

Module 5 Dynamic Programming Assignment

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Response 1

Given: n for the total number for doors and S for number or secured doors.

My algorithm would initialize an array of integers A of size $n + 1$ and fill the first $S - 1$ indices to 0 and $A[S]$ to 1. The algorithm will iterate through all the indices of A and update each element of the array such that index $A[i] = A[i - 1] + 2^{i-S}$. The algorithm will return $A[n]$.

Response 2

Response 3

Given: $w = \text{max size of the tile cover}$

The algorithm will first create an array A of integers of size $w + 1$ and assign $A[0] = 0$, $A[1] = 1$, and $A[2] = 2$. The algorithm will iterate through each of the cells after $A[2]$ and update each cell such that $A[i] = A[i - 1] + A[i - 2]$. Once the algorithm fully fills all the values in A , it will return the output of the value in the very last cell. The runtime of the algorithm is linear or $\Theta(w)$ because the algorithm has to loop through all w values.

Response 4

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