Some Notes

On

Day 1: Introduction to Robots and Robotics <Title>

By

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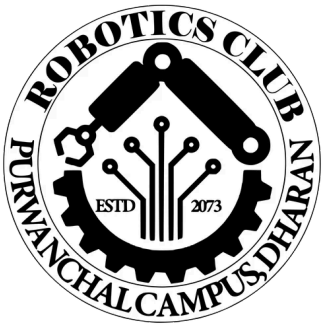
To

Robotics club



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1. LED PWM Dimming with Arduino in Tinkercad

1.1. Overview

This project shows how to use an Arduino to make an LED fade in and out using PWM (Pulse Width Modulation). It's built in Tinkercad, a free online tool for simulating circuits—perfect for beginners!

1.2. Setup Instructions

how to set it up:

1. Open [Tinkercad](https://www.tinkercad.com) and start a new circuit.
2. Add these components:
   - Arduino Uno
   - LED
   - 220-ohm resistor
3. Connect them:
   - LED long leg to Arduino pin 9
   - LED short leg to resistor
   - Resistor to Arduino GND
4. Add this code in Tinkercad's code editor:

```
int ledPin = 9;
int brightness = 0;
int fadeAmount = 5;

void setup() {
  pinMode(ledPin, OUTPUT);
}

void loop() {
  analogWrite(ledPin, brightness);
  brightness = brightness + fadeAmount;
  if (brightness <= 0 || brightness >= 255) {
    fadeAmount = -fadeAmount;
  }
  delay(30);
}
```

5. Click "Start Simulation" to see the LED fade!

1.3. Code Explanation

- `int ledPin = 9;`: Uses pin 9 for the LED.
- `analogWrite(ledPin, brightness);`: Sets LED brightness (0 to 255).
- `brightness = brightness + fadeAmount;`: Adjusts brightness each loop.
- `if (brightness <= 0 || brightness >= 255)`: Reverses fading direction.
- `delay(30);`: Pauses 30ms for smooth fading.

1.4. What I Learned

- PWM tricks the LED into dimming by switching it on/off quickly.

- Tinkercad makes testing circuits easy without real hardware.

1.5. Choices Made

- **Pin 9**: It supports PWM.
- **30ms delay**: Keeps fading smooth and not too slow.

Figure 1: Logo of Tribhuvan University.

One	Plan
Two	Draft
Three	Document