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BRANCH : MECHANICAL

TASK #1
ELECTRONICS



Project 3 :

Building a project consisting of force sensor and photoresistor.

Short Description :

In this project, we have mainly used :

- Force Sensor
- Photoresistor

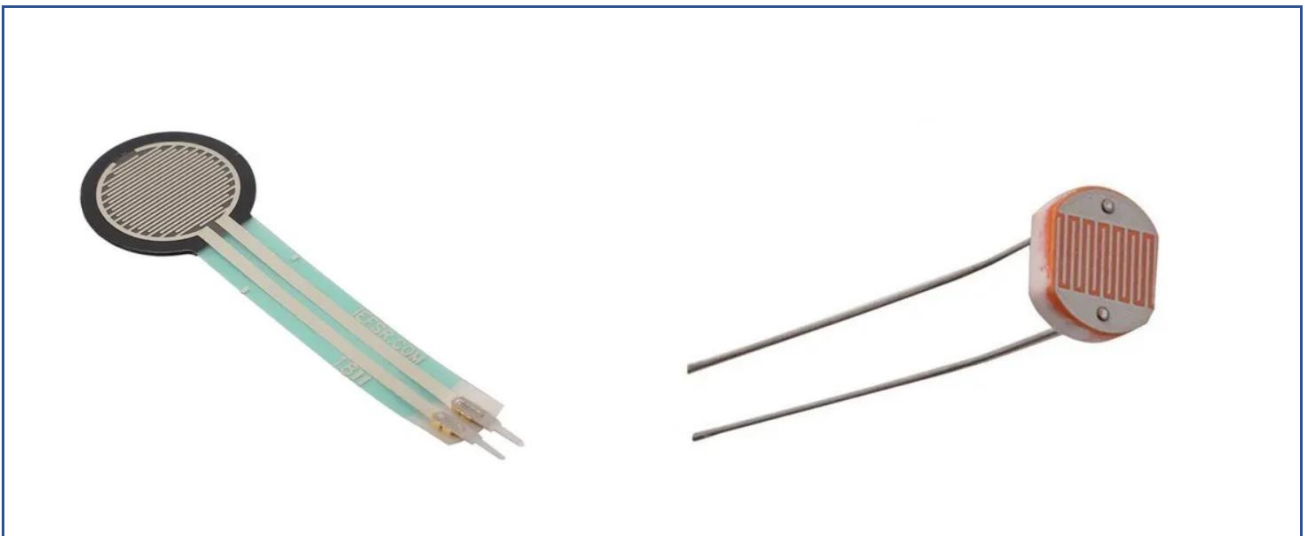
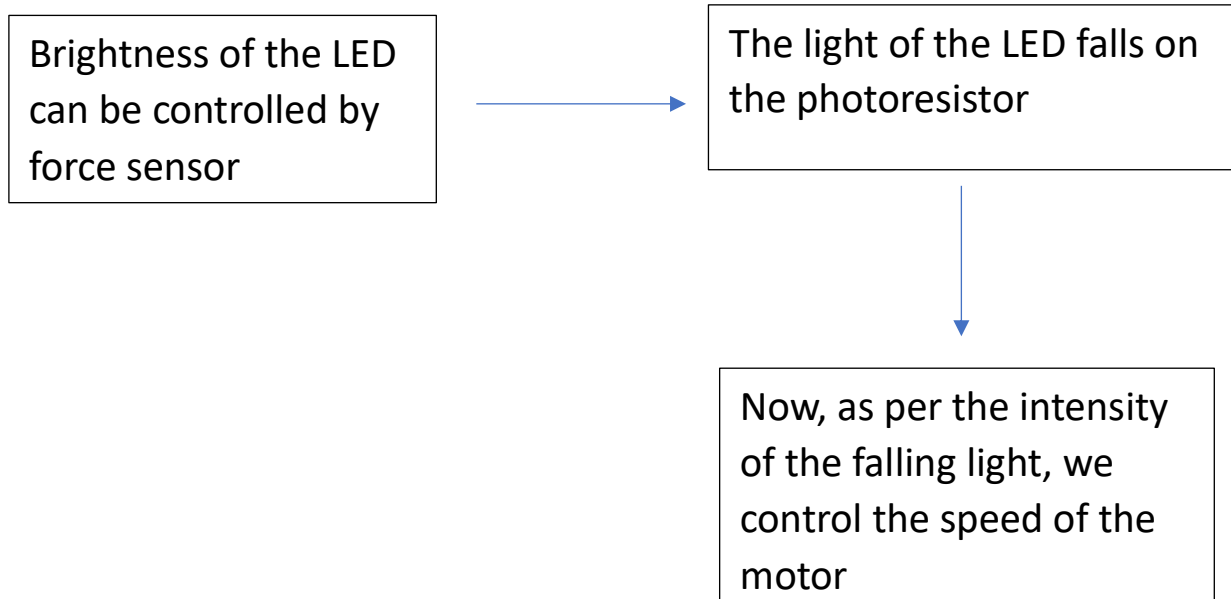


