Part 1 a)

The agent doesn’t know which cells are blocked when it starts to find the path.

If it has full knowledge of the maze, then the best path is to the North and then go around

the obstacle.

Since the agent doesn’t know, it has four options South, West, North and East. The first

step in A\* will be towards the shortest unblocked path.

It cannot go South as E2 is the bottom cell.

The manhatten distance from the neighbors are:

From North (D2) 🡪 4

From West (E1) 🡪 4

From East (E3) 🡪 2 (shortest path)

So, the first move from E2 the agent will make is to the east.

Part 1 b)

The agent will reach the goal as the number of grids is finite.

In A\*, there is a close list, so once it is expanded it will never go back to the open list.

If a cell is reachable from the start, the agent will visit them unless it is surrounded by blocked cells.

The algorithm terminates when it reaches the goal or when all the cells are visited. So, the

algorithm is guaranteed to find a solution if it is not blocked.

The worst-case scenario would be if all the cells are unblocked, and the agent start from an

unblocked cell and visit and expand all the other unblocked cells. By visiting every cell, it is

guaranteed to find the target if it is possible.

If the number of unblocked cell is ‘n’ in a certain scenario,

A\* will expand n nodes. In the worst case it will expand n nodes n times.

So, the upper limit on the moves by the agent is number of unblocked cells squared (n2)