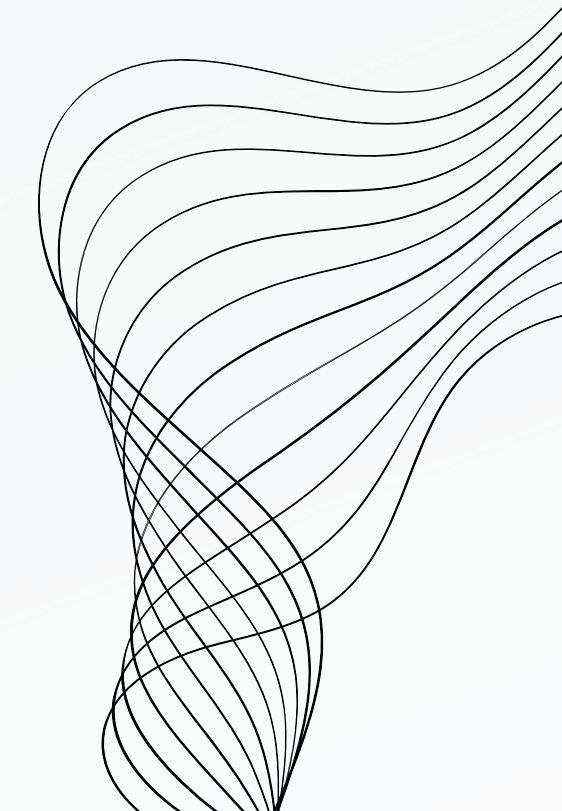


4-CONNECT
ROBOT

RAWAN ZANABET ZAINA ABUSAMRA



4-CONNECT

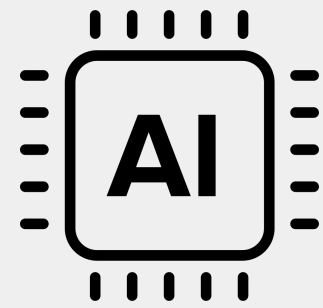
Two-player strategy game Involves dropping colored discs into a vertical grid. The first to form a sequence of four same color discs wins Game requires the player to anticipate the opponents moves.



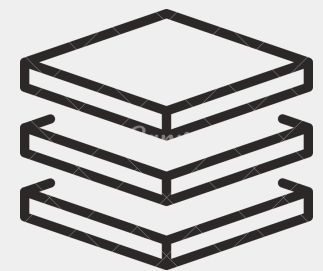
OUTLINE

- 01** PROBLEMS
- 02** SOLUTIONS
- 03** FEATURES
- 04** COMPONENTS
- 05** CONSTRAINTS
- 06** FUTURE WORK
- 07** DEMO

PROBLEMS



Lack of Engaging AI Opponents



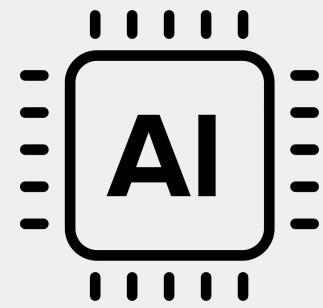
Limited Difficulty Levels



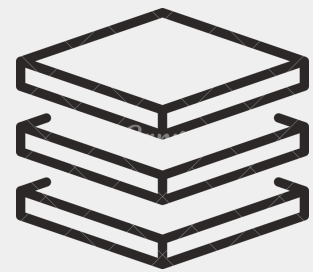
Monotonous Gameplay



SOLUTIONS



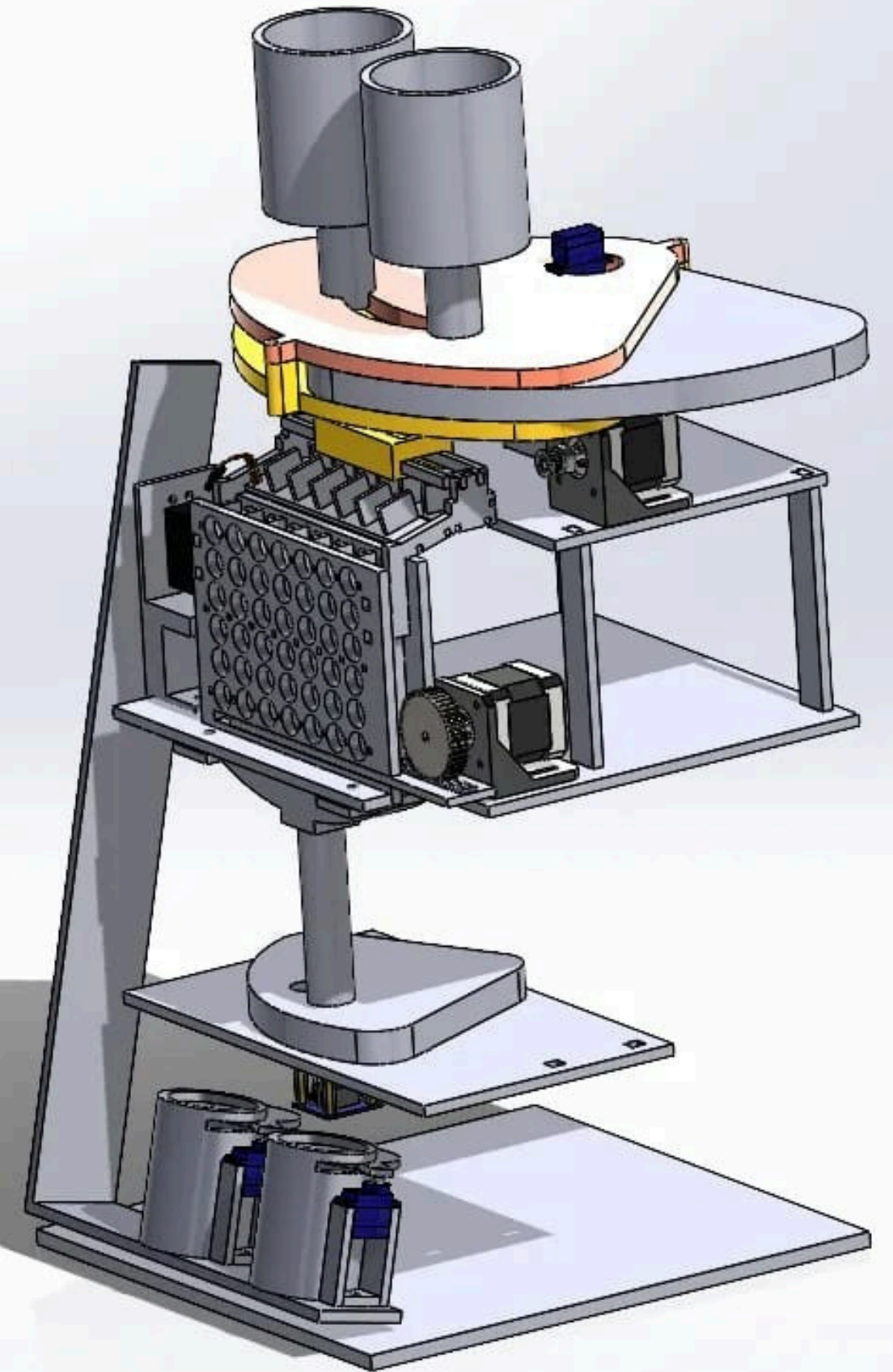
Dynamic AI with Multiple Difficulty Levels



Interactive User Experience



Innovative Gameplay Features



TWO MODES

Player vs Player

Two human players take turns dropping balls into the grid to connect four of their balls in a row and win



Player vs Computer

A solo player competes against the computer, driven by an AI algorithm, striving to achieve a four-ball connection first.

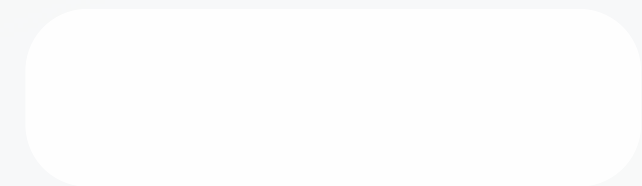
3 LEVELS

Play against the computer with three levels of difficulty - easy, medium, and hard

HARD

MEDIUM

EASY

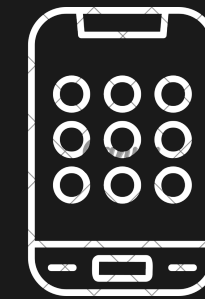


2WAYS TO PLAY



You physically drop the ball into your chosen column by hand, offering a hands-on gaming experience.

