

Problem Formulation:

<https://en.wikipedia.org/wiki/FreeCell>

1. States: What do the states of the game look like?

The states of the game are each of the eight card stacks, which contain zero or more cards, and the order of these cards. Free cell spots are empty or contain one card. Foundation piles are empty but fill up with cards, with the highest placed card visible. In the starting state, there are seven cards in four of the card stacks and six cards in the remaining four card stacks. We assume that agent will place cards in the first open freecell or empty tab, in order to reduce the state space.

2. Actions: What possible actions can the agent take given a game state?

The agent's possible actions are as follows:

1. Move one card from the top of a stack to another stack, given it does not violate the game's rules (color and number).
2. Move one card to an empty freecell
3. Move one card from an empty freecell to a stack
4. Move one card from a freecell to its respective foundation pile
5. Move a card from the top of one of the stacks onto its respective foundation pile

3. Transition Model: What connects two states together. Describe how each action modifies the game state.

Each action connects the states together. There are up to five successor states that can happen from the results of performing that action.

Each of the five actions change the environment by placing the cards in new locations.

4. Goal Test: What does the winning state look like? How many are there?

Are all of the foundation piles filled? Are there any cards left in the free cells or stacks?

The goal or winning state is when each king is on top of its foundation pile. There is only one winning state, the foundation piles have to be filled and the free cell and card stacks are empty.

5. Path Cost: Assume that the cost to move a card is 1.

Performance Measure

Environment

Fully Observable

Single-agent

Static

Sequential

Discrete

Known

Actuators:

Controller object that allows it to work with the model

Sensors:

A precept of the given board state