Duration: 30 minutes

1. To set up and solve an AI problem, we should (check all that apply)
   a. Make sure that the problem is very small in scale
   b. Write an algorithm for the problem that closely reflects human thought processes.
   c. Identify a well-architected set of Java classes that implement a model of the problem environment while being careful to not specify a performance metric for the solution.
   d. Identify and formalize the environment and the program’s input / output into the environment

2. True or False: There are no existing real-life applications for AI programs beyond winning board games; the fruits of AI will only be realized some time in the future.

3. Which of the following mappings best describes a goal-based vacuum cleaner agent? (check all that apply)
   a. (last n moves, current room, score) --> next move
   b. (current room, dirt) --> score
   c. (last n moves, current room, dirt, desired minimum number of clean rooms) --> next move
   d. none of the above

4. True or False. Every search-based solution can be an implementation of the agent process but not every implementation of the agent process needs to be search-based.

5. An example of a successor function in a search problem is (check all that apply)
   a. A function that stops the search if you have the solution in hand, continue if you don't
   b. A Java class that selects a “next state” after expanding the current state in the solution space
   c. A Java class that tests whether the “next state” is the same as the “goal state.”
d. A function that selects the next state based on a priority queue

6. A state space tree is different from a state space graph in what way? (select all that apply)
   a. Each node in the search tree is also a node in the state graph but they have different cost functions
   b. A state graph shows the states traversed from start node to goal node, whereas the nodes in a search tree each represent a particular sequence of choices from the start node to a particular node in the state graph
   c. There is no difference, they are the same.
   d. A state space tree is meant only for exploiting known tree search algorithms, while a state graph can use any algorithm.

7. True or False. Informed Search traverses the state space, while taking care to expand the frontier (aka fringe) to the maximum extent possible each time, so as to maximize the information it gets.

8. True or False. A search algorithm is complete if it searches every possible path through the state space graph.

9. True or False. Greedy search always produces an optimal path through the graph.

10. True or False. In heuristic search, it is always better to choose a heuristic that overestimates the forward cost.