Artificial Intelligence

Tutorial -4

1. What are the five components to design a Problem. Define these Component for the following
   a. 8- Puzzle Problem
   b. Traveling Salesmen Problem

2. Which parameters are used for measuring the performance of the solved problem. Design a solution for Solving "Color Map Problem" and comment on its performance parameters.
   Color Map Problem: "The four-color theorem states that any map in a plane can be colored using four-colors in such a way that regions sharing a common boundary (other than a single point) do not share the same color. i.e. *that no more than four colors are required to color the regions of any map so that no two adjacent regions have the same color"*.

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.
   a. Formulate this problem. How large is the state space?
   b. 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?
   c. 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?