

n : house

houses = $1, 2, \dots, n$

profit = p_i , $i = 1 \dots n$, where $p_i > 0$

condition: no adjacent houses

input: $p = [p_1, p_2, \dots, p_n]$

output: max profit

1.) Let $T(i)$ = maximum profit at p_i

2.) Base case: $T(0) = 0$; $T(1) = p_1$

Recurrence: $T(i) = \max \{T(i-1), T(i-2) + p_i\}$, $1 \leq i \leq n$

p_i 's = $[40, 30, 10, 60]$

T $\begin{matrix} p & 0 & 1 & 2 & 3 & 4 \\ & 0 & 40 & 40 & 50 & 100 \end{matrix}$

3.) $T(0) = 0$
 $T(1) = p_1$ } $O(1)$

$O(n)$ { for $i = 2$ to n do
 $T(i) = \max \{T(i-1), T(i-2) + p_i\} \rightarrow O(1)$
end for
return $\max \{T(i)\} \rightarrow O(1)$

4.) $O(n)$