Arda Şafak PARLAR
20050111043

2.1.Initialization solving the maze A algorithm finding the path resulting

2.2. Answer= 4

2.3.a The key difference between the Manhattan distance and Euclidean distance is how they measure distance
2.3.b Manhattan distance
2.3.c Because we are working in a grid-based environment

2.4.a Exploration Strategy,Use Cases:
2.4.b Because it uses an informed search strategy.
2.4.c A* search
2.4.d the "better" algorithm depends on the problem's characteristics and for this problem A* search is better

Manhattan Heuristic Function

2.5.a The Manhattan heuristic is typically beneficial in grid-based environments, particularly when movement is constrained to horizontal and vertical paths.
2.5.b The Manhattan heuristic is viewed as optimistic because it tends to underestimate the actual cost.
2.5.c The Manhattan heuristic can yield optimal outcomes for A* search in grid-based environments where movement is limited to horizontal and vertical directions, and in this context, it can be considered optimistic.
2.5.d Indeed, the Manhattan heuristic accurately models the cost of movement in such settings, avoiding overestimation, and it enables A* to efficiently discover the optimal path.

Euclidean Heuristic Function

2.5.a The Euclidean heuristic is useful in continuous or unobstructed environments where diagonal movements are allowed
2.5.b The Euclidean heuristic can be seen as overly positive when diagonal movements are possible, as it gives a lower estimate of the actual distance. Nevertheless, it might be too negative when the environment has obstacles that restrict diagonal movement, causing it to overestimate the distance in such situations.
2.5.c When applied correctly, the Euclidean heuristic can yield optimal outcomes in A* search, particularly in scenarios where diagonal movements are permitted, and the environment is continuous. It effectively directs A* in its quest to discover the shortest path.
2.5.d The Euclidean heuristic proves its worth when diagonal movements are permitted since it offers a more precise estimate of distances. This heuristic is particularly effective in situations where the optimal path includes substantial diagonal movement, making it a valuable option for A* search in such specific cases.

Manhattan Heuristic Function

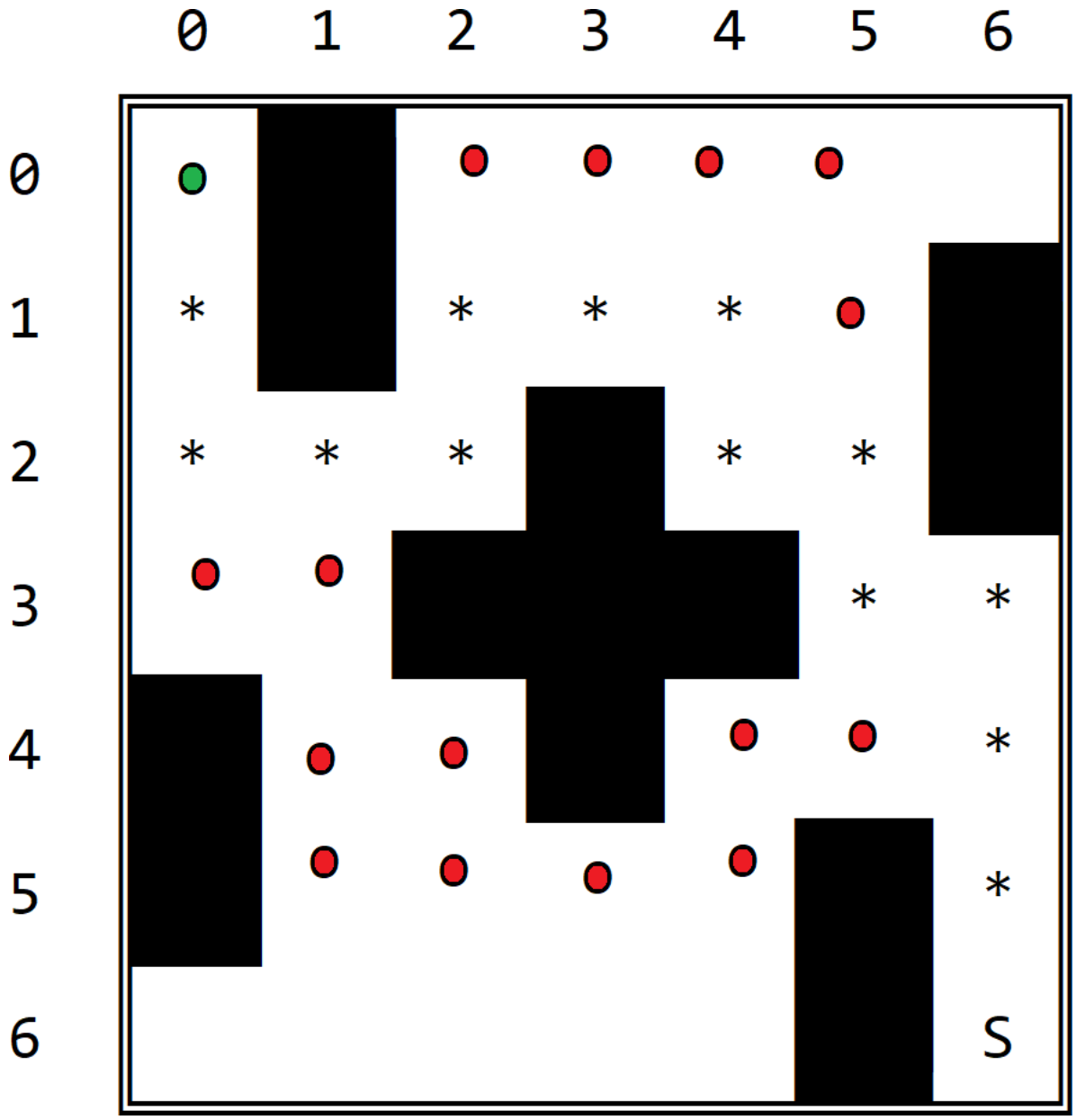
2.6.a The Manhattan heuristic is admissible. An admissible heuristic never overestimates the actual cost of reaching the goal from any given state, and the value is always less than or equal to the true cost, which is why it is considered admissible.

2.6.bThe Manhattan heuristic is also consistent. It satisfies this condition because in a grid-based environment with only horizontal and vertical movements, the cost of moving from one state to another is always equal to 1. This consistency property further enhances its effectiveness in guiding A* search to find the optimal path efficiently.

Euclidean Heuristic Function

2.6.aThe Euclidean heuristic can be admissible, but its admissibility depends on the specific context. It can become inadmissible if there are obstacles that block diagonal movement since it might then overestimate the true cost, making it unsuitable in such situations.

2.6.b The Euclidean heuristic is typically consistent when diagonal movements are allowed without obstructions. However, when obstacles restrict diagonal movement, the heuristic can become inconsistent because it overestimates the true cost when diagonal paths are blocked.


0 1 2 3 4 5 6
0
1
2
3
4
5
6
S