Chapter 17 Solusion

https://github.com/frc123/CLRS

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17.1

17.1-1

No. Consider we operate MULTPUSH(S, n) n times. Such n operations cost $\Theta(n^2)$, so the amortized cost is $\Theta(n)$.

Actually, we can MULTPUSH incredible large amount of items, so $O(1)$ of course cannot be bound on the amortized cost of stack operations.

17.1-2

Consider a k-bit counter where each bit in the counter is 1. Now, we perform INCREMENT which flips $k+1$ bits. Then, we perform DECREMENT which flips $k+1$ bits again. Hence perform a sequence of length n operations $\langle$INCREMENT, DECREMENT, INCREMENT, DECREMENT, $\cdots\rangle$ cost $\Theta(nk)$ in total.

17.1-3

$$n + \sum_{i=1}^{\lfloor \lg n \rfloor} (2^i - 1) \leq n + \sum_{i=0}^{\lg n} 2^i = n + 2^{\lg n + 1} - 1 = n + 2n - 1 = 3n - 1$$

Hence the amortized cost per operation is $O(1)$.

Updating...