4. Sequence of n operations on data structure

i^{th} operation costs $\begin{cases} = i & \text{if } i \text{ is exact power of 2} \\ = 1 & \text{otherwise} \end{cases}$

$$\text{Total cost} = \sum_{i=1}^{n} C_i \leq n + \sum_{j=0}^{\log n} 2^j$$

If i is exact power of 2, the cost is $\sum_{j=0}^{\log n} 2^j = 2^{\log_2 n + 1} - 1 \leq 2^{\log_2 n + 1}$

$= 2n$

Otherwise, the cost is $\leq n$

Thus, total cost $T(n) \leq 2n + n$

$= 3n$

$\Rightarrow O(n)$

Therefore, amortized cost per operation is $O(1)$