Fig. Components used in project L : Force Sensor ; R : Potentiometer

Now, the car is given an obstacle avoiding ability by interfacing an ultrasonic sensor with an Arduino. Full process is shown by flow chart below.

Flow chart :



So, basically :

Force sensor controls LED & LED controls speed of motor and the linking is done by photoresistor.

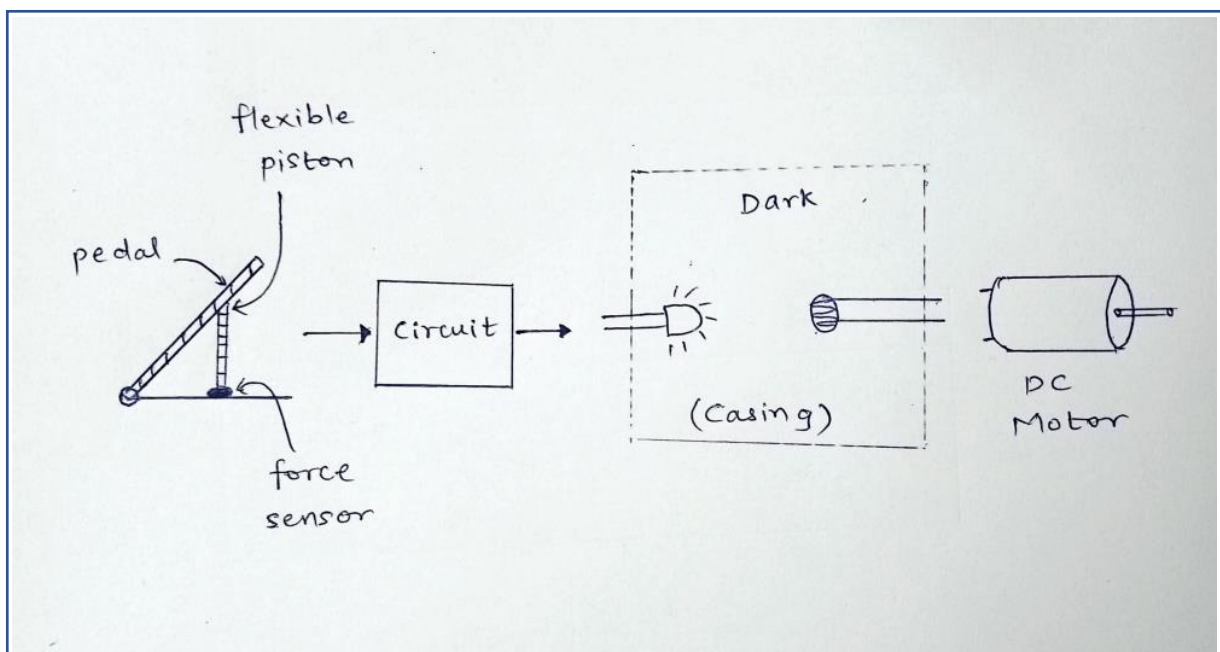


Fig. The possible setup

The circuit schematic (using Tinkercad) :

