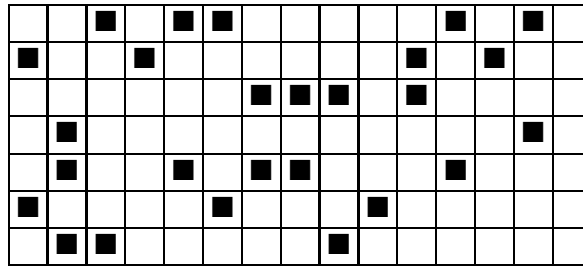


AUTOMATA

Exercise 1: *A simple robot*

A robot is programmed to move in the maze pictured below.



He enters this maze through a border (North, West, South or East) and then obeys to the following program:

A simple program.

```

1  Do
2      If the front cell is free, Then
3          Move in this cell
4      Else
5          Rotate a quarter turn clockwise
6      End If
7  Until out of the maze

```

1. Where will the robot leave the maze if he enters through the 3rd cell (from the top) of the West border?
2. Where must the robot enter the maze to leave through the 5th cell (from the left) of the South border (2 solutions)?
3. What happens if the robot enters through the 7th cell of the South border (from the left)?

Exercise 2: *A more evolved robot*

This time, the robot has a 1-bit memory! This memory can be viewed as a binary number (0 or 1) that we'll call his state. The robot still begins just at a border of the previous maze, outside the maze, and ready to enter. He now obeys the following program:

A more evolved program.

```

1  Begin with the state 0
2  Do
3      If the front cell is free, Then
4          Move in this cell
5          Change state
6      Else, If the state is 0, Then
7          Rotate a quarter turn clockwise
8      Else
9          Rotate a quarter turn anticlockwise
10     End If
11 Until out of the maze

```

1. What happens if the robot enters through the 2nd cell of the North border (from the left)?
2. What happens if the robot enters through the 8th cell of the South border (from the left)?