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1. **Define the problem as state space search (initial state, goal states, and operators)**

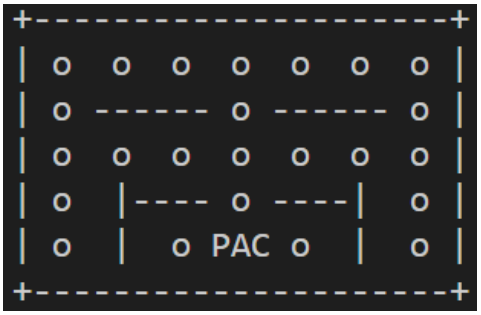
This Pac-Man game is a 5x7 maze consisting of pellets, walls and Pac-Man ofcourse. Pac-Man can move to spaces to eat pellets, but he cannot move to a space without a pellet, he cannot move diagonally and cannot go over walls. The objective of this game is to find a path for Pac-Man to eat as many pellets as possible according to the rules.

States:

A state in this problem represents where the Pac-Man is currently legally positioned and how many pellets have been eaten.

Initial State:

Initial state represents the start of the game where Pac-Man has not moved or ate any pellets.



Goal States:

Goal state represents the state where Pac-Man eats as many pellets as possible legally. There could be multiple goal states in this problem.

Operators:

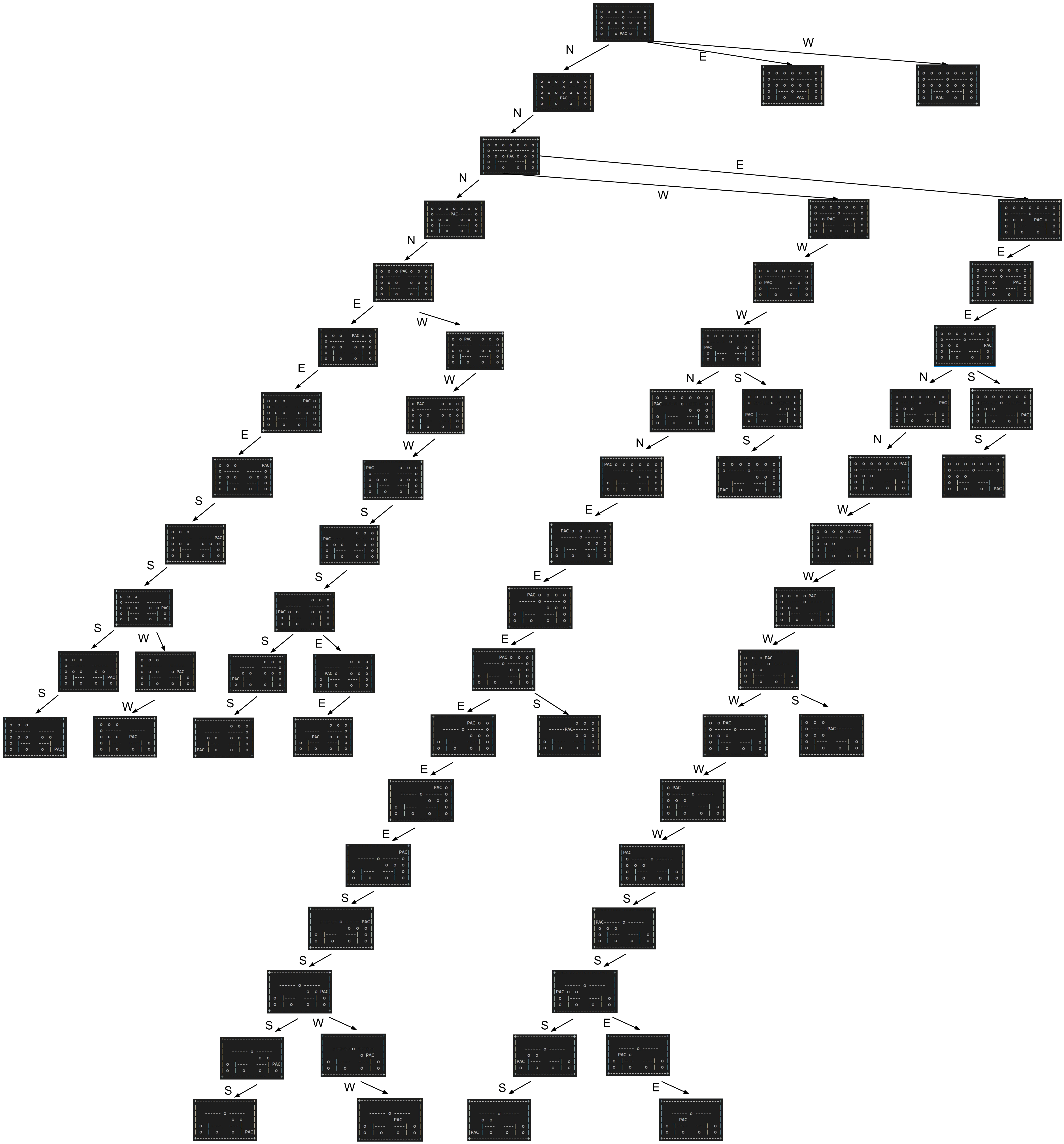
N: Pac-Man moves North/Up to eat a pellet.

