**Algo: 1** Stochastic Approximation of estimating $b$

**Input:** learning rate $\alpha \in (0, 1)$, $b_0$

**Output:** $b_n$

**function** SA($b_0, \alpha$)
    Initialize $b_0$
    **for** $k = 1, 2, ..., n$ **do**
        Generate $x_k \sim \mathcal{N}(b, \sigma^2)$
        $b_{k+1} \leftarrow b_k + \alpha(x_k - b_k)$
    **end for**
    **return** $b_n$