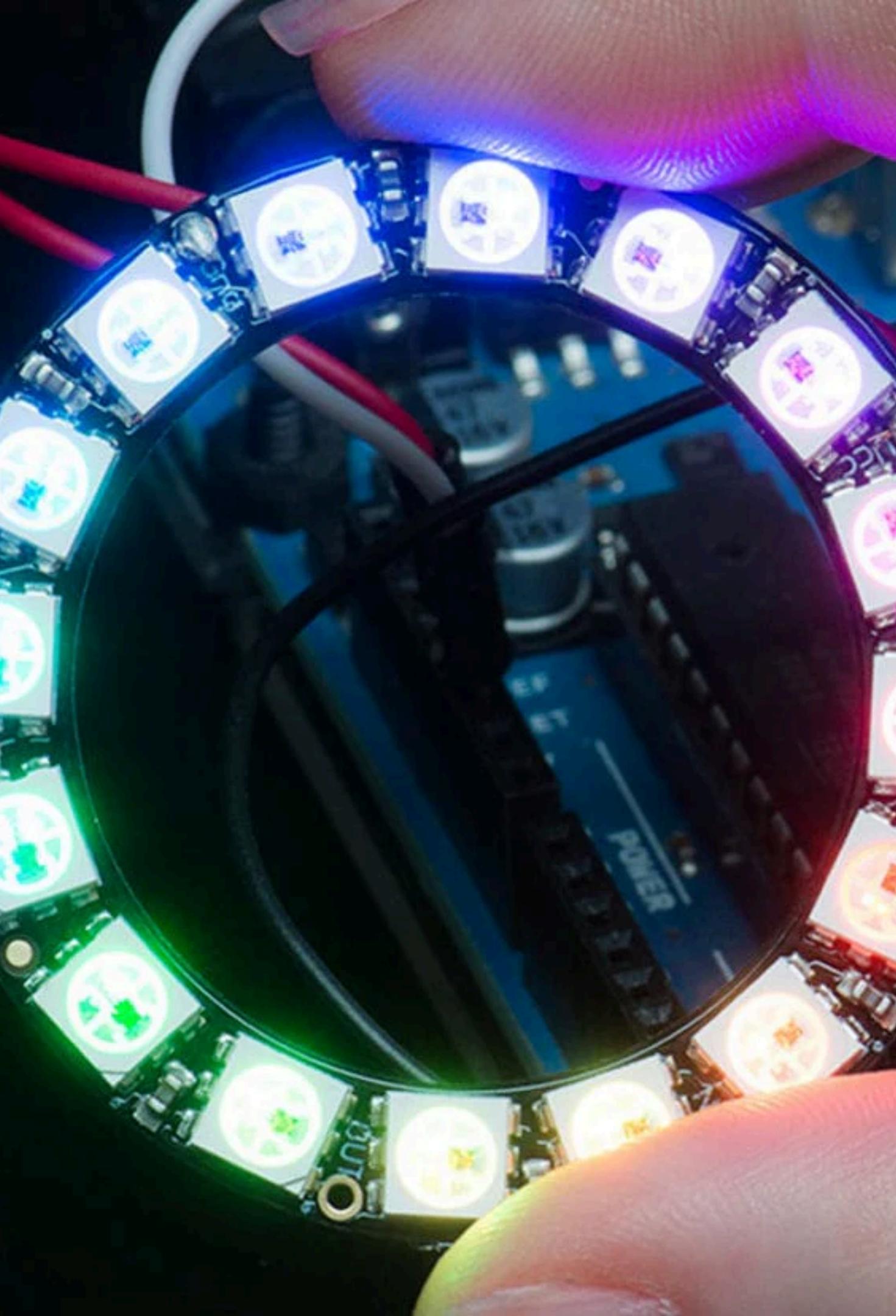


MEMORY GAME

Shreya and Durva

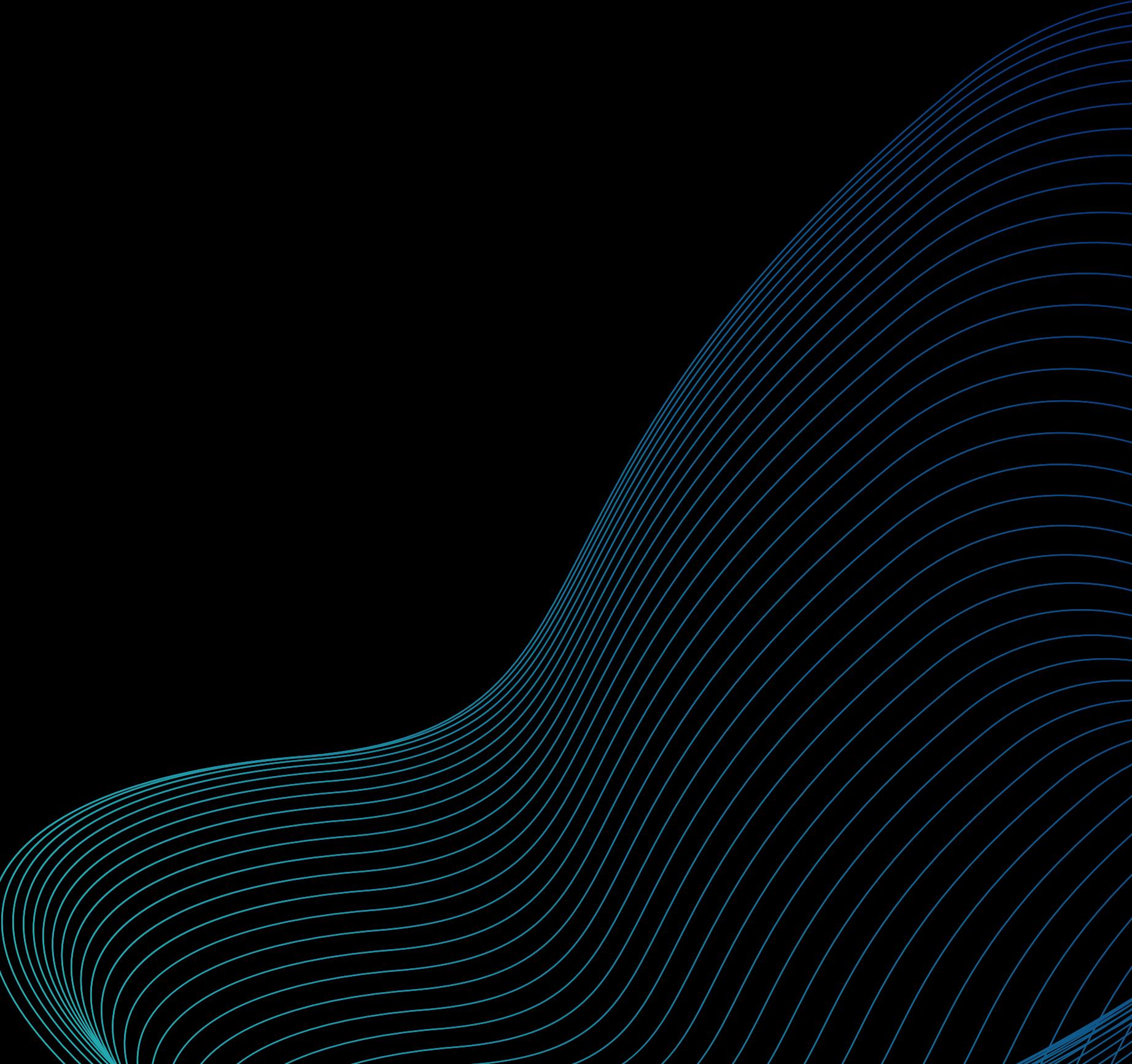
Ideation

1. Inspired by the classic “Simon Says” pattern memory game.
2. Game begins when the player waves their hand over an IR sensor , makes it modern and interactive.
3. Speed increases every round to make it progressively challenging.
4. Wrong answer → Red LED flashing (failure feedback)
5. Uses only 1 NeoPixel LED to display all colours, making it simple yet smart.



Code Logic

1. Wait for IR Detection
 - The system waits until a hand wave is detected.
 - Then the game starts.
2. Game Runs for 5 Rounds
 - Each round increases difficulty (speed increases).
3. Generate Random Sequence
 - 4 random numbers (0–3) are generated.
 - Each number represents a color.
 - NeoPixel displays them one by one.
4. Player Input Phase
 - Player presses 4 buttons.
 - Each press is recorded into a list.
 - System waits until button is released to avoid double input.
5. Sequence Comparison
 - If player list matches generated list → Correct
 - Else → Game Over
6. Feedback
 - Correct → Servo rotates (reward)
 - Wrong → Red LED flashes 5 times and game stops
7. Game Ends
 - After 5 successful rounds OR one wrong attempt



Flow of the Game



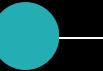
Wave over IR sensor to start
then carefully watch the colour sequence.



Repeat the same sequence using the 4 buttons.
make sure to be right!



