

Homework 7

Due 11/18/2024

November 11, 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  $m \cdot \text{MysteryRecursion}(n, \lfloor m/2 \rfloor)$   
6 else if  $m = 1$  then  
7   | return  $n \cdot \text{MysteryRecursion}(\lfloor n/2 \rfloor, m)$   
8 else  
9   | return  $n \cdot \text{MysteryRecursion}(\lfloor n/2 \rfloor) + m \cdot$   
   |  $\text{MysteryRecursion}(n, \lfloor m/2 \rfloor)$   
10 end
```

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.