

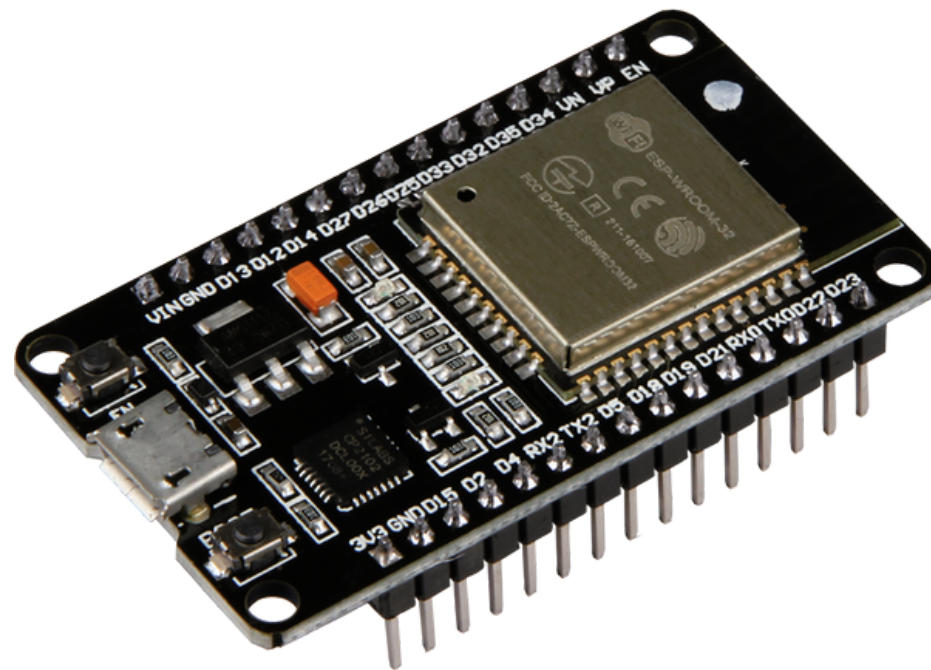
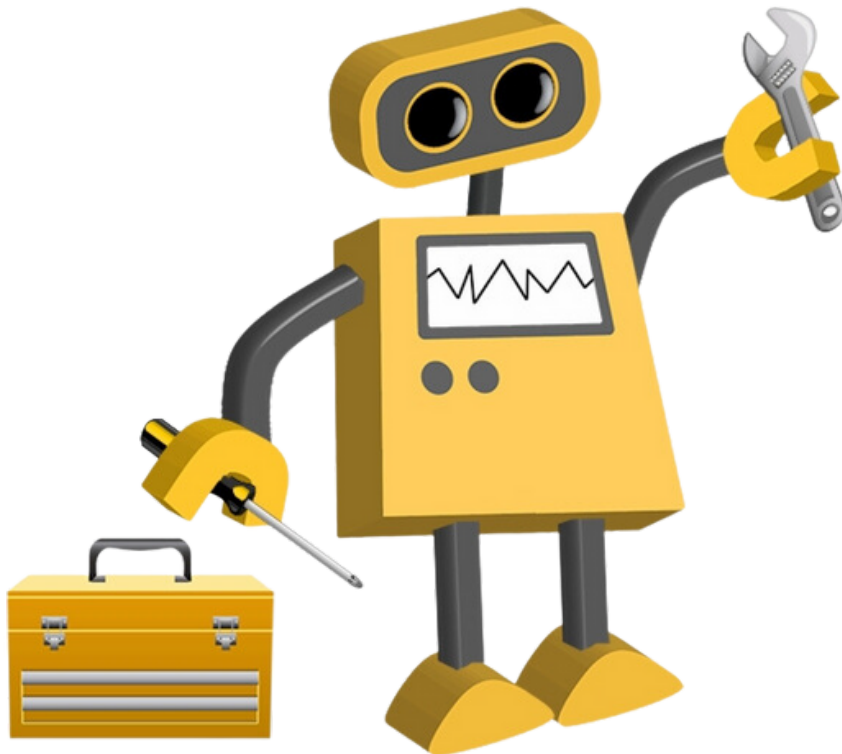


