

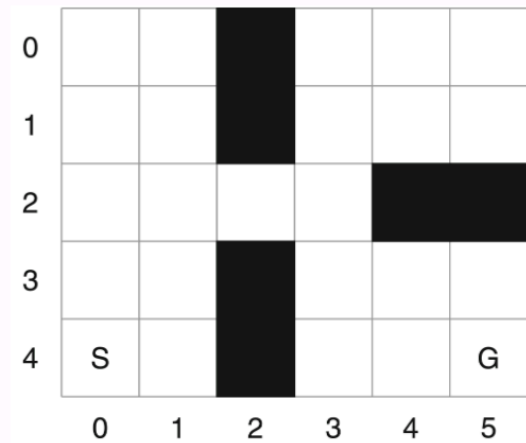
# Understanding Path Planning on **Paper**

For the paper based algorithms, you will need the files located in the Paper folder :

- ``grid1.pdf`` for the Dijkstra and A\* algorithms on paper.

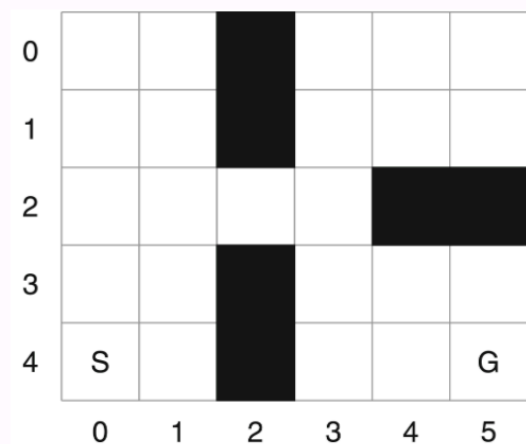
## Dijkstra's Algorithm

Apply the Dijkstra's algorithm on **paper** on the map of the Figure below using 4 neighbors (Manhattan) distance.



## A\* Algorithm

Apply the A\* algorithm on **paper** on the map using 4 neighbors (Manhattan distance) from the source for the motion cost and the Manhattan distance to the goal (without obstacles) as heuristic function.



# (Not for now, but for later exercises.)

## Path Planning in a Line-Based Map

The previous exercises were done on an occupancy grid map. The grid map is already a form of graph, and the application of the Dijkstra's algorithm or the A\* algorithm is immediate.

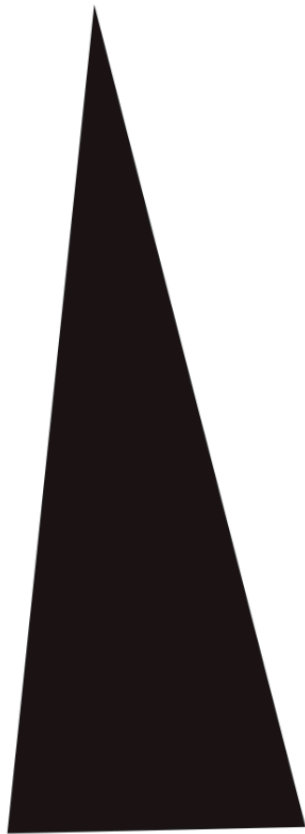
Please consider a line-based map and the whole process from graph generation, to path planning including metric information.

Apply one of the algorithms seen in the course to find the best path between the start (S) and goal (G) positions of Figure below. Use only algorithms that can be processed by a computer and show clearly each step.



Size of robot

Start 



Goal 