Homework 7

Due 11/18/2024

November 18, 2024

Answer the following questions about applying dynamic programming to the recursive algorithm below.

Input: n: positive integer
Input: m: positive integer
1 **Algorithm:** MysteryRecursion

2 **if** $n = 1$ and $m = 1$ **then**
3 | **return** 1
4 **else if** $n = 1$ **then**
5 | **return** $m \cdot$ MysteryRecursion$(n, \lfloor m/2 \rfloor)$
6 **else if** $m = 1$ **then**
7 | **return** $n \cdot$ MysteryRecursion$(\lfloor n/2 \rfloor, m)$
8 **else**
9 | **return** $n \cdot$ MysteryRecursion$(\lfloor n/2 \rfloor, m) + m \cdot$
     MysteryRecursion$(n, \lfloor m/2 \rfloor)$
10 **end**

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1. What implementation would you recommend for a dynamic programming data structure for MysteryRecursion?

2. Give pseudocode for a memoized dynamic programming algorithm for MysteryRecursion.

3. Describe one or more for loops that could be used for an iterative dynamic programming algorithm for MysteryRecursion.