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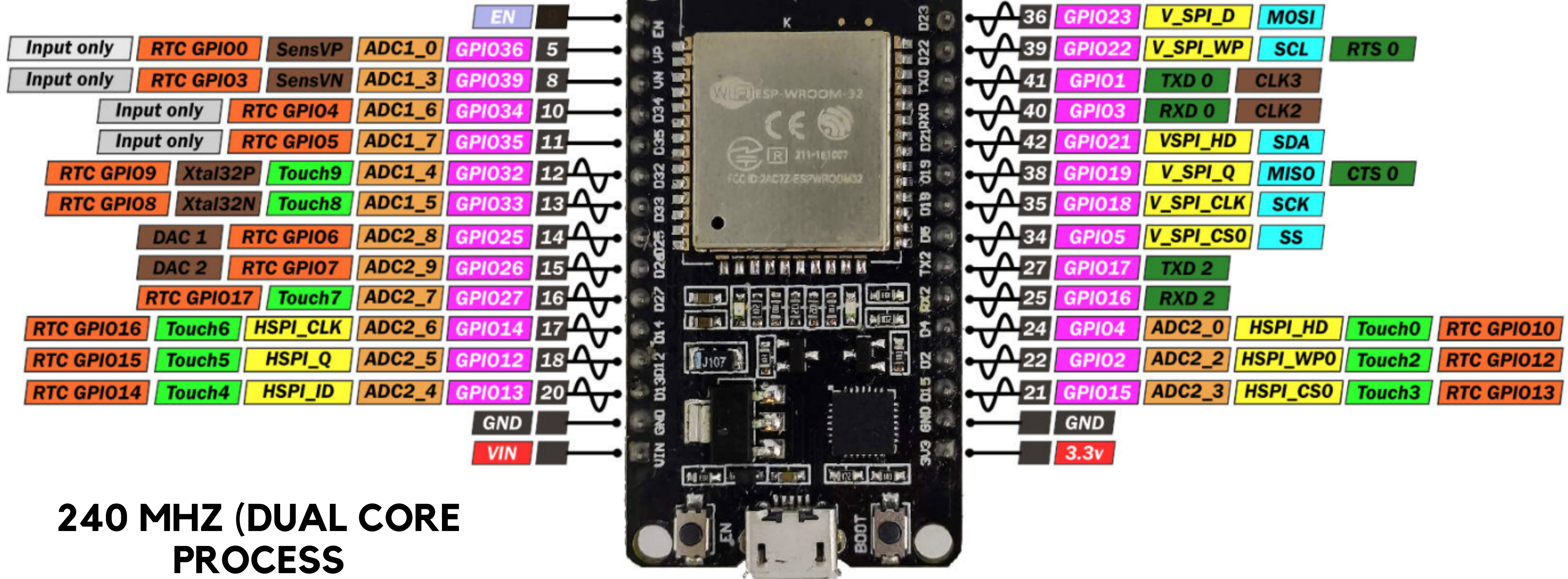
EMBEDDED SYSTEM DESIGN PRACTICAL - 1

LED BLINK PWM

By Divesh Jadhvani



ESP32 PINOUT



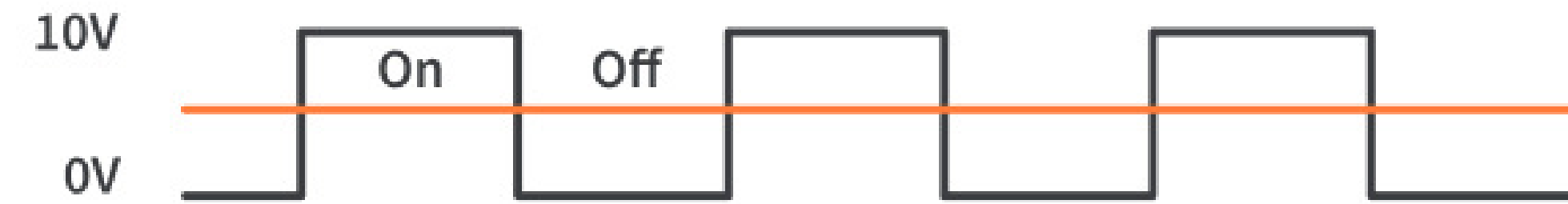
**240 MHZ (DUAL CORE
PROCESS
4MB FLASH MEMORY
520 KB RAM**

ESP32 PINOUT

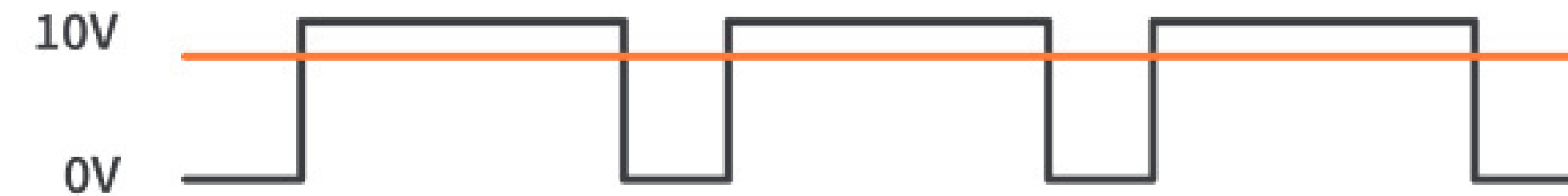
- **34 PROGRAMMABLE GPIOS**
- **18 12-BIT ADC CHANNELS**
- **2 8-BIT DAC CHANNELS**
- **16 PWM CHANNELS – INTENSITY**
- **3 UART INTERFACES – ADD**
- **3 SPI INTERFACES – MEMORY**
- **2 I2C INTERFACES – SDA AND SCL**
- **10 CAPACITIVE TOUCH SENSING GPIOS**
- **16 RTC GPIOS – DATE AND TIME**

