

# Problem: maze generation and resolution

*Credits: This problem was initially written by Florent Bouchez-Tichadou from Université Grenoble Alpes.*

## 1 Statement

Minos, king of Crete, is not happy with the new labyrinth Daedalus has invented. He comes to your team asking for a way to generate a maze **randomly** so that no one can access the blueprints. The maze will be built under the palace and should have **only one exit**, at its south-east corner. But there are many entries possible through trap doors in the palace. Knowing the man's propensity for using inventions on their creators, you decide to accept the king's request, but secretly swear to find a way to keep track of any generated maze, as well as find a way to navigate to the exit, just in case...

You realize you can build a simple maze by just **dividing the allocated space using a full wall** separating the longest dimension (not necessarily in the middle), and placing only **one door** on this wall, creating now two spaces, and then applying the same reasoning to those new spaces (see an example of such a maze on Figure 1).

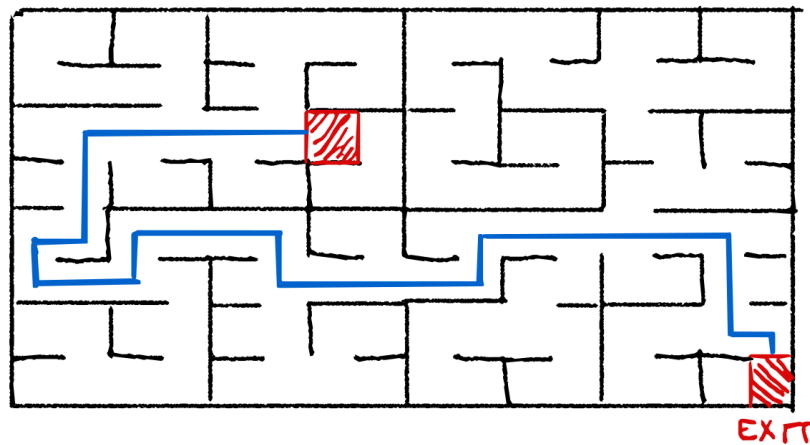


Figure 1: A maze generated using the method described in this problem, and the shortest path from a random position to the exit.

For this problem you will have to solve two issues:

1. Given the width and height of the initial area, generate a maze;
2. Find the shortest path from any position in the maze to the exit.