MANUAL PLAY



Utilize a keypad to pick your desired column for ball placement, with the system automating the drop.

KEYPAD PLAY



Our project is effectively divided into three main components:

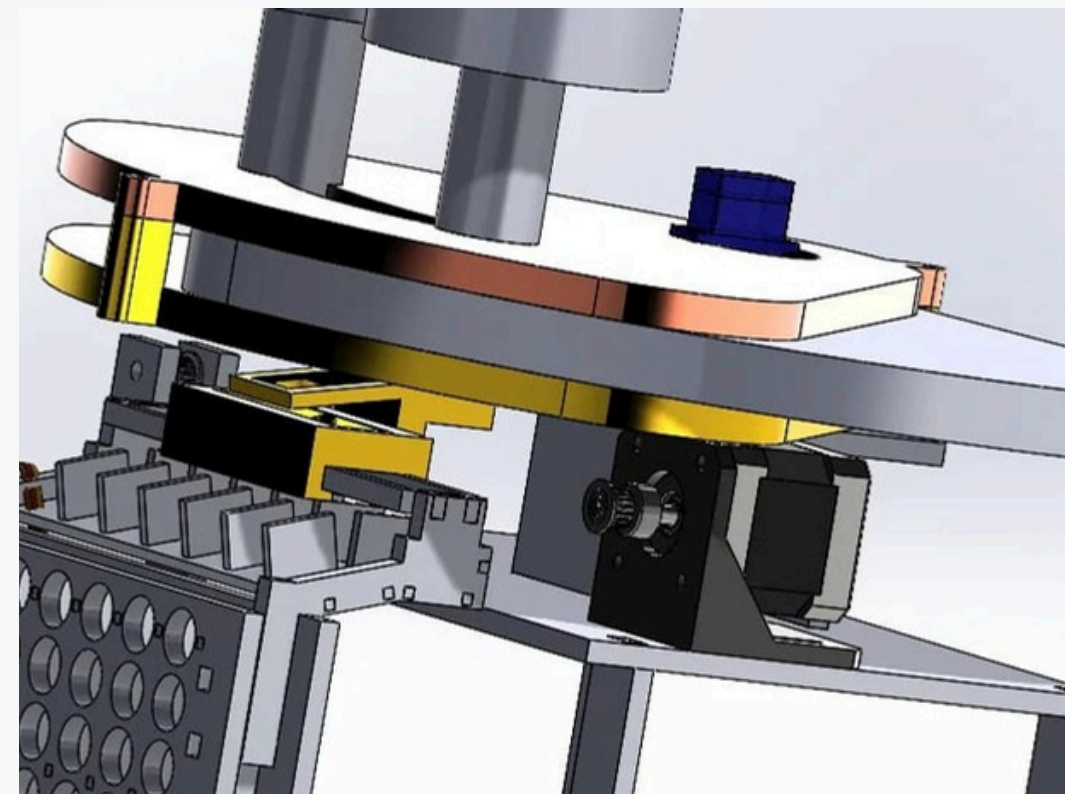
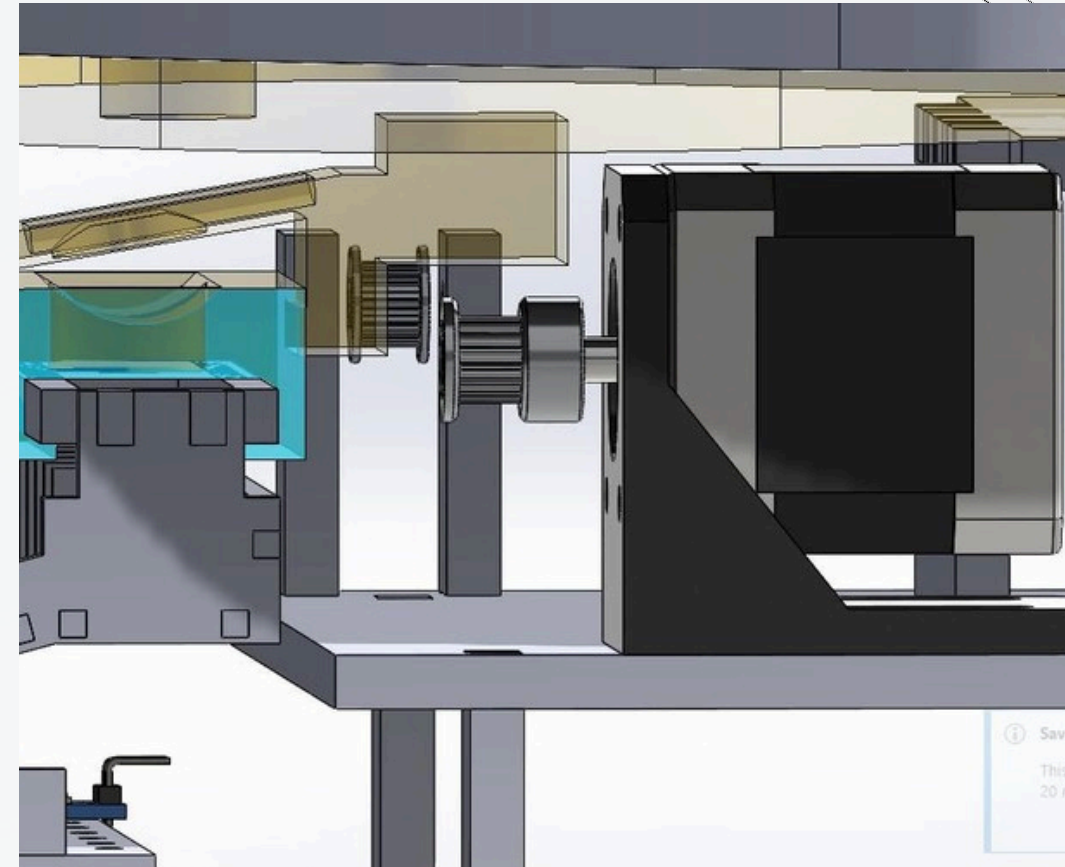
1-Game play

2-Post-game ball sorting Ball

3-return process (prepare for next round)

