

1.

a. Tic Tac Toe

i. Fully Observable

1. Entire environment can be seen, no hidden information

ii. Multi-Agent

1. Have to worry about the actions of other agents

iii. Deterministic

1. Actions have a known, constant effect. Going in one spot, goes in that spot, every time

iv. Sequential

1. Past actions have effects on future actions

v. Static

1. One action per time step, one time step per action

vi. Discrete

1. Distinct environment states. There is no intermediary steps to placing a shape

vii. Known

1. Actions have known effects. The rules of the game are known.

b. Memory

i. Partially Observable

1. We can see the states of the cards on the board, but not what is on each card

ii. Single or Multi agent

1. The game can be played solo, or with other agents. The rules are flexible

iii. Stochastic

1. If the cards are randomly placed, we only know that there is a probability of several different transitions occurring. That two cards are going to match, and be removed, or that they are not.

iv. Sequential

1. The ordering of actions matters. One move can take cards away, and one can use those cards, so the latter has to occur before the former

v. Static

1. The environment doesn't change unless an agent makes an action

vi. Known

1. We know the rules of the game. We know the possible outcomes of an action

c. Grading Problem 1

- i. Partially Observable
 - 1. We can only see the homework of the student that we are grading
 - 2. We cannot see every homework
- ii. Single Agent
 - 1. The TA is the only agent making actions
- iii. Deterministic
 - 1. The two actions have known outcomes
 - a. Grading gives the student a grade (or is this part stochastic because the grade itself [the result] is unknown until the grading occurs
 - b. Switching papers gets a new paper
- iv. Sequential
 - 1. A new paper needs to be selected in order to grade it.
 - 2. It doesn't work to grade 100 papers, then switch papers 100 times
- v. Static
 - 1. The order of papers, and what is on the papers doesn't change as time goes on, except when we take an action
- vi. Known
 - 1. We know how grading and switching papers affects them

2.

- a. Fringe: {(S, 0)} Explored: {} Next: S
- b. Fringe: {(A, 1), (G, 12)} Explored: {S} Next: A
- c. Fringe: {(B, 4), (C, 2), (G, 12)} Explored: {S, A} Next: C
- d. Fringe: {(B, 4), (D, 3), (G, 4)} Explored: {S, A, C} Next: D
- e. Fringe: {(B, 4), (G, 4)} Explored: {S, A, C, D} Next: B
- f. Fringe: {(G, 4)} Explored: {S,A,C,D,B} Next: G
- g. GOOOOOOAAAAALLLLLL Fringe: {} Explored: {S,A,C,D,B,G} Next:

3.

- a. Salad
 - i. Initial State: Three Unchopped ingredients
 - ii. Actions from Initial: Chop Ingredient
 - iii. Other States: Different combinations of chopped ingredients not mixed, all ingredients chopped and mixed, all ingredients chopped and mixed in with dressing
 - iv. Incremental/Complete: Incremental
- b. Class Scheduling
 - i. Initial State: All classes selected
 - ii. Actions from Initial: Move a class to a different semester
 - iii. Other States: The different combinations of classes in semesters
 - iv. Incremental/Complete: Complete State
- c. UPS Truck
 - i. Initial State: No houses delivered to
 - ii. Actions from Initial: Deliver to House X

- iii. Other States: Combinations of all houses delivered to and not delivered to
- iv. Incremental/Complete: Incremental

4.

- a. Hide and Go Seek: Depth First Search
 - i. The most appropriate way here is to go into a room and search each area of it. It doesn't make sense to go into a room, then leave to another room, then come back and search one spot, then leaving to search a spot in another room, and so on.
- b. Free Music: Breadth First Search
 - i. If each genre is a branch of tree, breadth first guarantees that we are actually searching at least three genres for lengths that are good
- c. UPS Truck: Uniform-Cost Search
 - i. This search works for minimizing distances. It actually deals with costs as well

5.

- a. Human Chess: Rational
 - i. The human is taking what they perceive the best action in order to achieve the optimal outcome
- b. Dumb Roomba: irrational
 - i. Random direction isn't the optimal action to take always to minimize time
- c. Smart Roomba: Irrational
 - i. Because of the furniture , this leaves gaps of uncleaned floor in the room. It gives a nonoptimal solution