





## Chassis & Safety - Labyrinth plotter (a 2 axis positioning system)

### Description

Prepare a system using 2 BLDC (Brushless DC) motors that will control the movement on 2 axis (x and y).

First, the system has to detect the way through a labyrinth that will be drawn on a A3 piece of paper, carrying a pen to mark the way without crossing the walls.

Second, the system has to draw the correct solution without dead ends on a new piece of paper.

### Requirements

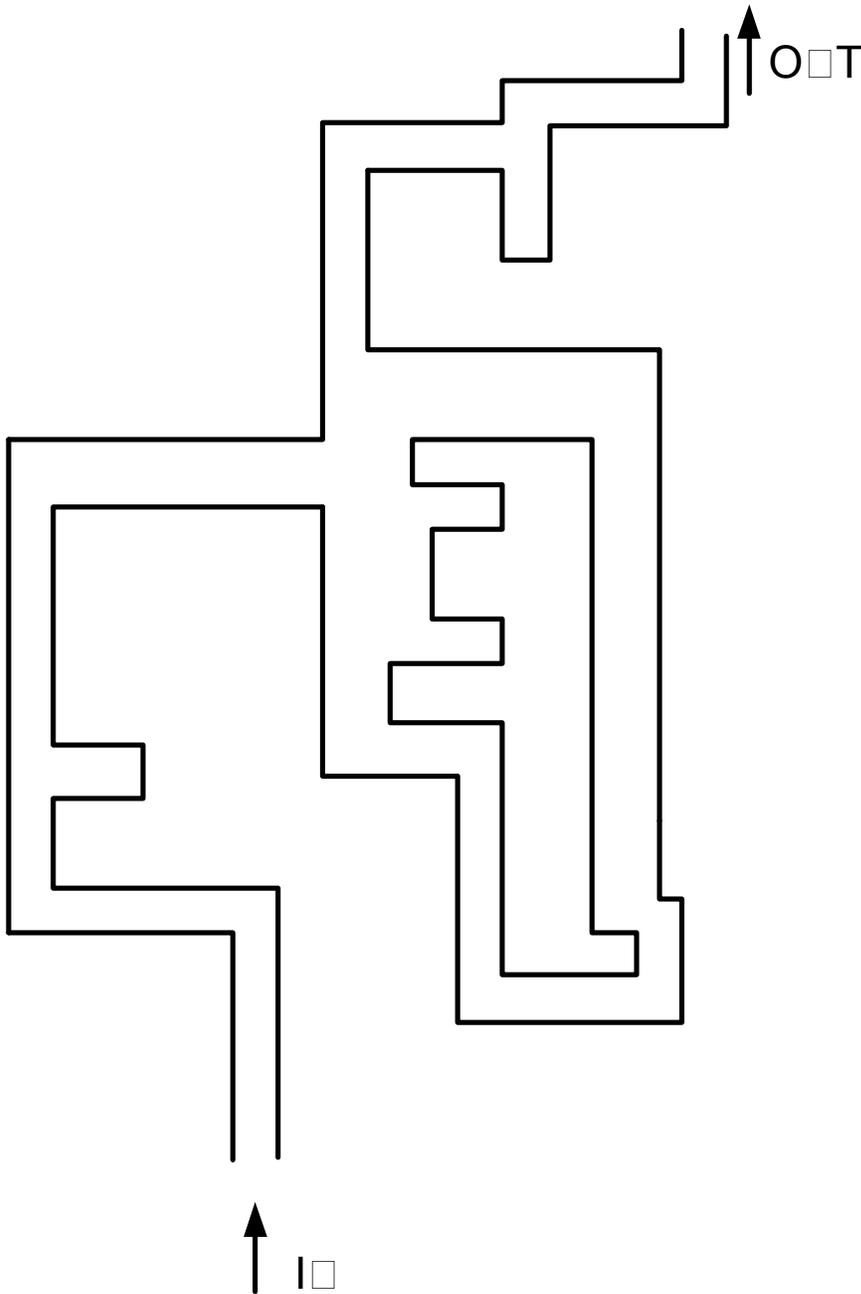
- Width of labyrinth path (white): 10 mm
- Width of wall lines (black): 3 mm
- Initial position: [10,10] lower left corner of paper, in mm
- Paper orientation is "Landscape"
- The system must carry a pen to draw the detected way in both steps
- The system must be supplied with 13.5V (13.5 V power supplies will be provided)

### Delivery content

- Design handbook is required from each discipline ( about 5 pages)
- system must be controlled by a microcontroller (no PC support is allowed)
- the pen carrier must be manufactured from zero (drawings, tolerance calculations, 3D model, assembly order etc. )
- the whole system must be available in 3D CAD environment (STP or IGS)
- an explosion drawing for the complete system must be available on A1 or A0
- BOM must be also included in this drawing
- A Matlab model for motor control is required
- For the electronic control circuit developed, a design report must be available showing the calculations for components, simulations, worst case analyses

### Recommendations

- the goal is to go as fast as possible. crossing a wall will cause a penalty to the time
- recommendation: 3 people must be included (at least) in your group (HW, SW, MD)
- the maximum time for finding the solution: tbd



Example of the labyrinth given to explore