

VIDEO LINK: <https://vimeo.com/319060537>

Introduction

A tilt maze, that must be beat within a certain period of time. We achieve this by using a motion sensor to detect the ball at a certain point, both starting a timer and opening two gates that the user must make it past before the timer runs out. If the timer runs out, the gates close and the user must navigate back to a certain point in the maze to trigger the motion sensor again and have another go.

Originally, the board was to be controlled by joystick that moved servos based on it's X and Y axis positions, and these servos would be attached to the nobs that currently control the maze to tilt it. While the code for this is complete and works in practice when wired up and tested with an Arduino and it's components, we found attaching it to the board in the end was not feasible, as the mechanism on the inside was too flimsy. However, the code for this is included, as well as footage of us testing.

Design Principles:

Visibility: What the user can see, and the state of the interface:

Visibility was used in our design in multiple ways, firstly, the maze has a large title stating that it is a TILT maze, and the nobs on the side, although initially made to be controlled by the joystick, are intuitive to use, and obvious in there function. Other consideration include a timer to show the user how much time they have left to pass the first part of the maze before the doors close, as well as a green light to show when the doors are open.

Feedback: Originally, the maze would tilt based on joystick input, the movement of the maze would have been the feedback. However, due to issues with the joystick implementation, the maze is controlled by hand. However, it still tilts and the user can feel resistance when turning the nobs on the side to indicate when the maze can't be titled further. Furthermore, when the sensor to start the timer and open the doors is triggered, the user can both see the doors open, and see the timer countdown. We believe this is also feedback.

Affordance: The major perceived properties are the Hole in the middle of the maze, to drop the ball into to start, as well as the nobs on the side to tilt the maze (originally was going to be via joystick).

Mapping: The controls of the final maze are two nobs, one on the length side and one on the width side. These nobs control tilting the maze on it's length axis and it's width axis respectively. The controls are intuitive and responsive once the user begins using them.

Restraints: The only interactions the user can have with the maze is to drop the ball in to start, as well as to tilt the maze via the controls to play it. We found however that the final part of the maze, when after the ball escapes the two doors controlled by servos and triggered by a motion detection was quite difficult. So we didn't cover it with acrylic, allowing the user to reset themselves if need be.