Chapter 6, Problem 2. Let $p_i$ be the minimum penalty we can have when we stop at $i$th hotel. $p_n$ is the final answer which we are looking for. For convenience, we let that $p_0 = 0$ and $a_0 = 0$. Notice that for all $i \geq 1$

$$p_i = \min_{0 \leq j < i} p_j + (200 - (a_i - a_j))^2.$$ 

Let $pre(i)$ be the index $j$ such that $j < i$ and the quantity $p_j + (200 - (a_i - a_j))^2$ is minimized.

If we compute all $p_i$’s over $i$ from 1 to $n$ and store each $pre(i)$ in an array, then we can get the total penalty $p_n$ and the optimal sequence of hotels at which to stop by tracing back $pre(i)$’s. A naive implementation will gives us an $O(n^2)$ running time algorithm (computing each $p_i$ takes us $O(n)$ time).