CPSC 413: Exercise Set 8

1. A fast-food company is deciding where to build restaurants along a stretch of highway. They have n possible locations for the restaurants, located in order at $l_1, l_2, \ldots l_n$. Each location has a projected profit p_i. Now, the government has mandated that no two restaurants can be built within 10km of each other. So, the company wants to determine which set of restaurants they should build, so that no two restaurants are within 10km of each other, and their total projected profit is maximized.

   (a) Describe a dynamic programming solution to the problem.

   (b) Prove that it always gives an optimal solution.

   (c) Determine its running time.