CS-661 AI Assignment 3

1. The *vacuum world* consists of a grid of n by m squares, in each of which may be empty, contain dirt, or may be occupied by furniture. The vacuum-cleaner agent's job is to clean all of the dirt, and return to its docking station before its batteries are exhausted. The agent has three binary sensors:

   1. a touch sensor (which is 1 iff the agent just bumped into a wall or furniture)

   2. a photosensor (which is 1 iff the square contains dirt)

   3. an infrared sensor (which is 1 iff the agent is at its docking station).

The agent has five possible actions:

   1. go forward

   2. turn right 90 degrees

   3. turn left 90 degrees

   4. suck up dirt

   5. dock

Can a simple reflex agent solve this problem? What size lookup table is required for a n by n world with no furniture and only d squares with dirt? Write a rough algorithm for an agent with internal state that solves the problem ignoring the battery constraint. Is the solution optimal from the time point of view?