

Assignment-3

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1. **Atomic Representation:** In atomic representation, each state of the world is indivisible meaning there is no internal structure. The state either matches or does not match the goal state. It is more of black box (no structural details) representation. Consider a vacuum cleaner agent atomic representation will be either clean or not clean.

Factored Representation: In factored representation state of the world is represented in the form of variables which contain one or more values. Unlike Atomic representation two states can share some variables which has same values in it. Now it is much easier to turn one state to other. In a vacuum, cleaner agent factored representation will consist of position of dirt, position of the agent etc.

Structured Representation: In structured representation states are modeled as entities or objects consisting of various relationships with other entities. Unlike Atomic and Factored Representations Structured representation can indicate relationship among entities of the same state or different. In a vacuum cleaner agent, the agent can be an entity consisting of variables like position and methods like moveLeft () moveRight () suckDirt () and NoOp ().

Expressiveness (Atomic) < Expressiveness (Factored) < Expressiveness (Structured)

2. **Atomic Representation**



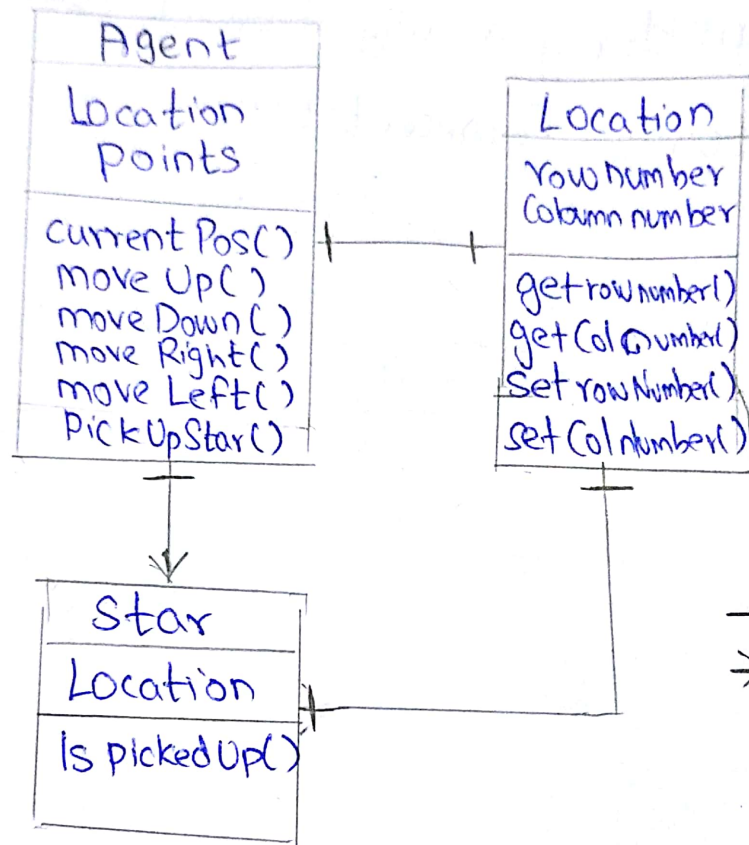
Just a black box no internal structure the agent moves from initial state picks up the stars and reaches the goal state.

Factored Representation

- Current position = {row number, column number} representing the location of the agent.
- Is Star = {T, F} Boolean attribute representing whether current location contains a star.
- Move Up = {T, F} Boolean attribute representing whether agent can move up from the current location or not. If it is in top most row can't move up hence false.
- Move Left= {T, F} Boolean attribute representing whether agent can move left from the current location or not. If in left corner then can't move left hence false
- Move Right= {T, F} Boolean attribute representing whether agent can move right from the current location or not. If it is right corner then can't move right hence false.
- Move Down = {T, F} Boolean attribute representing whether agent can move down from the current location or not. If agent is in the down most row then can't go down hence false.
- Pick up star = {T, F} Boolean attribute representing whether the agent has picked up the star or false if none exists.

- Total Points = any float value represents the total points the agent has gained in the game
- Goal = {T, F} Boolean variable representing whether agent has achieved the goal of picking up all stars or not.

STRUCTURED REPRESENTATION



- - one
 > - one or more

An agent is in one particular location
 An agent can pick up multiple stars
 A star belongs to one particular location