Amaze - Maze

Target Audience

For 8 - 11 years old kids

Concept and Design

- This toy is based on developing motor skills and giving an engaging experience to a kid in their growth years.

- The layout of the toy is a maze that contains a ball that needs to go to a glowing LED bulb (a typical maze in short) via rotating the maze-top using the four axles attached to servo motors at the bottom.

Design Process

- Laser Cutting: An MDF sheet was used to create the majority of the physical structure. This process was selected to give more stability to our toy. We've very small pieces in our design. Hence we used the laser cutting method.

- Arduino Programming: To manage the different components used, an Arduino MEGA was used. It gave us the 4 interrupt pins required for the Hall-sensors used in the toy.

- After the above processes, we assembled the Laser-cutted parts and with a maze-top supported by a ball and socket joint that rotates according to the four servo motors connected.

Conditional Logic

The Core concept of our 'Amaze-Maze' is to use the 'accelerometer' of a phone to wirelessly control the movement of the maze and use 'hall sensor' to detect the ball.

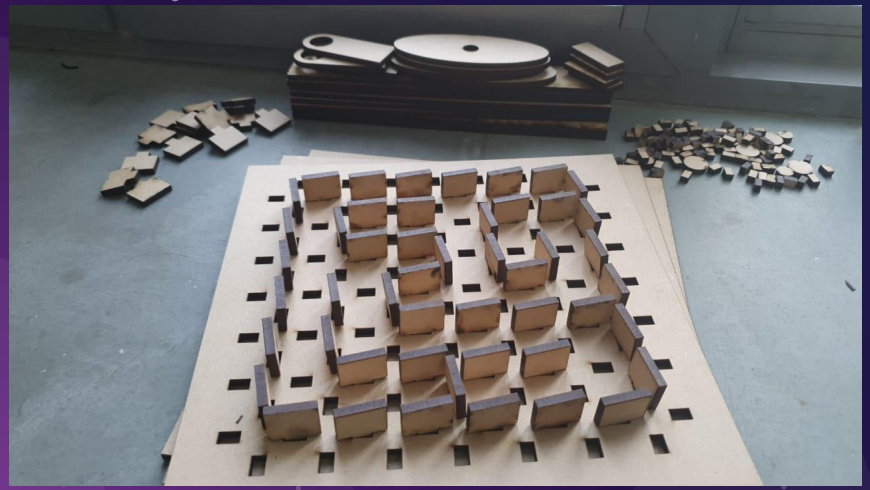
We are sending different signals corresponding to the orientation of the maze via a bluetooth module.

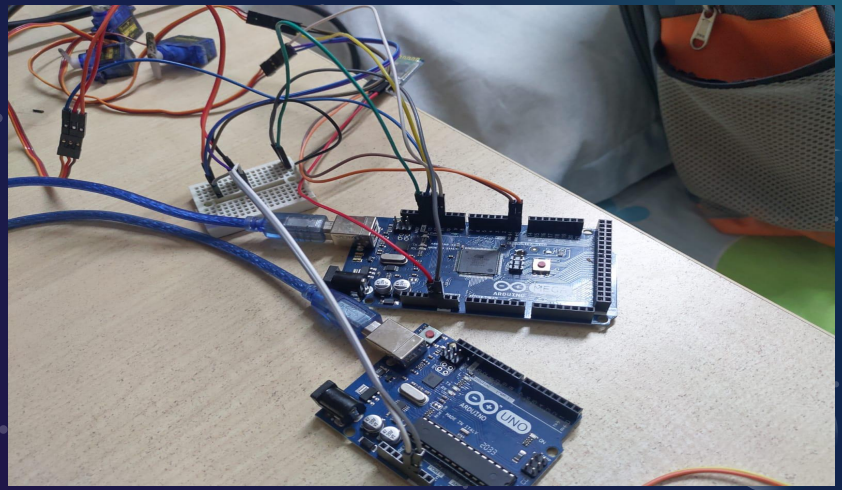
After reading the orientation through the arduino, we are rotating the motors accordingly, which eventually rotates the maze board, we are using a 'universal joint' to help the rotation.

There are four goals in our maze, each goal has a corresponding LED near it. Whichever LED glows, the player has to take the ball to that goal. The goal changes randomly. We are using a hall sensor to detect if the ball has reached the goal (we've used a magnet ball).

If the ball reaches a goal the hall sensor detects it and sends the signal to arduino, arduino checks if the goal is the correct active goal. If it is so, the arduino generates a random number(1 to 4) and then the corresponding Goal's light light's up.

