Part 1 Extra Solutions

Example 1

Performance Measure	Time spent in maze
Environment	Walls
Actuators	Wheels
Sensors	Depth sensor

Partially Observable	The agent cannot see the entire maze at the same time.
Single Agent	The agent is the only one in the environment.
Deterministic	Only the moves the agents makes affect the environment state.
Sequential	Current moves affects the agent's future position
Static	The maze does not change while the agent deliberates
Continuous	The agent could be at any position in the maze.
Known	The agent knows how move actions affect its future position.

Simple Reflex Agent	IF wall ahead THEN turn right IF no wall ahead THEN go straight
Model-Based Reflex Agent	Build a map of the maze as we explore. Explore new squares that are adjacent to previously explored squares.
Goal-Based Agent	Achieve a goal of exiting the maze.
Utility-Based Agent	Utility function finds a tradeoff between finding solution quickly and finding the shortest solution.

Example 2.

Step 0: Frontier: Sud(f=300, g=0, h=300, -)

Step 1: Frontier: Bar(f=320, g=200, h=120, Sud)
NB(f=400, g=150, h=250, Sud)

Step 2: Frontier: NB(f=400, g=150, h=250, Sud)
Tor(f=425, g=325, h=100, Bar)

Step 3: Frontier: Tor(f=425, g=325, h=100, Bar)
OH(f=650, g=450, h=200, NB)

Step 4: Frontier: Pet(f=425, g=425, h=0, Tor)

Explored:
Sud(f=300, g=0, h=300, -)
Bar(f=320, g=200, h=120, Sud)
NB(f=400, g=150, h=250, Sud)
Tor(f=425, g=325, h=100, Bar)

Step 4: Frontier: Pet (f=425, g=425, h=0, Tor)
Kin (f=600, g=500, h=100, Tor)
Ott (f=650, g=450, h=200, NB)

Step 5: Goal state achieved.

Path: Sud → Bar → Tor → Pet

Cost: 425

Example 3.

Consider node n and successor n'

$$h(n) = |lat(n) - lat(goal)|$$
$$h(n') = |lat(n') - lat(goal)|$$

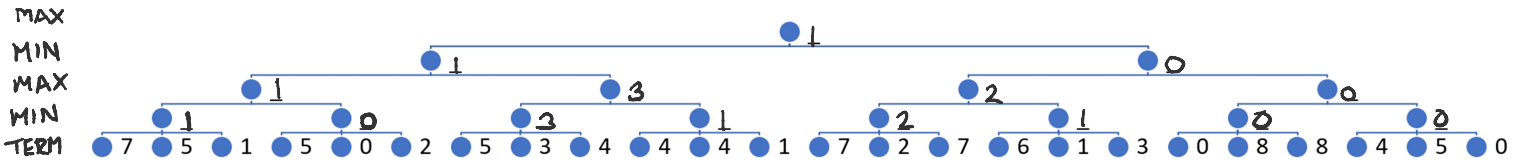
$$\begin{aligned} h(n) - h(n') &= |lat(n) - lat(goal)| - |lat(n') - lat(goal)| \\ &\leq |lat(n) - lat(n')| \\ &\leq Distance(n, n') \\ &\leq cost(n, n') \end{aligned}$$

Thus, $h(n) \leq cost(n, n') + h(n')$

Clearly, $h(goal) = |lat(goal) - lat(goal)| = 0$

Example 4.

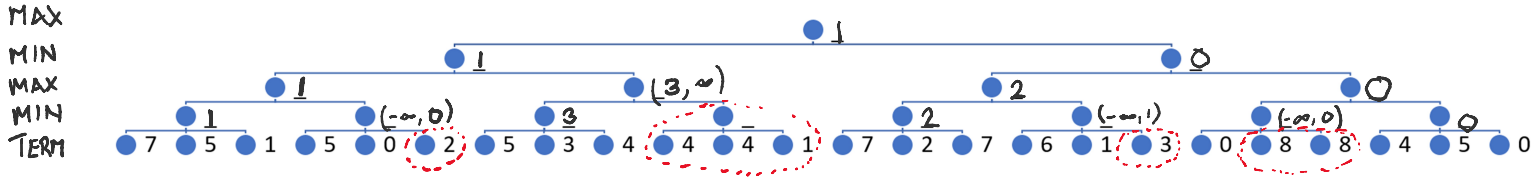
a)



Optimal move: left

Minimax score of root: 1

b)



Optimal move: left

Minimax score of root: 1

8 nodes pruned.