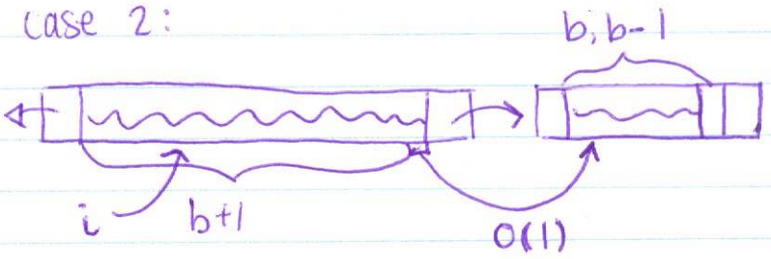
Oct 6, 2017

add(i,x):
- find the node
↳ $O(1 + \frac{\min\{i, n-1\}}{b})$
- insert x, into ArrayDeque
↳ O(b) shift

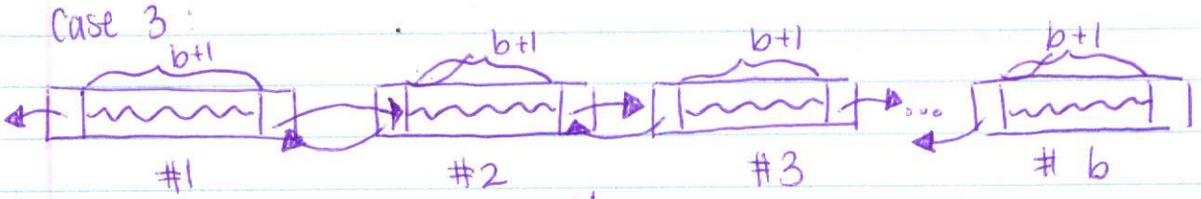
Case 1: b-1, b



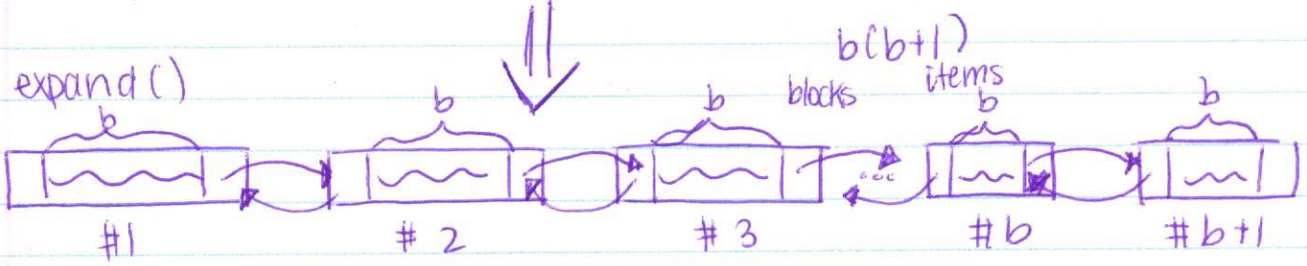
Case 2:



Case 3:



expand()



b(b+1) items, b blocks

$\frac{O(b^2) \text{ work}}{O(b) \text{ steps}} = O(b)$ amortized

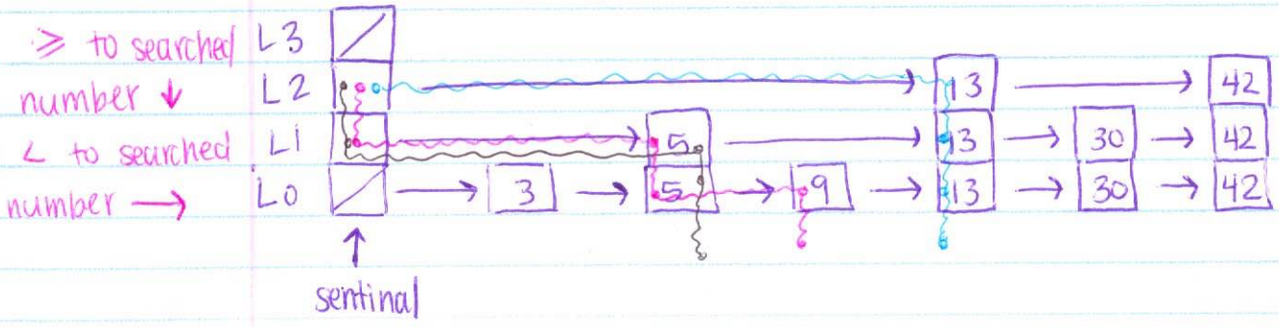
↳ O(b) moves (case 2)
↳ O(b) amortized (case 3)

$O(b + \frac{\min\{i, n-i\}}{b})$

b(b+1) items, b blocks

Skip Lists

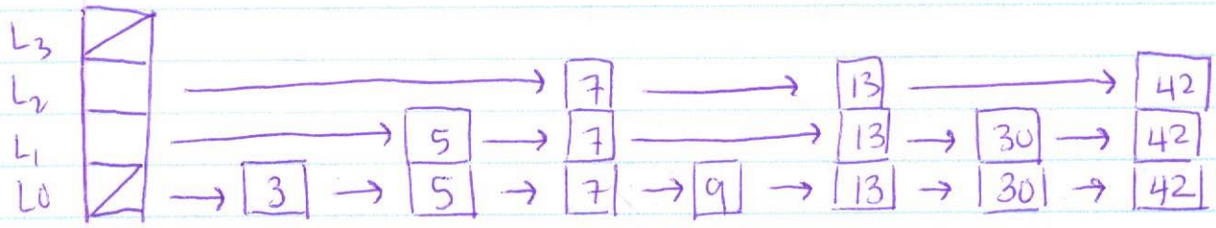
→ Sorted Set



* find (15)

* add (7)

→ Step 1: Find location O(logn)



→ Step 2: Splice into L_0 O(1)

→ Step 3: Promote O(logn)