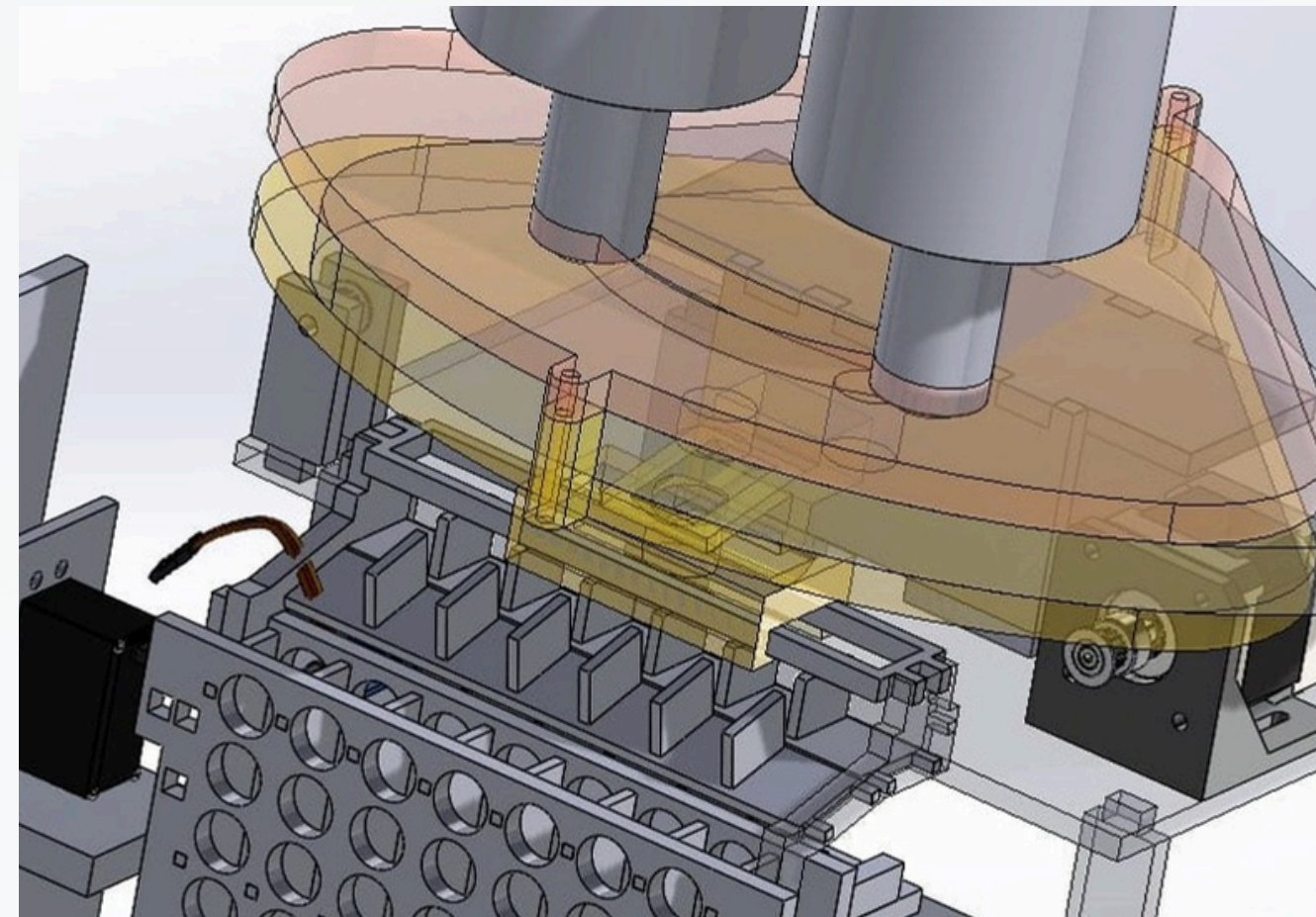
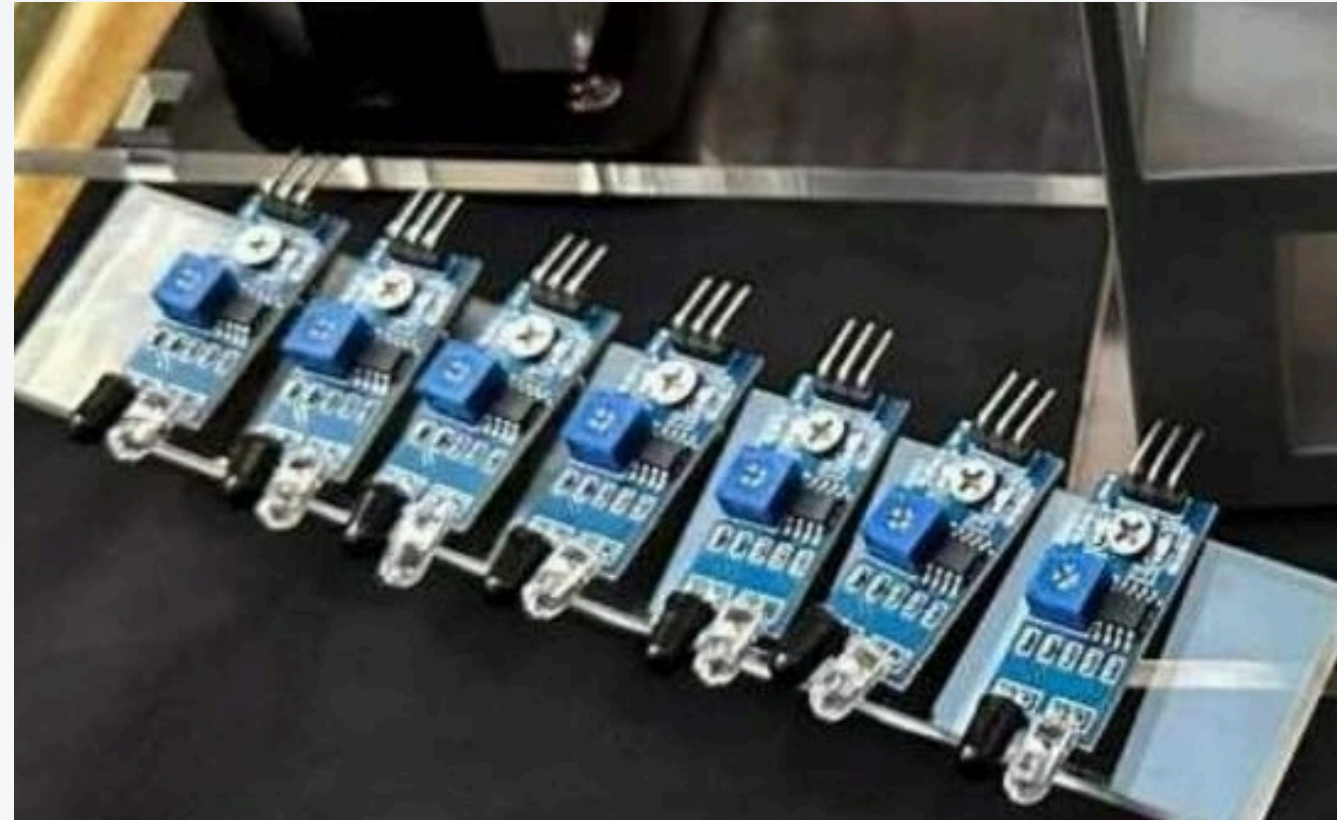
MAIN PART

- A stepper motor pulls a belt to ensure accurate ball placement upon descent.
- Next, a ball is released from the upper cups to the chute using a servo motor.



