Review 10-3

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1. Calculate the amortized cost of the *i*th TABLE-INSERT operation when $\alpha_{i-1} < 1/2$.

Case 1: $\alpha_{i-1} < 1/2$ and $\alpha_i < 1/2$.

$num_i = num_{i-1} + 1$

$size_{i-1} = size_i$

$$\hat{c}_i = c_i + \Phi_i - \Phi_{i-1}$$

$$= \boxed{1 + size_i/2 - num_i - size_{i-1}/2 + num_{i-1}}$$

$$= \boxed{1 + size_i/2 - num_i - size_i/2 + num_{i-1}}$$

$$= \boxed{0}$$

Case 2: $\alpha_{i-1} < 1/2$ but $\alpha_i \geq 1/2$.

$num_i = num_{i-1} + 1$

$size_{i-1} = size_i$

$\alpha_i = \frac{num_i}{size_i}$

$$\hat{c}_i = c_i + \Phi_i - \Phi_{i-1}$$

$$= \boxed{1 + 2 * num_i - size_i - size_{i-1}/2 + num_{i-1}}$$

$$= \boxed{1 + (2 \times (num_{i-1}+1) - size_i - size_{i-1}/2 + num_{i-1} - 1)}$$

$$= \boxed{3 * num_{i-1} - \frac{3}{2} size_{i-1} + 3}$$

$$= \boxed{3 * \alpha_{i-1} * size_{i-1} - \frac{3}{2} size_{i-1} + 3}$$

$$< \boxed{\frac{3}{2} size_{i-1} - \frac{3}{2} size_{i-1} + 3}$$

$$= \boxed{3}$$