

## DESCRIPTION OF DAY4

### Real-Time Servo Control with PWM Signal Analysis

In this project, a **SG92R servo motor** was controlled using an **Arduino Uno** and a **potentiometer**. The potentiometer provided analog input (0–1023) which was mapped to servo angles (0° to 180°) using Arduino's `analogRead()` and `servo.write()` functions.

To verify the PWM signal being sent to the servo, a **digital oscilloscope** (in Proteus simulation) was connected to the servo control pin (D9). The oscilloscope was used to:

- Measure the **PWM frequency**, which remained constant at approximately **50 Hz** (20 ms period).
- Observe **pulse width (duty cycle)** changes based on servo angles:
  - ~1 ms pulse for 0°
  - ~1.5 ms pulse for 90°
  - ~2 ms pulse for 180°

By rotating the potentiometer in real-time, the **PWM pulse width on the oscilloscope** changed accordingly, confirming correct signal generation and servo response. This successfully demonstrated the relationship between analog input, PWM signal, and servo motion.

#### CODE UPLOADED IN ARDUNIO:

```
#include <Servo.h>

Servo myServo;

int potPin = A0;

void setup() {
    myServo.attach(9);
}

void loop() {
    int val = analogRead(potPin);
    int angle = map(val, 0, 1023, 0, 180);
    myServo.write(angle);
    delay(15);
}
```