Image of the model and making Process

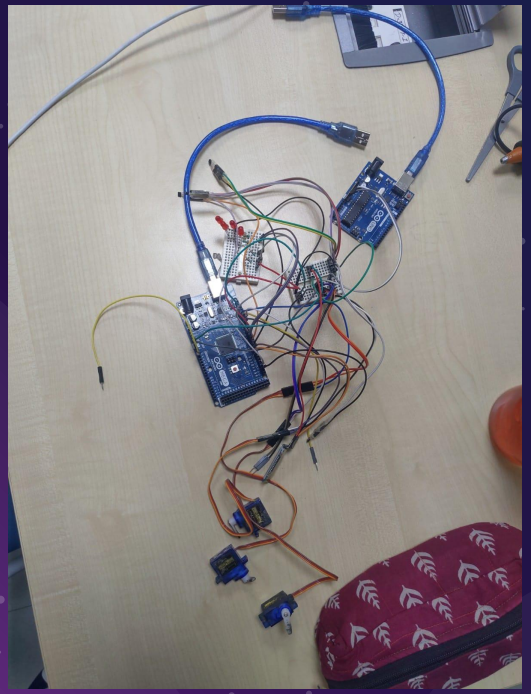




- Laser-cutting

Arduino-Programming for servo motors

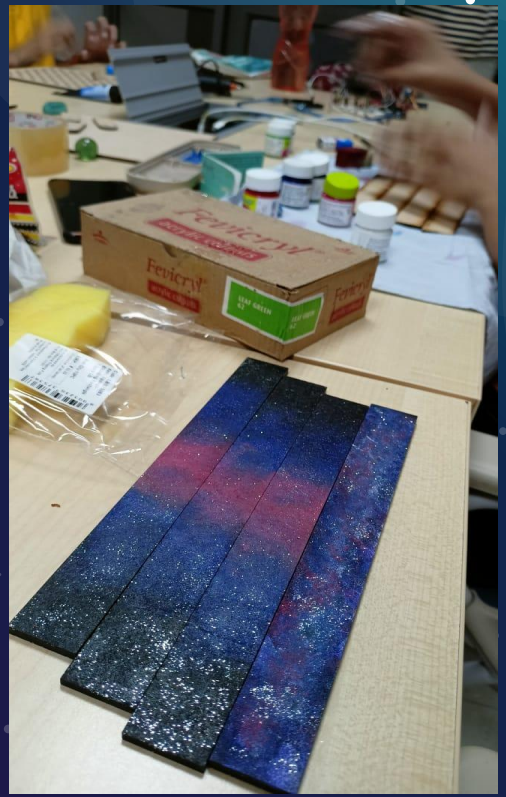
(UNO used for power only)



Programming done for servo motors, hall sensors and LEDs

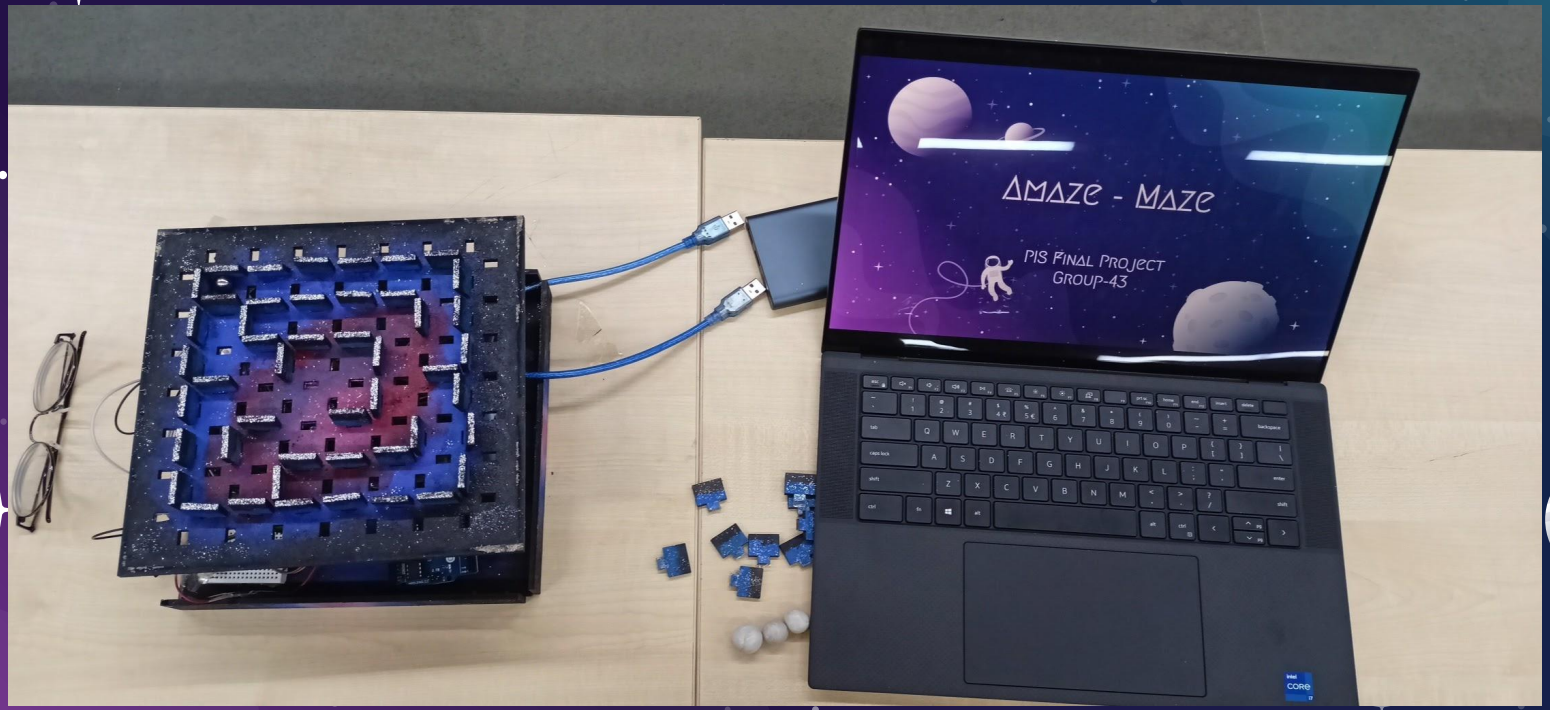
Painted base for servo motors

(4 clay-modeled motor -supporter)



Side covers painted

Final Prototype:

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PIS FINAL PROJECT
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Thank You