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HW17

1)

a. 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16

O(1) O(1) O(1) O(4) O(1) O(1) O(1) O(8) O(1) O(1) O(1) O(1) O(1) O(1) O(1) O(16)

So sequence of n inserts

$O(n) + O(2n) = O(n)$

Thus amoritized runtime is

$O(n)/n = O(1)$

		Amortised	Actual
b)	Simple ops	O(3)	O(1)
	Complex ops (i^{th} index)	O(10)	O(i)

i) 1 2 3 bank = 3+3+3−1−1−1 = \$6

ii) 1 2 3 4 _ _ _ Cost = 0−4 = −4 ⇒ bank = 6−4 = \$2

iii) 1 2 3 4 5 6 7 _ _ _ bank = 2+6 = \$8

O(1) O(1) O(1)

iv) 1 2 3 4 5 6 7 8 Cost = 0−8 = −\$8 ⇒ bank = \$8 − \$8 = \$0

= O(8)

v) 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 bank = \$18

O(1)

vi) 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 ⇒ bank = \$0

O(18)

Thus we can always keep bank non-negative

Our Assumptions hold ⇒ Θ Θ Θ . Amortized time for each op