COMP 3711 – Spring 2019
Tutorial 6a
Review problems for Start of DP

1. Give an $O(nk)$-time dynamic programming algorithm that makes change using the minimal possible number of coins.

   The solution obviously depends upon the country you are in.

   Let the local given coin denominations be $d_1 < d_2 < \cdots d_k$, where $d_1 = 1$ (which guarantees that some solution always exists).

2. KFCC is considering opening a series of restaurants along the highway. The $n$ available locations are along a straight line; the distances of these locations from the start of the Highway are given in miles and in increasing order: $m_1, m_2, \ldots, m_n$. The constraints are as follows:

   (a) At each location, KFCC may open at most one restaurant.
   The expected profit from opening a restaurant at location $i$ is $p_i$, where $p_i > 0$ and $i = 1, 2, \ldots, n$.

   (b) Any two restaurants should be at least $k$ miles apart,
   where $k$ is a given positive integer.

   Give a dynamic programming algorithm that determines a set of locations at which to open restaurants that maximizes the total expected profit earned.