IR Sensor

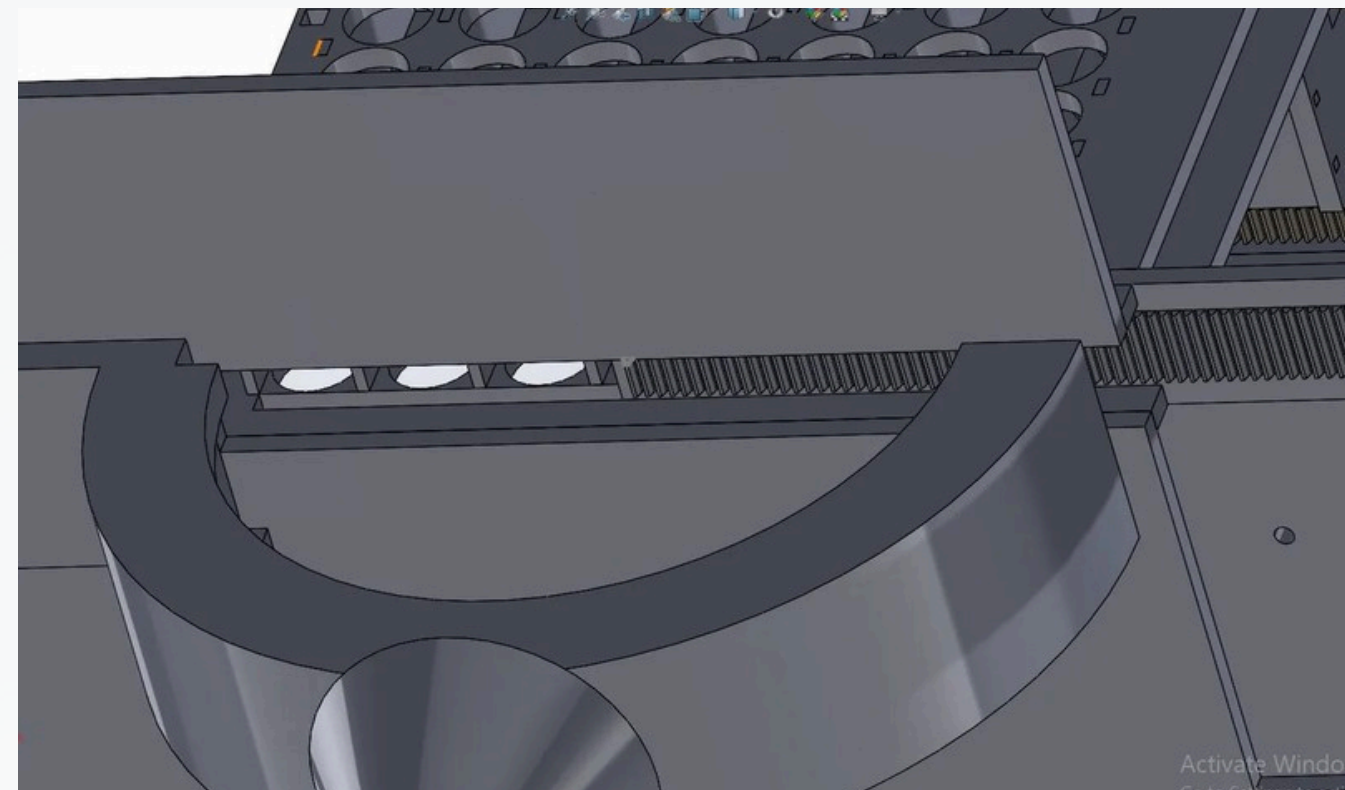
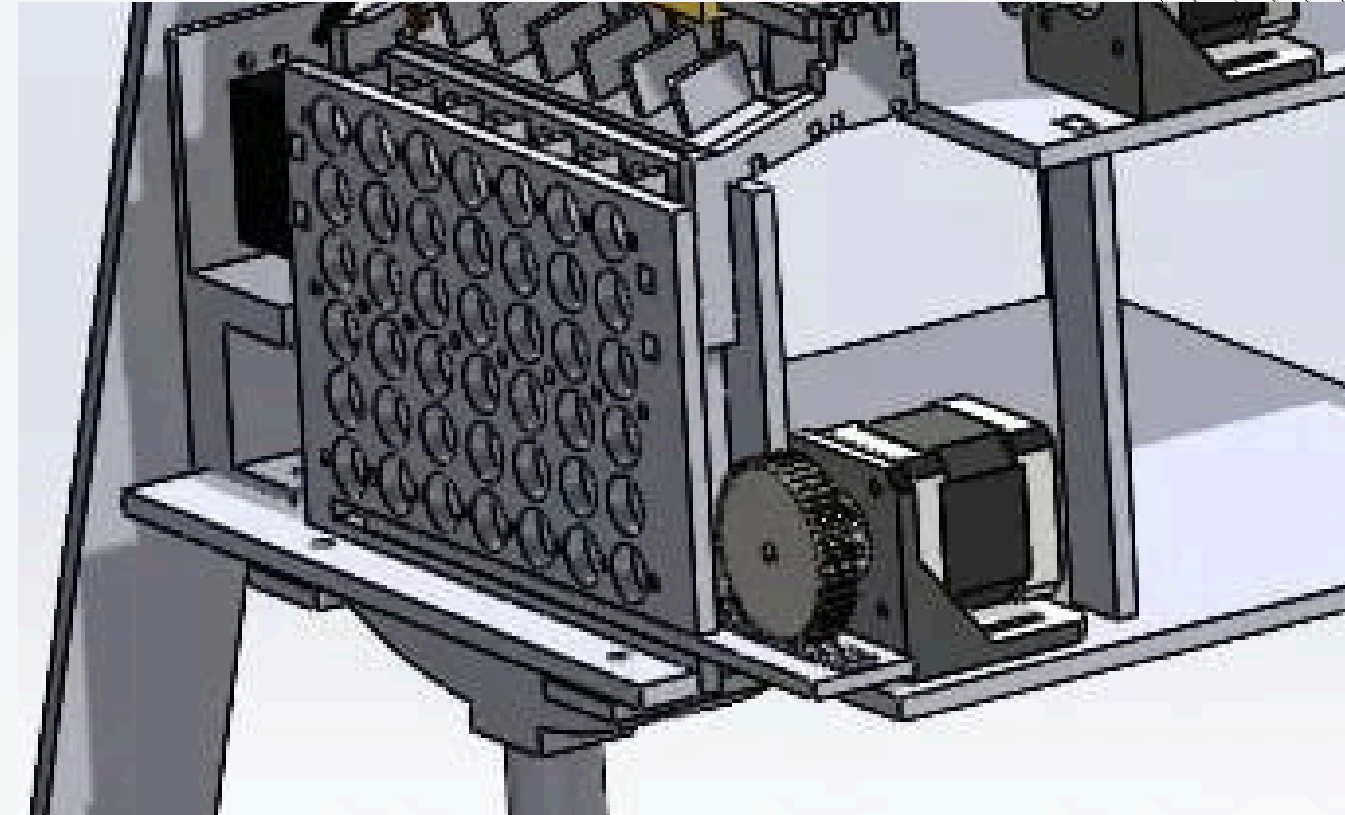
- Seven IR sensors were utilized to determine the column into which the ball has fallen.



Feature 1: Classification

Stepper Motor 2

- This stepper motor pulls the grid-closing piece from below, one column at a time.
- Balls from the first column drop into a funnel, guiding them to another opening in a triangular piece that holds the ball.