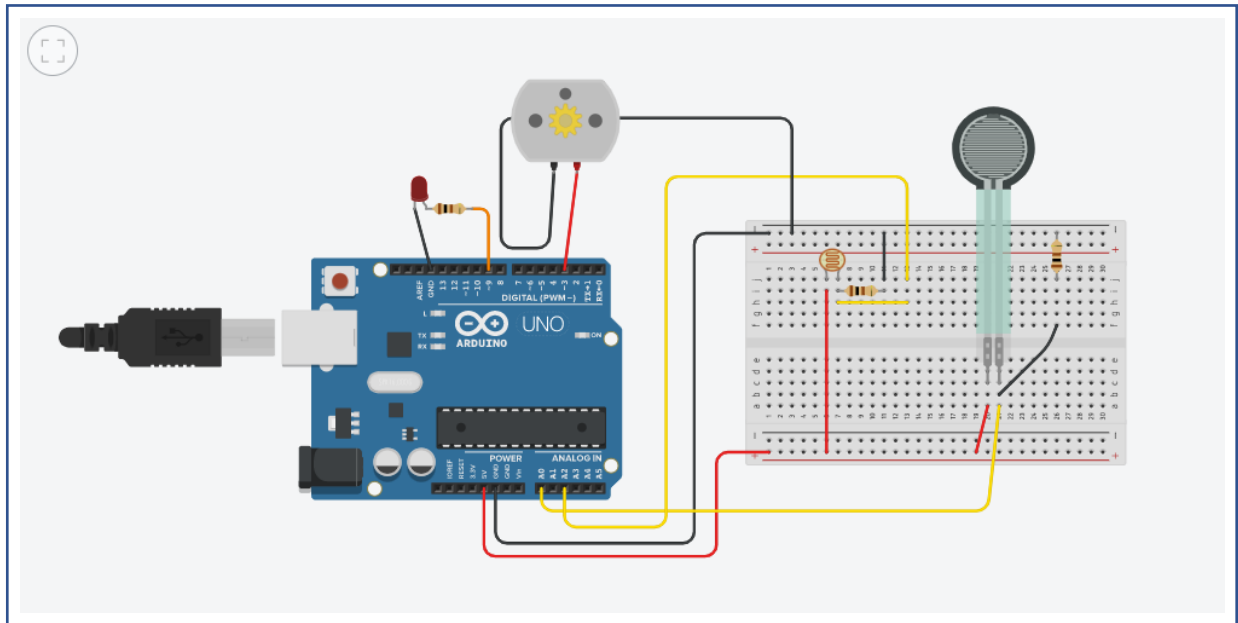


Fig. Circuit schematic using Tinkercad

I have decided to use the breadboard instead of just direct connections in order to give ground and +5V supply to the rail because of the limited pins for ground on Arduino.

Code for the project :

For presentation purpose, I have decided to break the code into 3 parts :

- Initialization
- Void setup
- Void loop

Initialization :

```
int led = 9;  
int motor = 3;  
int photo = A2;  
int force = A0;  
int fvalue;  
int pvalue;
```

1. There are 2 pins of force sensor one goes to the ground and analog pin A0 while another goes to +5V.
2. Also motor is connected to pin 3;
3. Photoresistor is a 2 terminal device, one is connected to gnd and A2 while another is connected to +5V.
4. The 'fvalue' is declared with 'int' datatype since the force sensor is further connected to analog pin which returns integer value between 0 to 1023.
5. Similarly, for 'pvalue' for the values obtained from photoresistor so that we can further work on it.

Void setup :

```
void setup()
{
  pinMode(led, OUTPUT);
  pinMode(motor, OUTPUT);
  pinMode(photo, INPUT);
  pinMode(force, INPUT);
  Serial.begin(9600);
}
```

1. The led and motor are acting here as an OUTPUT devices which we have stated in the pinMode function.

Note : Both, led and motor are connected to PWM pins (9 and 3 respectively). The reason being that, we need to control the motor and led through analog values (0 to 255).

2. The photoresistor and force sensor are sensors and because of which they will be acting as INPUT.
3. We want to keep an eye on the values given by sensor and hence we print the values on the Serial monitor.

Void loop :

```
void loop()
{
    fvalue = analogRead(force);
    Serial.print("Force values : ");
    Serial.print(fvalue);
    Serial.print(" ; ");
    analogWrite(led, fvalue/4);

    pvalue = analogRead(photo);
    Serial.print("photoResistor value : ");
    Serial.println(pvalue);
    analogWrite(motor, pvalue/4);
}
```

1. First of all, we start taking the values from the force sensor. The force sensor values are dependent on the force applied on the sensor. Based on that, it provides values to analog pin A0.



From there, we read those values by using analogRead function.

2. We print those values on Serial monitor to have a track of what's happening.
3. Now, we need to control LED based on analog values, so for that we use analogWrite, and do (fvalue/4) since analogWrite accepts value between 0 to 255 only.
4. Now, based on the light intensity of LED, the photoresistor starts to generate values and we need to read them. Hence, analogRead at pin A2.

5. Now, we use those values to control motor by analogWrite function

Precaution !! :

In this project, all the parts except force sensor and motor need to be kept in dark environment so that, the surrounding light doesn't affect the photoresistor values and is completely dependent on LED brightness.

Another point :

During the simulation in Tinkercad, it is not able to detect the light of red LED falling on photoresistor. Instead it has it's own input taking meter. So in reality, that red LED will only work as the light source for the photoresistor.

Thought process :