If correct...
next round starts



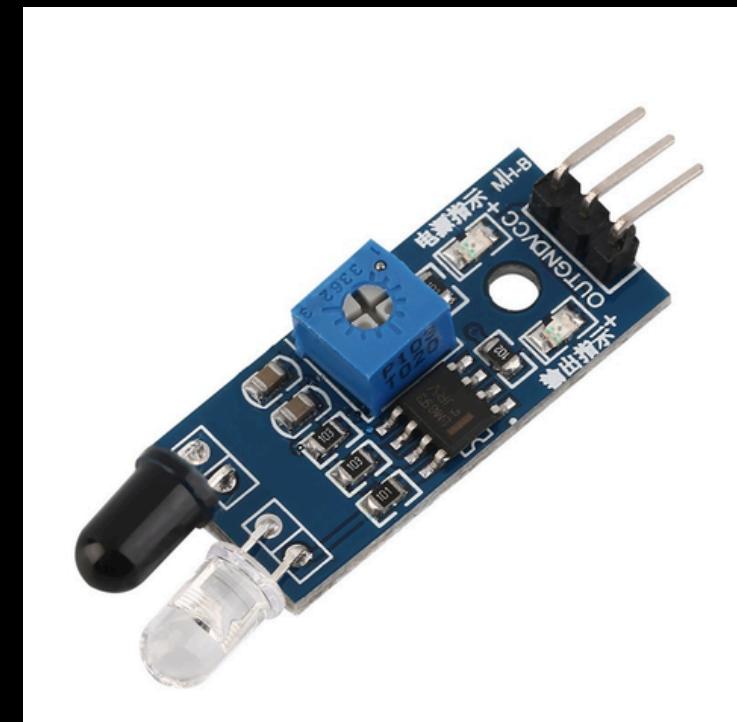
If wrong...
Red LED flashes and the game ends

Components



ESP 32

Main microcontroller (brain of the game)



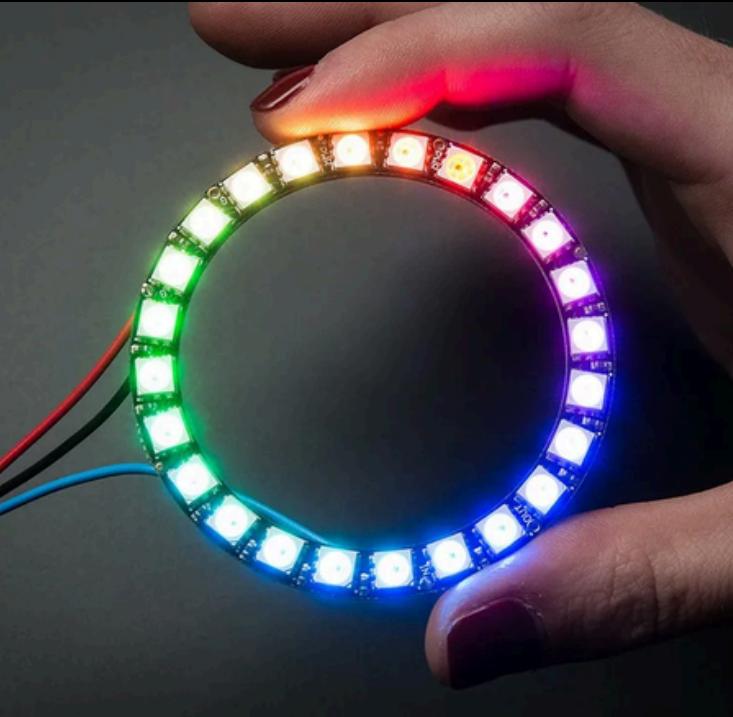
IR Sensor

Detects hand wave to start game



4 push buttons

Player inputs (Red, Green, Blue, Yellow)



1 Neopixel LED

Displays colour sequence



Buzzer

Can be used for sound feedback



LEDs

for the colour output

Reflections



Pain Points

Buttons were registering multiple presses for one click.

Without waiting for release, inputs were skipped or duplicated.

Adjusting LED speed and user response timing required testing.

Needed slight delay to avoid accidental starts.

Ensuring player list exactly matches generated sequence.

Learnings

How to use GPIO pins as input and output.

Working with NeoPixel LED color control (RGB values) and Using lists to store and compare sequences.

Implementing conditional logic and loops for game mechanics.

Controlling a servo motor using PWM signals.

Structuring a full embedded system game loop.

Contribution



Shreya

Ideation

Coding - assigning values,
generating a random colour pattern,
Seeing if player lost.

Aesthetics - game box

Circuit Building



Durva

Ideation

Coding - controlling the speed of
each round, counter statements to
print buttons, seeing if player won.

Aesthetics - game box

Circuit Building

Thank you!

happy colouring