Answer the Following Questions:

1. Is AI a science, or is it engineering? Or neither or both? Explain.
2. Give a complete problem formulation for each of the following problems. Choose a formulation that is precise enough to be implemented.
   - There are six glass boxes in a row, each with a lock. Each of the first five boxes holds a key unlocking the next box in line; the last box holds a banana. You have the key to the first box, and you want the banana.

   - You start with the sequence ABABAECCEC, or in general any sequence made from A, B, C, and E. You can transform this sequence using the following equalities: AC = E, AB = BC, BB = E, and Ex = x for any x. For example, ABBC can be transformed into AEC, and then AC, and then E. Your goal is to produce the sequence E.

   - There is an n×n grid of squares, each square initially being either unpainted floor or a bottomless pit. You start standing on an unpainted floor square, and can either paint the square under you or move onto an adjacent unpainted floor square. You want the whole floor painted.

   - A container ship is in port, loaded high with containers. There 13 rows of containers, each 13 containers wide and 5 containers tall. You control a crane that can move to any location above the ship, pick up the container under it, and move it onto the dock. You want the ship unloaded.

3. Your goal is to navigate a robot out of a maze. The robot starts in the center of the maze facing north. You can turn the robot to face north, east, south, or west. You can direct the robot to move forward a certain distance, although it will stop before hitting a wall.

   1. Formulate this problem. How large is the state space?
   2. In navigating a maze, the only place we need to turn is at the intersection of two or more corridors. Reformulate this problem using this observation. How large is the state space now?
   3. From each point in the maze, we can move in any of the four directions until we reach a turning point, and this is the only action we need to do. Reformulate the problem using these actions. Do we need to keep track of the robot's orientation now?
   4. In our initial description of the problem we already abstracted from the real world, restricting actions and removing details. List three such simplifications we made.

4. Solve Towers of Hanoi using AI Problem Solving Methods.