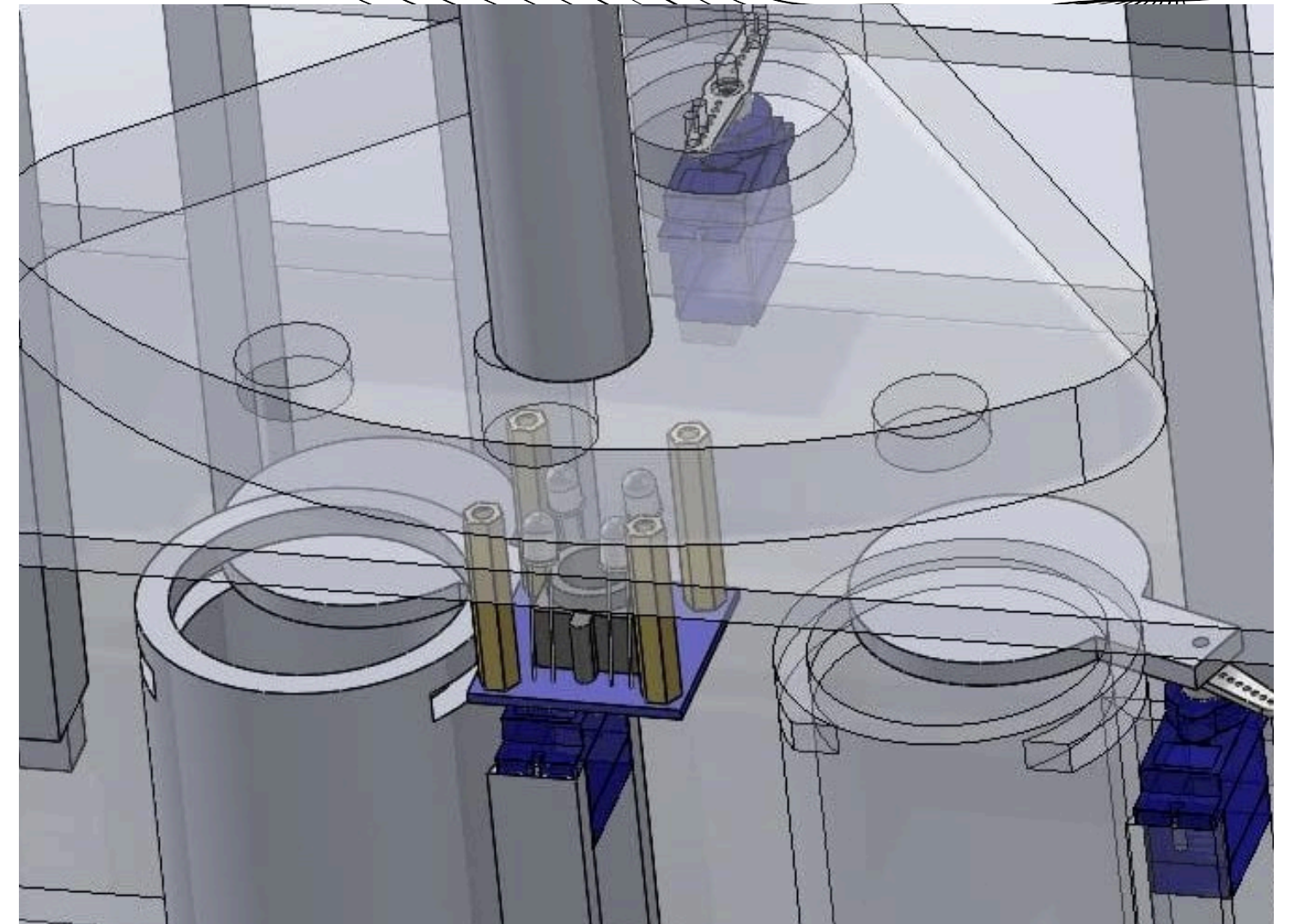


Color Sensor

- This sensor identifies the color of the ball while it's inside the triangular piece.

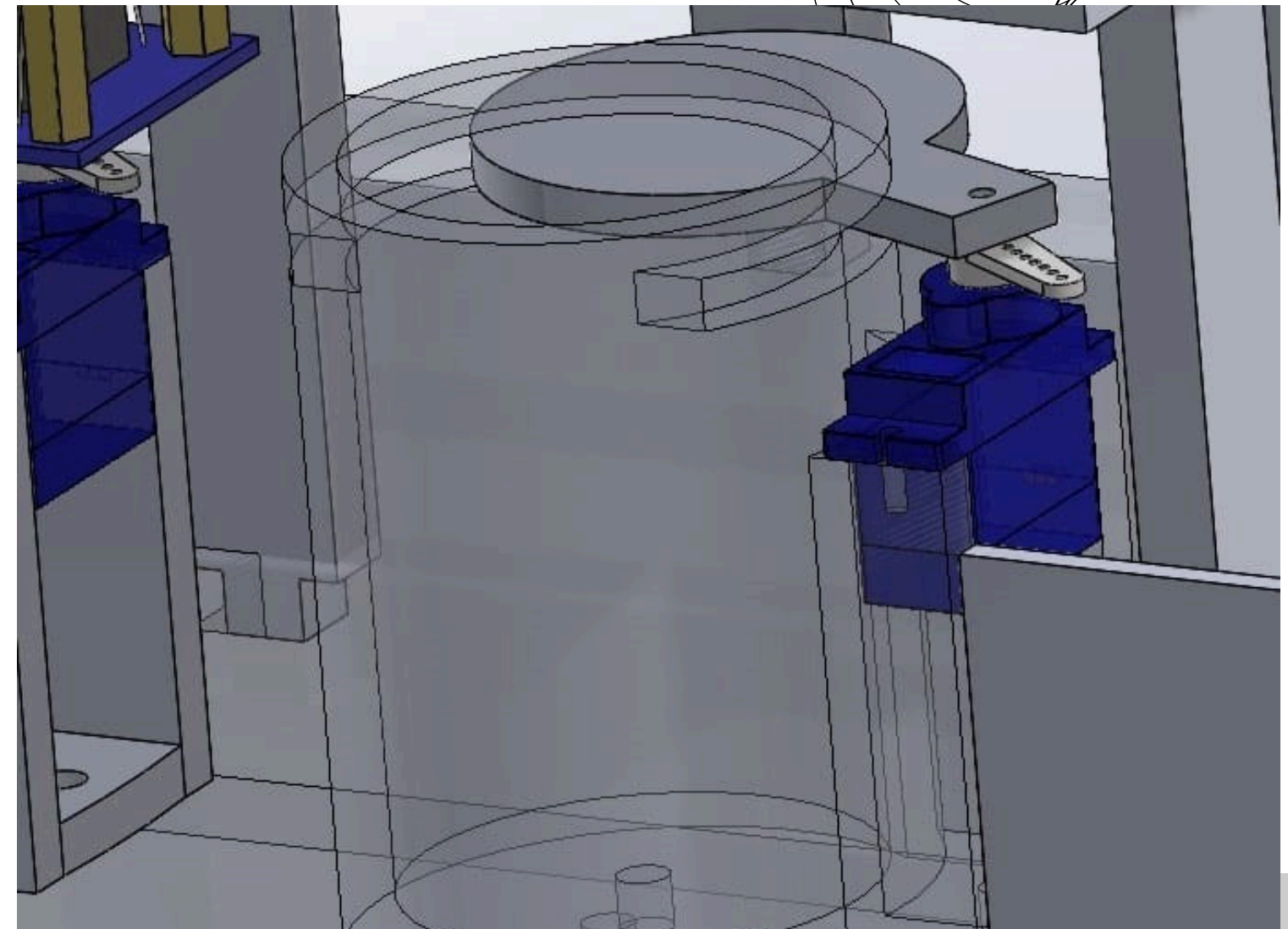
Servo Motor

- moves the piece after recognizing the color.



Servo Motor

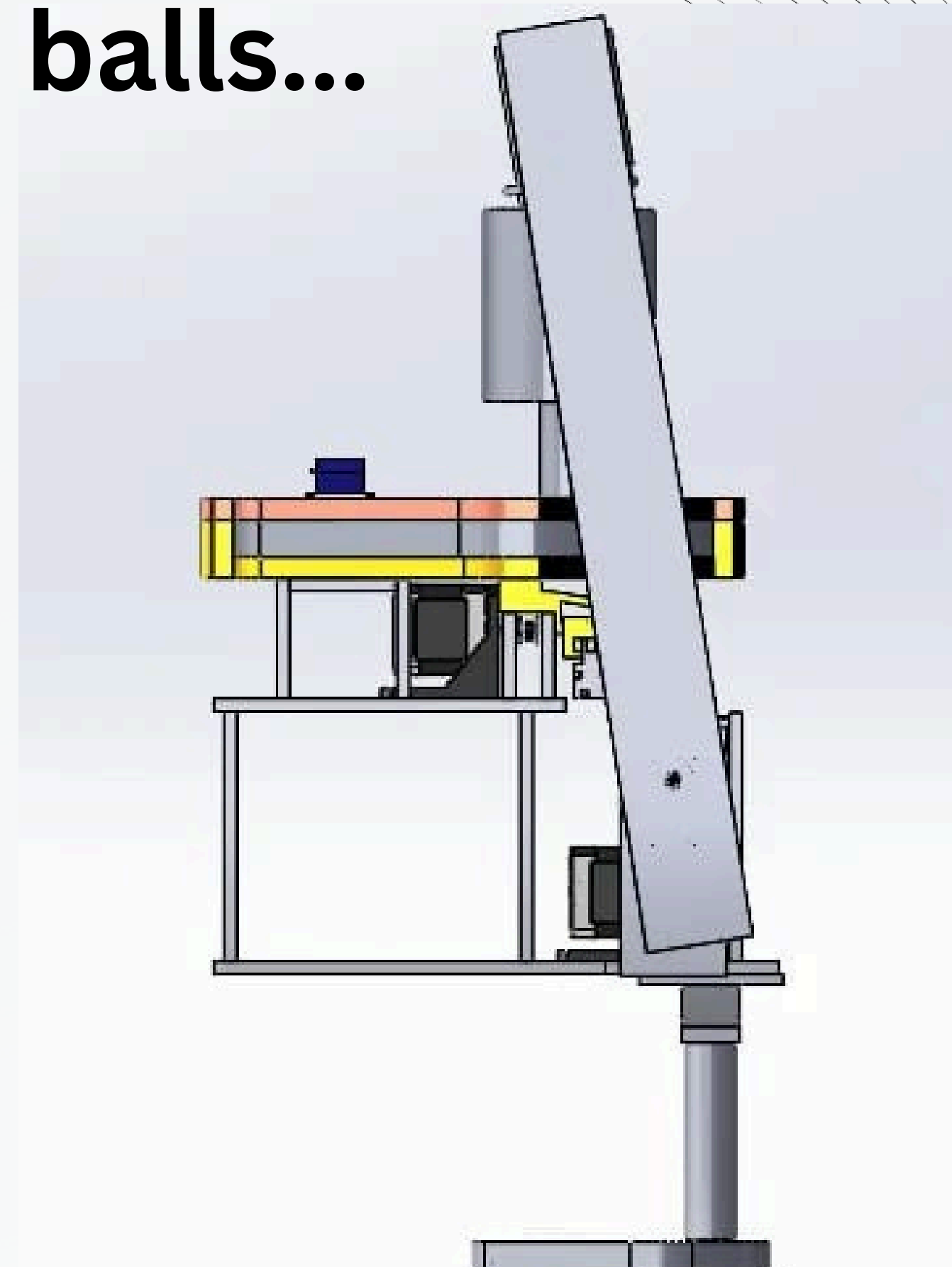
- The sorted balls are released into cups by color and, once finished, both cups are sealed using a servo motor.



