Workshop 10-Frequency, Duty Cycle, Arduino Programming

Objective:

- To implement PWM in Arduino Programming
- To monitor PWM output
- To implement and verify output signal

TASK 1:

Analog input, analog output, serial output

Reads an analog input pin, maps the result to a range from 0 to 255 and uses the result to set the pulse width modulation (PWM) of an output pin. Also prints the results to the Serial Monitor.

The circuit:

potentiometer connected to analog pin 0.

- Center pin of the potentiometer goes to the analog pin.
- side pins of the potentiometer go to +5V and ground
- LED connected from digital pin 9 to ground through 220 ohm resistor

For Reference: https://www.arduino.cc/en/Tutorial/BuiltInExamples/AnalogInOutSerial

TASK 2:

1. Open the Arduino environment and start a new program.
2. Connect an LED from pin 5 to ground.
3. Upload and run the following code:

```
int ledPin = 5;     // Connect LED to digital pin 5

void setup()  {
  pinMode(ledPin,OUTPUT); // set pin 5 as an OUTPUT
}

void loop()  {
    analogWrite(ledPin, 127);
}
```

Based on the above program:

- Provide your observation and give the meaning of analogWrite() in above program.
- Change 127 to other values in between 0 – 255 and then give findings of your observation.
- Give meaning of period, frequency, pulse width, and duty cycle of the signal resulted from the output of above program.
- Verify the output, use suitable simulation tool that visualizes the output waveform.