Assignment-1

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1.

Partial-Observable:

Poker is partial observable because in the game of poker there will be three closed cards, which an agent can't sense until an initial action is taken.

Multi-agent:

It's clear that poker is multi-agent game because the opponent entity tries to maximize its performance measure (trying to get maximum amount) which in-turn minimizes the other agent's performance measure (this is referred as competitive multi agent environment).

Stochastic:

Poker is stochastic because the environment is partially observable and the agent can't determine which cards are closed.

Sequential:

In poker, current decision whether to bet or raise or check could affect the bid amount and clearly affect the future decisions

Static:

Clearly poker is static environment because the state of environment (the bet amount the cards) doesn't change while agent is deliberating.

Discrete:

The poker environment has finite number of distinct states and discrete set of percepts (read cards check combinations) and actions (raise or check or bet or leave). So, its discrete.

Description:

Performance Measure: Maximizing the profit, Playing by the rules.
Environment: Players (other agents), Cards, poker-chips, audience, poker-table.
Actions: Pick cards, see cards, analyze pattern, Check, Raise, Bet, Fold, Leave.
Observations: Bluff, Straight, Flush, 2-pair, 3-pair.

2. RATIONAL AGENT VS AUTONOMOUS AGENT:

Rational agent is the one which selects an action for each possible percept sequence such that it maximizes the performance measure given built in knowledge the agent has, whereas **autonomous agent** is the one which learns and compensates for incorrect prior knowledge without any external interference. A rational agent should ideally be an autonomous agent but one seldom requires complete autonomy from the start. Important point to note is **rational agents are not completely autonomous**. Some rational agents could require external interference for achieving their goals.

3.

a. The agent **is bound to move** despite Noop option because the environment is partially observable and based on the current percept it's impossible for simple reflex agent to check whether there is dirt in other squares so usage of noop can't be justified as dirt can appear anytime and **there is no internal state in a simple reflex agent to remember.**

b. A **model based agent** can be used i.e. the agent will **maintain an internal state** that depends on percept history and can keep track of part of the world which it can't see now. So now if the agent views the world as [A, clean] [B, dirty] it can move right and clean B and since it stores [A, clean] it can use Noop to prevent from moving. It also must check in regular intervals of time as dirt can appear anytime but **model based agents can prevent vacuum from moving after all squares are cleaned.**