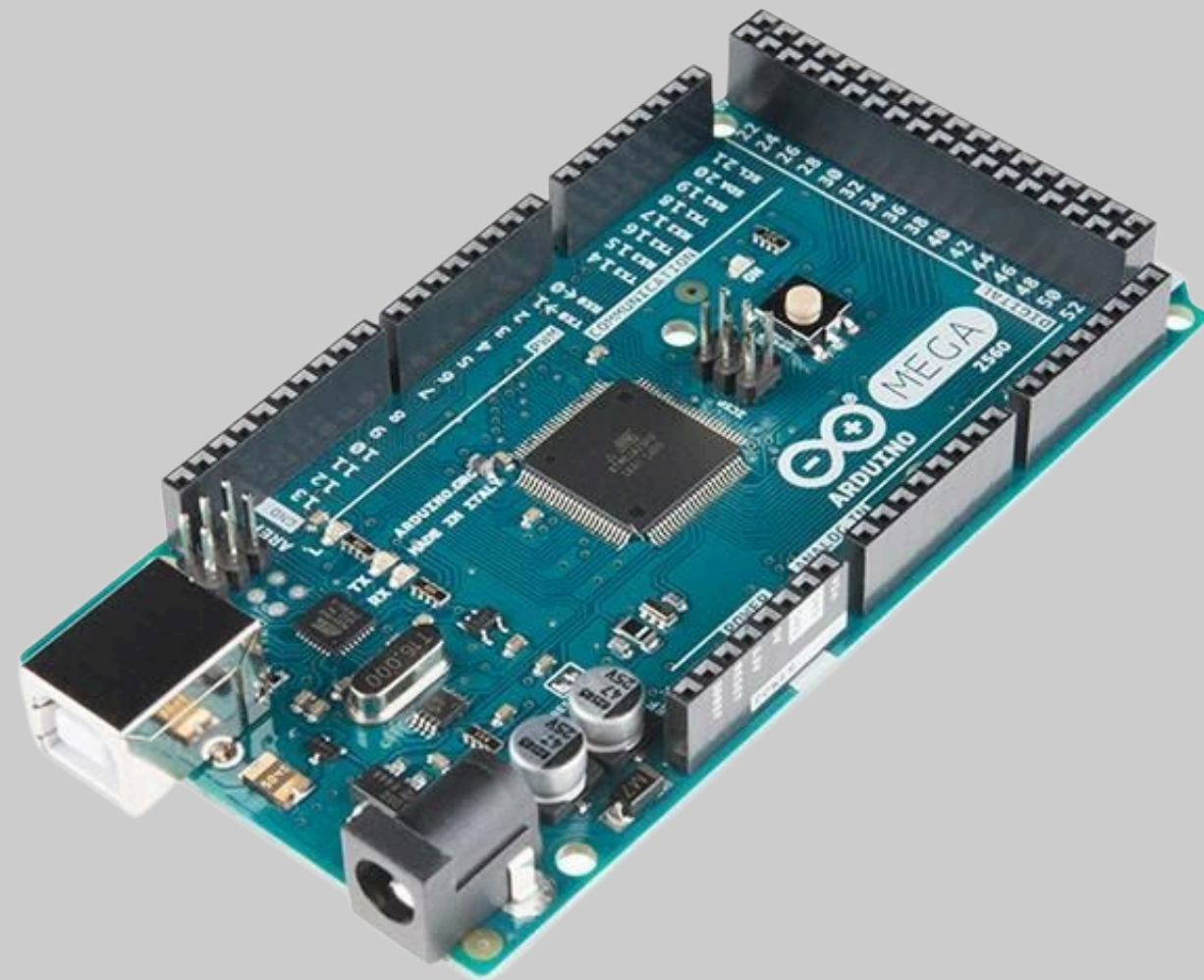
Feature 2: Returning the balls...

