Stepping Stone:

You need to know ...

- Ohm's Law: Knowledge of voltage, current, and resistance relationships.
- How to write and connect sensors to a circuit, including understanding sensor specifications and outputs.
- How to calibrate and test sensors for accurate readings.
- How to control servo motors, including the use of PWM (Pulse Width Modulation) signals. how to connect and power multiple servos within a circuit.
- What a code is. and Arduino IDE software.
- How to Install libraries including <servo.h>

You will be able to...

- Wire and connect a color sensor accurately within an electrical circuit.
- Connect and control multiple servo motors within a single circuit.
- Test and calibrate the color sensor for precise and accurate color detection.
- Configure and power the circuit to operate multiple servo motors and synchronize their movements effectively.
- How to link between the i/p signals from the sensor and the brain then the o/p to the servo motors.

let's Think

What could have gone wrong with the electrical system that might cause the machine to fail?

How would you troubleshoot and fix the electrical problem to get the sorter back up and running?

Explore

do it

Collect the following components from the lab to make your color sensor circuit and name each:

.....

.....

.....

Watch it..

To understand more about the connection, let's watch this video:

Scan Here!

https://www.youtube.com/watch?v=cRR5jDKTKno

Read about it

Read this search to know more about color sensors technics:

https://circuitdigest.com/microcontroller-projects/interfacing-color-sensor-with-arduino

Scan Here!

Assessment

Focus

Watch the video and refer to the link to understand how the colour sensor detects and outputs RGB values.

Observe and record the RGB ranges for at least five colours as shown in the experiment.

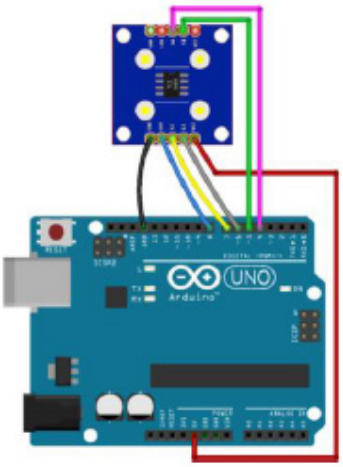
Fill in the table with the Red (R), Green (G), and Blue (B) values for each colour.

Color Sensor RGB Value Table

Color	Red (R)	Green (G)	Blue (B)
Red			
Green			
Blue			
Yellow			
Purple			

Practice

Let's connect the color sorting sensor to the Arduino.



Connect servos

LESSON 02

let's Think

If the servo motor can control the direction of the conveyor belt, what do you think would happen if it stopped working? How could you design a backup system to ensure that the candies still reach the correct sorting area?

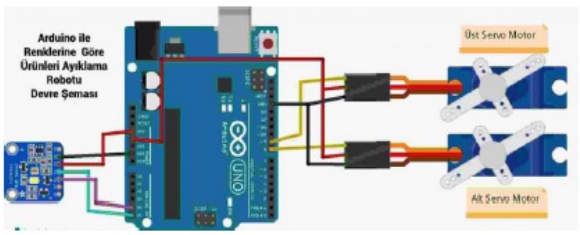
The servo motor relies on sensors to know where to guide the candies. What challenges might arise if the sensors fail to detect the candies properly, and how could the factory prevent or fix this issue?

Explore

do it

Connect the servo motor with the color sensor on the Arduino board.

What challenges might we face in controlling multiple servomotors independently?



Watch it..

Let's watch the following video:

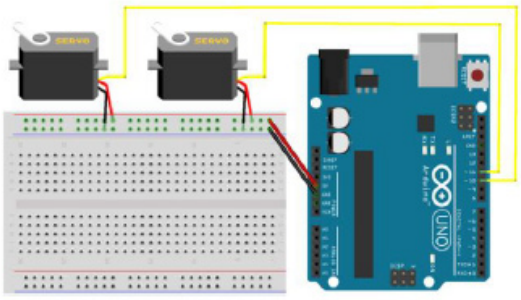
Scan Here!

https://youtu.be/tHOH-bYjR4k?si=Jzih_eAuHloMf_iQ

Assessment

Practice

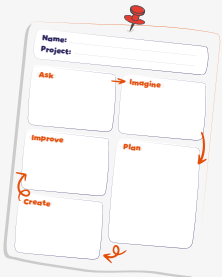
Now try to attach more than one servo to Arduino circuit.



Showcase..

Adding color sensor to the design.

After we learned what are the parts we need for our machine, let's go back to our EDP paper and add these parts to the create part..



Now I can...

- Understand the concept and how to connect a color sensor in circuit.
- Wire and connect sensor to a circuit, including and understanding sensor specifications and outputs.
- Understanding how to control servo motors, including the use of PWM (Pulse Width Modulation) signals.
- How to link between the i/p signals from the sensor and the brain then the o/p to the servo motors.