**Quiz #2. Problem solving and search**

Explain the differences between reflex agent and goal-based agent.

Assume that simple reflex agent observes $O_1$ and its response is action $A_1$. Now, if that agent observes $O_1$ again, what will be its action?

Assume that model-based reflex agent observes $O_1$ and its response is action $A_1$. Will that agent always respond with action $A_1$ if it will observe $O_1$ in future?

What is a transition model?

Explain the difference between atomic and factored representations of states using N-queens problem.

Is problem solving agent a reflex agent or a goal-based agent?

What do we need to define a problem?

Discuss various abstractions for N-queens problem. Hint: look at the size of search space.

What is the difference between search node and state? Is it the same?

Explain the differences between tree search and graph search. Discuss their advantages and disadvantages.

Explain the differences between BFS and DFS. Discuss their advantages and disadvantages.

What is difference between pure DFS and backtracking? What do we need to be able to use backtracking?

Explain why greedy best-first search is incomplete when implemented as tree search. Hint: give an example.

Formulate A* algorithm.

Is every admissible heuristic also monotonous (consistent)? Prove it.

Is every monotonous (consistent) heuristic also admissible? Prove it.

Why is consistent heuristic also called monotonous?

Prove that the tree-search version of A* with admissible heuristic is optimal.

Show that the graph-search version of A* with admissible heuristic is not optimal.

Prove that Manhattan heuristic is admissible for the sliding-block puzzle.

Prove that if $h_1$ dominates $h_2$ then A* using $h_1$ will not explore more nodes than A* using $h_2$.

Think if A* is an appropriate algorithm to solve N-queens problem.

If we use best-first algorithm with f(n) = g(n), which algorithm do we get? Is it optimal?