Servo Motor mg996r

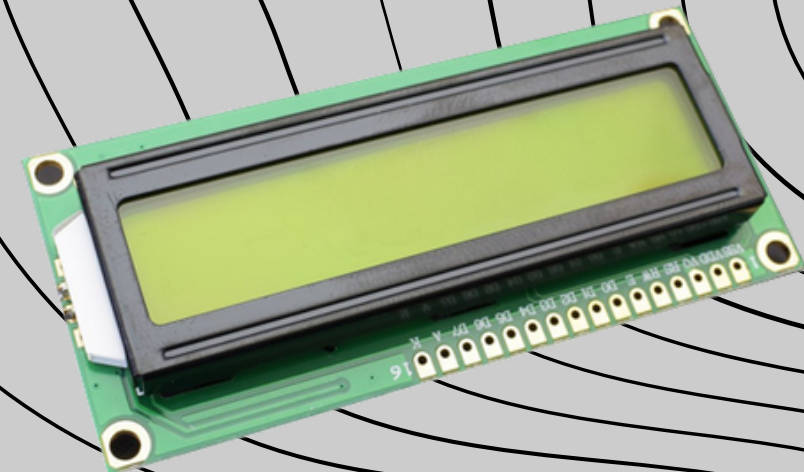
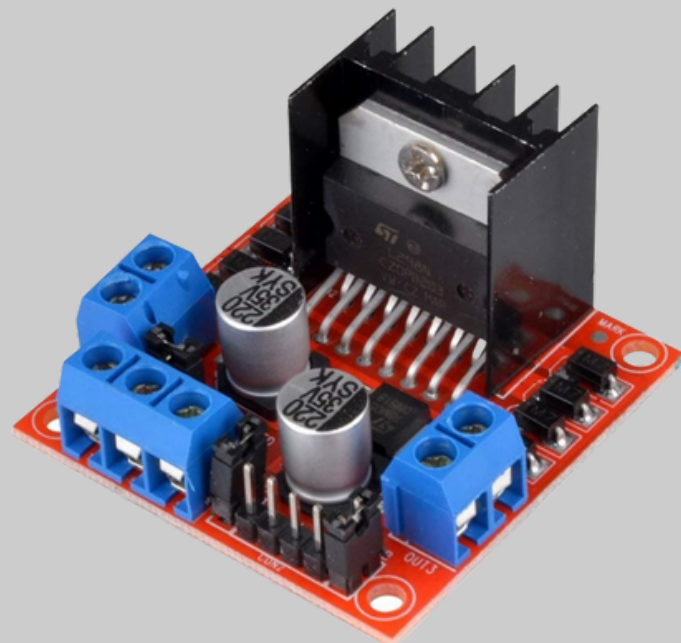
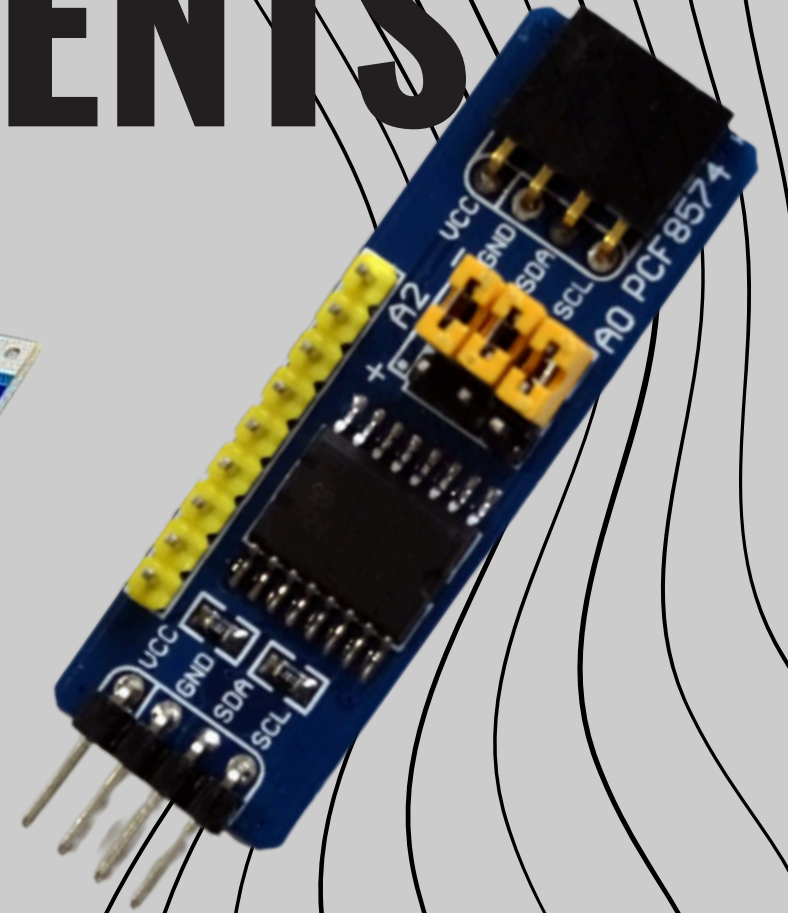
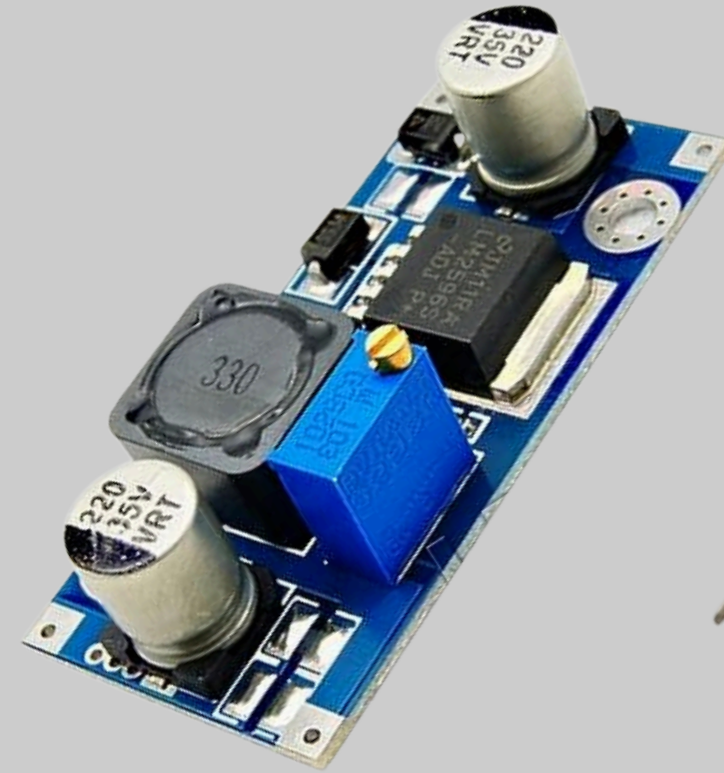
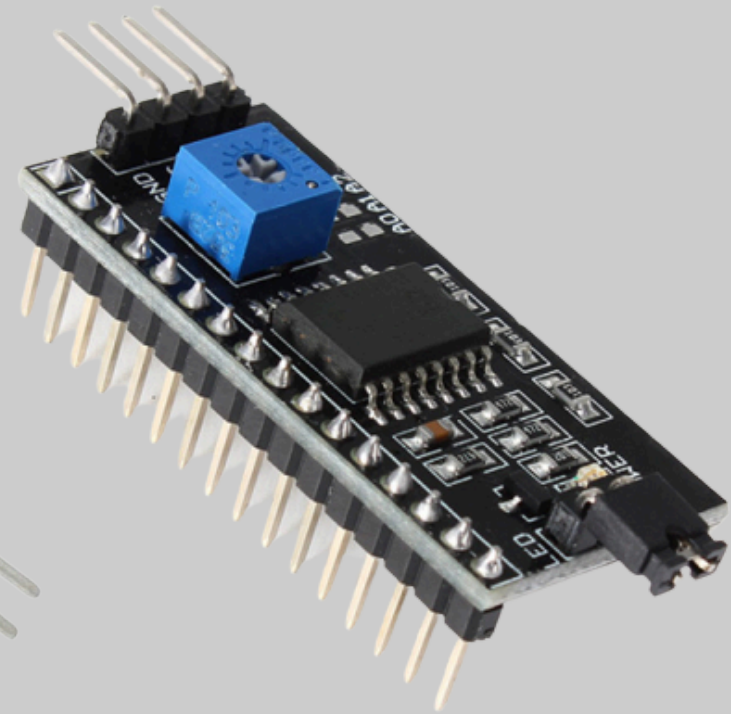
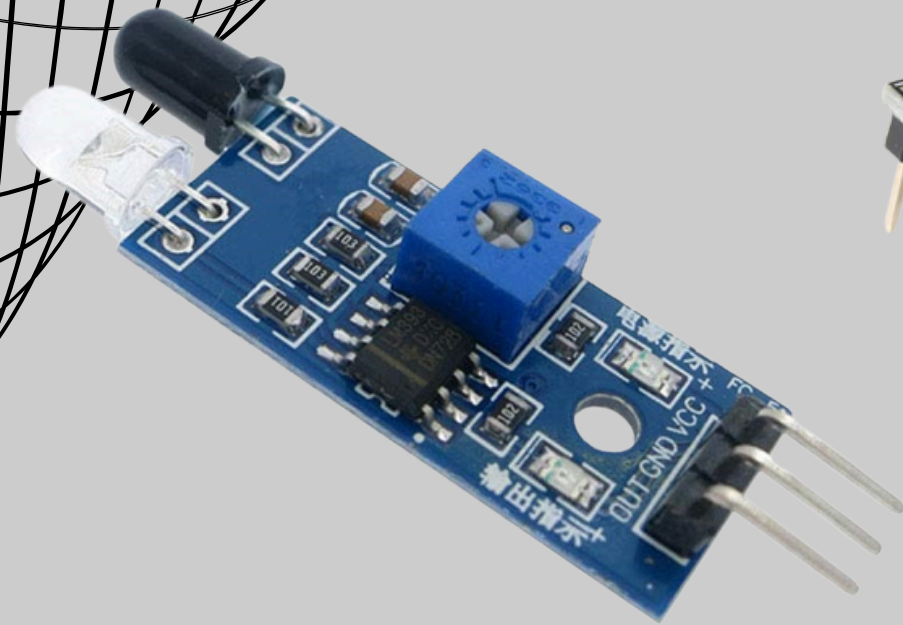
- astly, a high-torque servo motor raises balls from the bottom to the top.
- The arm lifts and aligns the sealed cups with the upper ones, then opens them at the right time.



