Example 4: Vacuum World

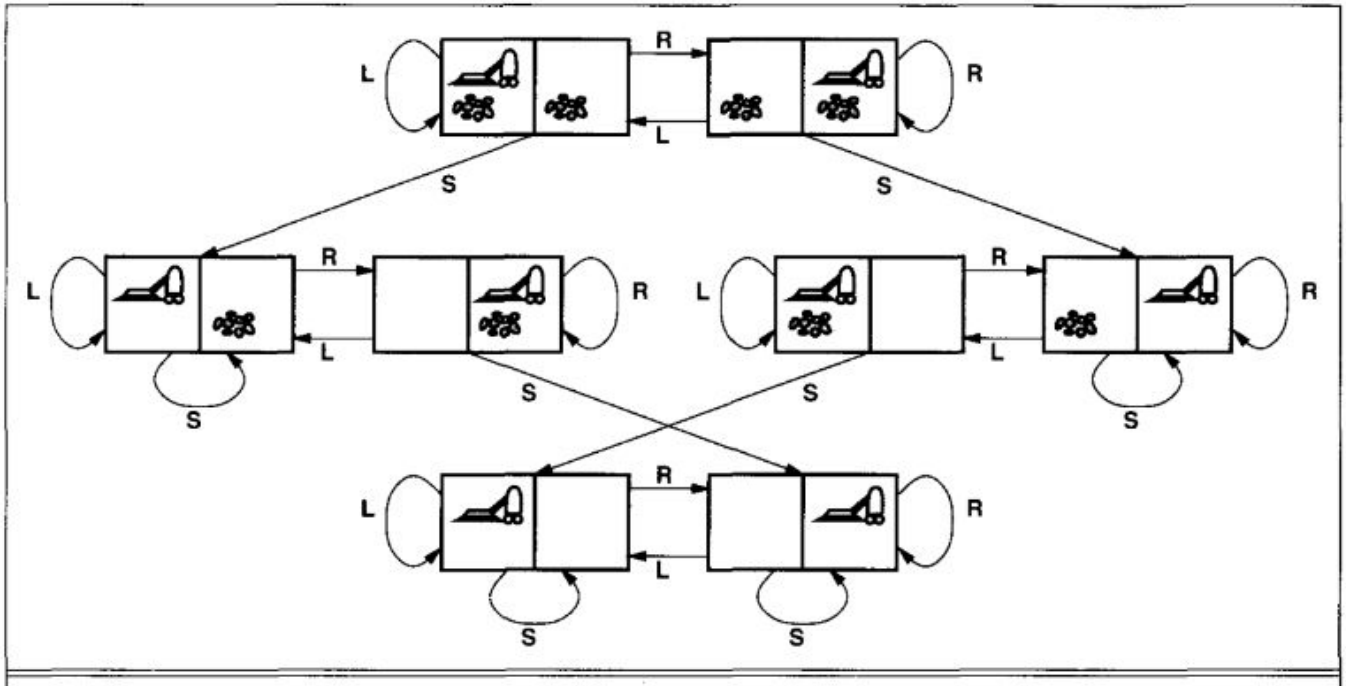


Figure 3.6 Diagram of the simplified vacuum state space. Arcs denote actions. L = move left, R = move right, S = suck.

Example 4: Vacuum World : Solution

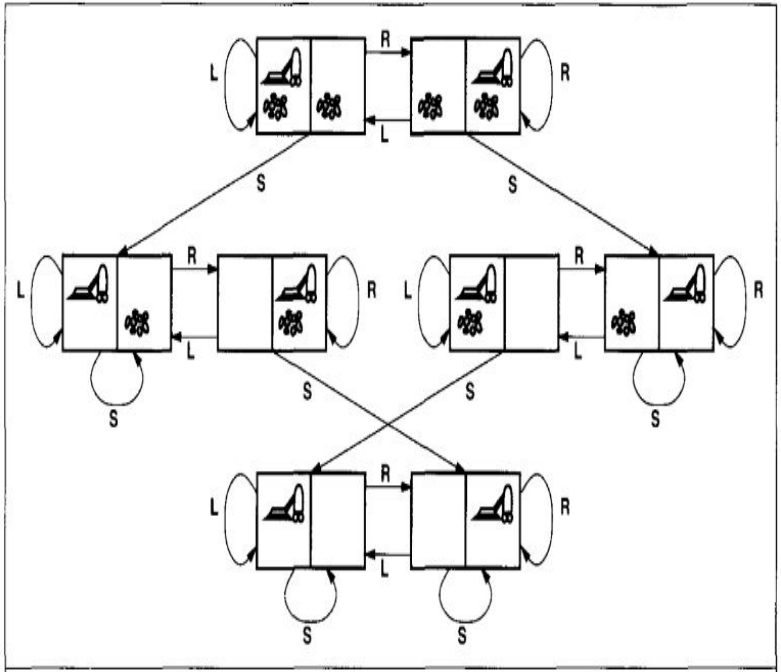


Figure 3.6 Diagram of the simplified vacuum state space. Arcs denote actions. L = move left, R = move right, S = suck.