E: Pac-Man moves East/Right to eat a pellet.

S: Pac-Man moves South/Down to eat a pellet.

W: Pac-Man moves West/Left to eat a pellet.

2. **Draw the complete state space**

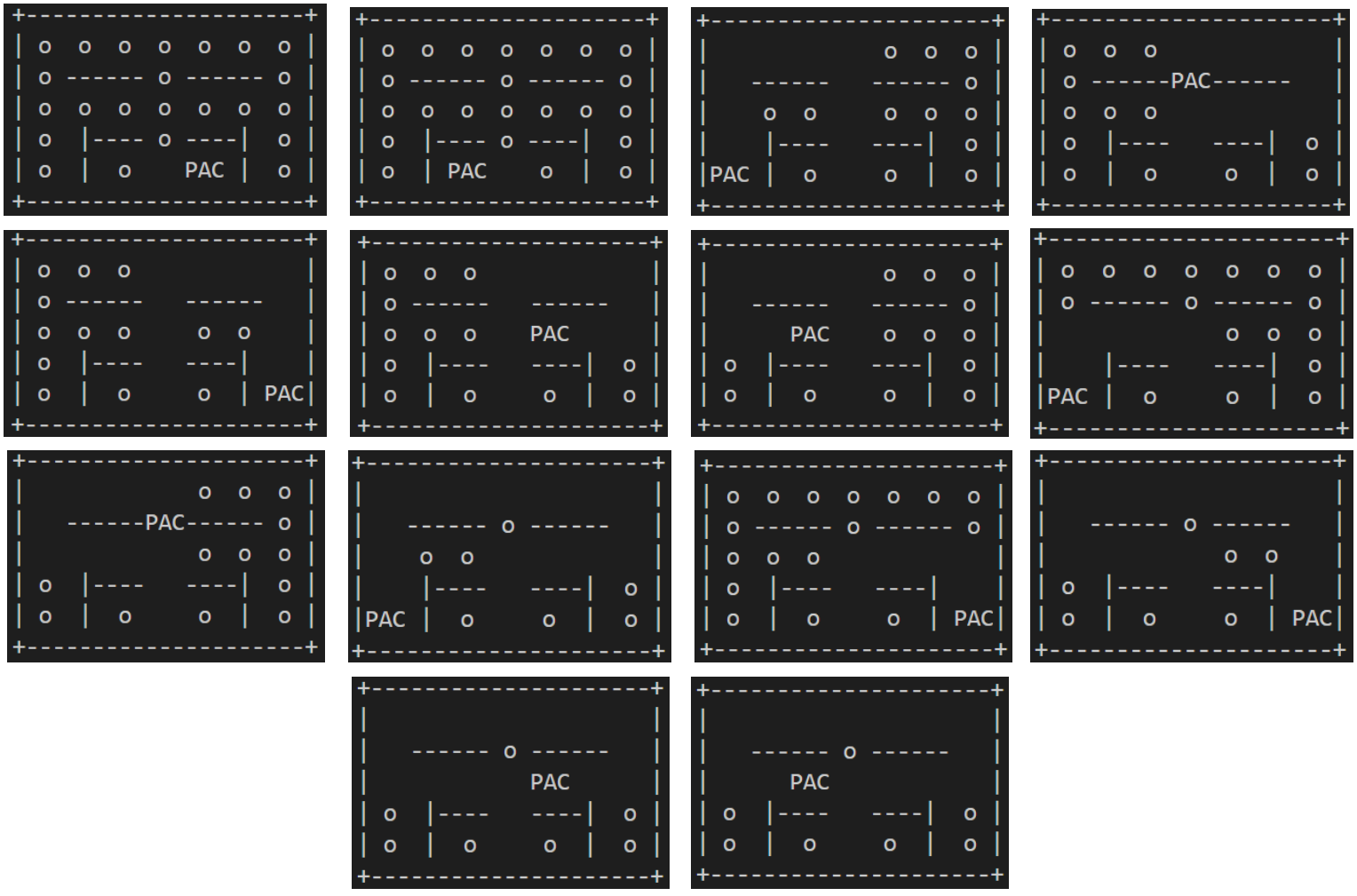


3. Find all solutions with the fewest remaining pellets in the maze.

The solutions with the fewest remaining pellets in the maze are seen below. These solutions which are represented by states are equally effective because Pac-Man eats 17 pellets and leaves 7 behind in all of these paths.

4. Find all terminal states.

A terminal state represents a state where Pac-Man is unable to move legally according to the rules. The terminal states are seen below.



State Space Numbers:

Size of state space:

- Total number of States: **65**
- Total number of Arcs: **64**

Number of solutions with fewest remaining pellets in the maze: **4**

Number of terminal states: **14**