

Q (1)

insert(val)

remove(val)

getRandom()

$$T = \begin{matrix} & 0 & 1 & 2 & 3 & 4 \\ [& 1 & 1 & 1 & 2 & 2 \end{matrix}]$$

$$\left\{ \begin{array}{l} 1: [0, 1, 2] \\ 2: [3, 4] \end{array} \right\}$$

↑ ↑
 val positions of val

remove '1'

Diagram illustrating the pop operation:

- Stack 1: $[1, 1, 1, 2, 2]$
 - Top element: 2 (labeled *val*)
 - Second element from top: 1 (labeled *last*)
- Stack 2: $[1, 1, 2, 2, 1]$
 - Top element: 1 (labeled *pop*)

- swap
- pop vals
- remove p1 from val
- remove p2 from last
- add p1 to last