Initial State: Given in diagram

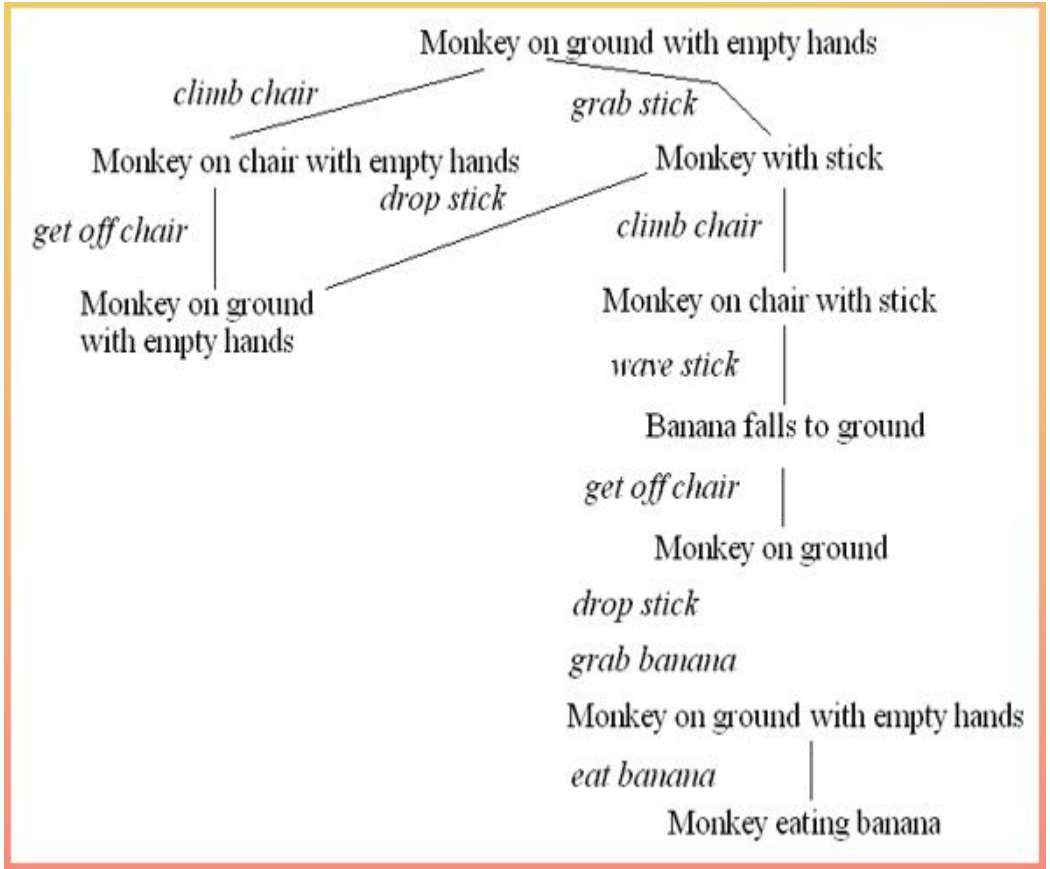
States: one of the eight states shown in Figure 3.6

Actions: move left, move right, suck.

Goal test: no dirt left in any square.

Path cost: each action costs 1.

Example 5: Monkey Banana Problem



- A monkey is in cage and bananas are suspended from the ceiling, the monkey wants to eat a banana but cannot reach them.
- There is a chair and stick in the room
- If the monkey stands on the chair and waves the stick, he can knock a banana down to eat it.
- What are the actions the monkey should take?

Example 5: Monkey Banana Problem

- A monkey is in cage and bananas are suspended from the ceiling, the monkey wants to eat a banana but cannot reach them.
- There is a chair and stick in the room
- If the monkey stands on the chair and waves the stick, he can knock a banana down to eat it.
- What are the actions the monkey should take?

Solution

Initial State: monkey on ground with empty hand, banana suspended

Goal State: monkey eating banana

Actions: climb chair, get off the chair, grab, wave, eat

Example 6 : Water Jug Problem

Gallons in the 4-gallon jug	Gallons in the 3-gallon
0	0
0	3
3	0
3	3
4	2
0	2
2	0

You are given two jugs, a 4-liter one and 3-liter one. Neither has any measuring markers on it. There is a pump that can be used to fill the jugs with the water. How can you get exactly 2-liters of water into 4-liter jug.

Example 6 : Water Jug Problem: Solution

Gallons in the 4-gallon jug	Gallons in the 3-gallon
0	0
0	3
3	0
3	3
4	2
0	2
2	0

Initial State : (0,0)
Goal State : (2,0)
Path Cost : 1 for each step
Actions : Fill the jug, pour water from jug
States : (0,3), (3,0),(3,3), (4,2), (0,2), (2,0)

Example 7: Water Jug Problem

We have 2 jugs, a 5 gallon and the other 3 gallon with no measuring marker on them. There is endless supply of water through tap. Our task is to get 4-gallon of water in the 5-gallon of jug.

Example 7: Water Jug Problem: Solution

5-g jug	3-g jug
0	0
5	0
2	3
2	0
0	2
5	2
4	3
4	0

We have 2 jugs, a 5 gallon and the other 3 gallon with no measuring marker on them. There is endless supply of water through tap. Our task is to get 4-gallon of water in the 5-gallon of jug.

Solution

Initial State: (0,0)
Goal State: (4,0)
Path Cost: 1 for each step
Actions: fill the water, pour the water.
States : (5,0), (2,3), (2,0), (0,2), (5,2), (4,3), (4,0)

Example 7: Water Jug Problem: Solution

5-g jug	3-g jug
0	0
0	3
3	0
3	3
5	1
0	1
1	0
1	3
4	0

We have 2 jugs, a 5 gallon and the other 3 gallon with no measuring marker on them. There is endless supply of water through tap. Our task is to get 4-gallon of water in the 5-gallon of jug.

Solution

Initial State: (0,0)
Goal State: (4,0)
Path Cost: 1 for each step
Actions: fill the water, pour the water.
States :