CS 411 - Artificial Intelligence I
Fall 2018
Assignment 2 - Solutions
Department of Computer Science, University of Illinois at Chicago

1.

Goal based agent selects action <u>to help it reach pre-defined desirable state(s)</u> by combining current percept and its internal representation of the world.

Utility based agent selects action <u>to maximize its utility function</u> by combining current percept and its internal representation of the world.

2.

Partially observable: When agent can only see its current position in a grid world

Fully observable: When agent can see its own location, location of all stars and all possible squares it can move to in grid world

Deterministic: When there is no randomness in next state after acting in current state. Each (state,action) pair always leads to same future state For example, if agent selects action 'up' from position (1,1), it will end up in position (1,2) 100% of time.

Stochastic: There is randomness in resulting state from the action choice at some state. For e.g. if agent selects 'pick' action, it can pick up star 80% of time but fails remaining 20% of time.

Dynamic: If the location of stars changes or the grid world grows or shrinks when agent is acting on the environment

Static: If the environment stays the same while agent is acting on it.

Episodic: If the star-picking game is played multiple times (say in randomly generated 4x3 environment), but each play has a time horizon of 1. Because the agent's decision to take certain action in game 1 doesn't impact its performance in subsequent games.

Sequential: Each game of duration greater than 1 is sequential because the decision to move to certain direction initially will determine how fast the agent will reach the stars in this game.

Known: If agent knows everything about the world like a set of actions, world dynamics, rules of the game.

Unknown: Agent doesn't know the probability of failing when trying to pick up stars or moving and has to infer it by interacting with environment.

Single-agent: There is only one agent acting to collect as many stars as possible

Multi-agent: There are two agents competing to pick up stars in the environment