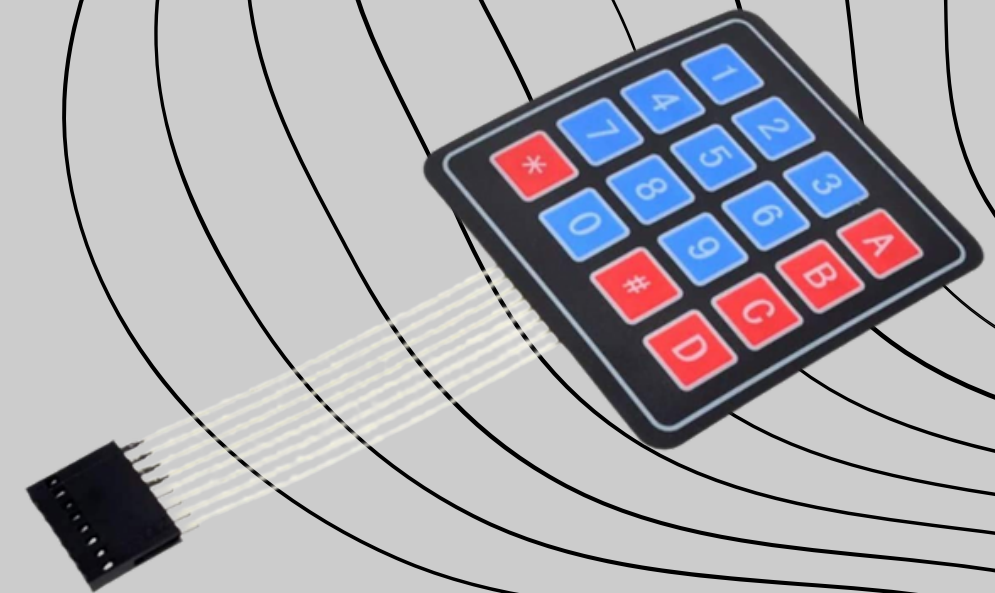
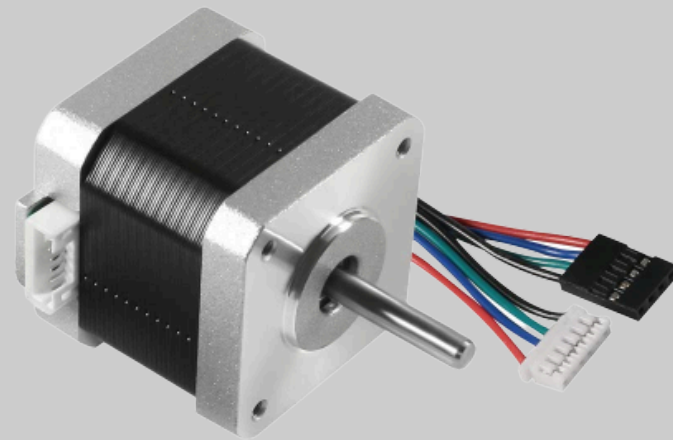
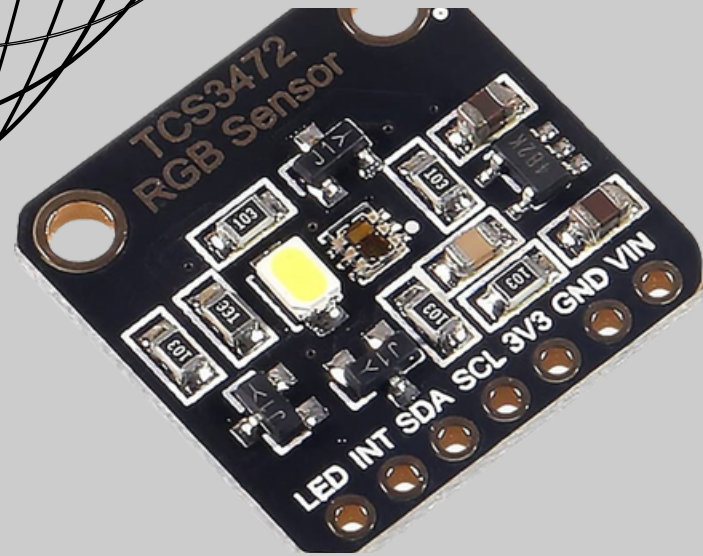
MICROCONTROLLERS



SENSORS & COMPONENTS



SENSORS & COMPONENTS



CONSTRAINTS

- 1 The ball retrieval mechanism
- 2 The game speed
- 3 The large code size

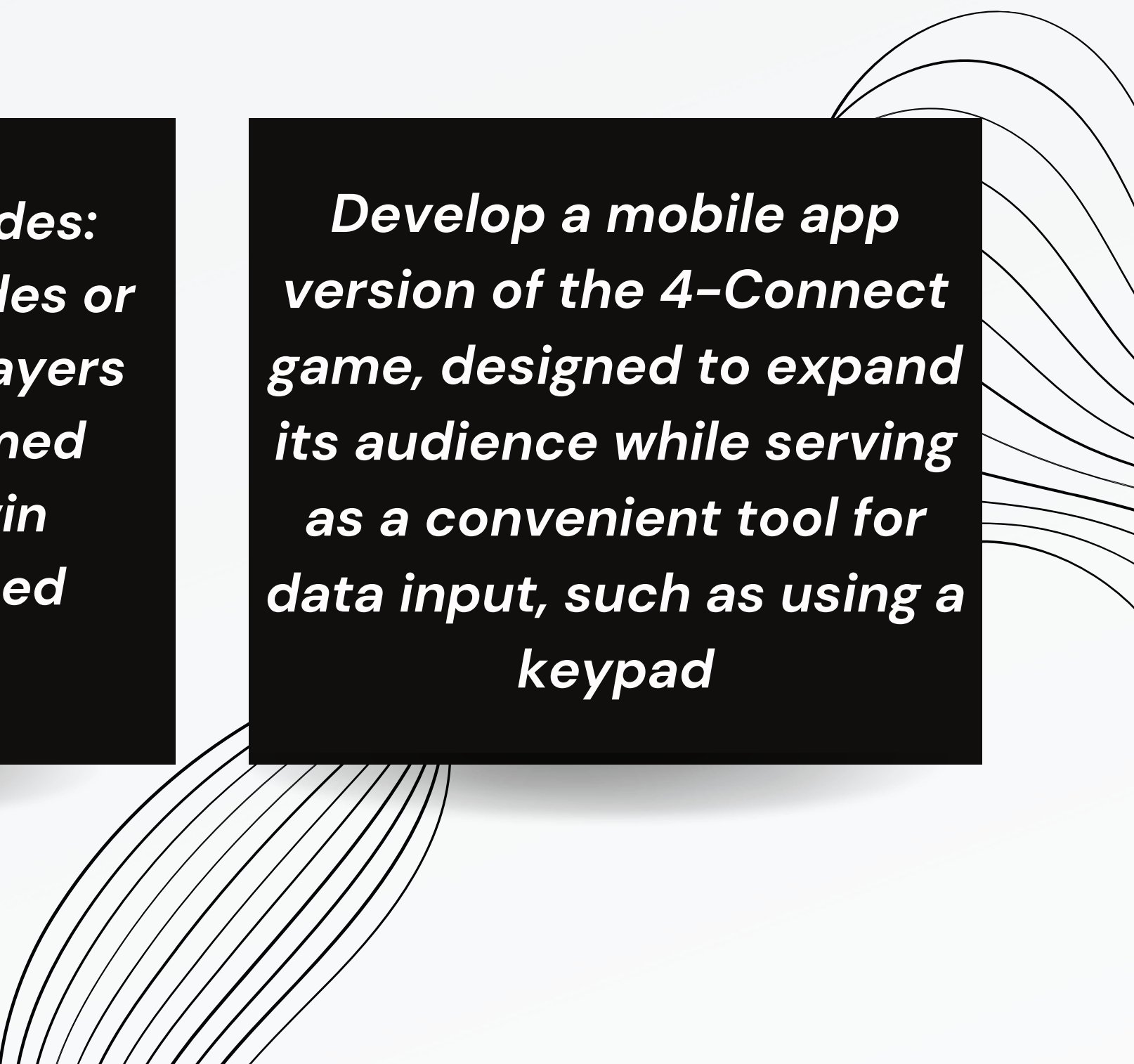


FUTURE WORK

Enhancement of the design and the mechanisms

*Additional Game Modes:
Create new game modes or challenges to keep players engaged, such as timed matches, unique win conditions, or themed variations.*

Develop a mobile app version of the 4-Connect game, designed to expand its audience while serving as a convenient tool for data input, such as using a keypad





DEMO

THANK'S FOR WATCHING

ANY QUESTIONS?