PWM

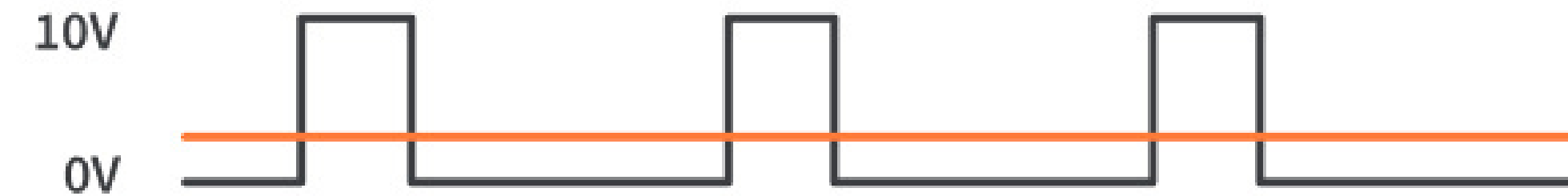
50% Duty Cycle - 5V



75% Duty Cycle - 7.5V

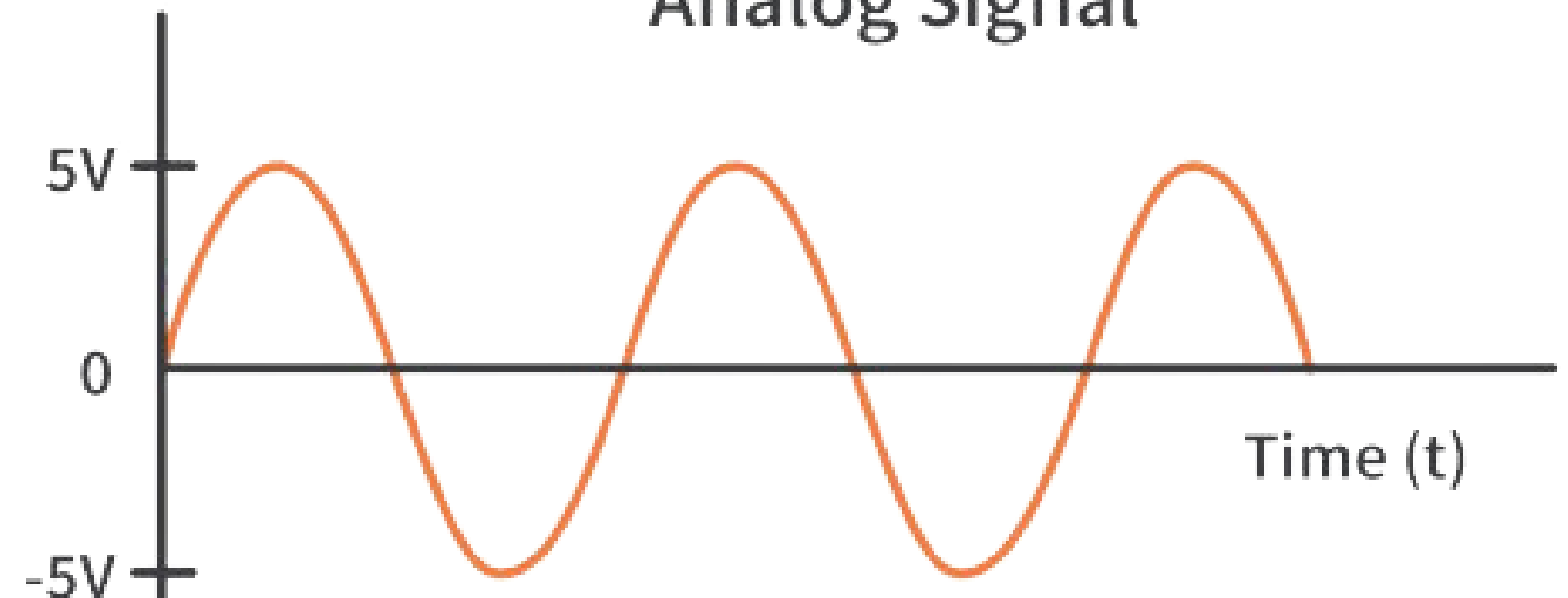


25% Duty Cycle - 2.5V

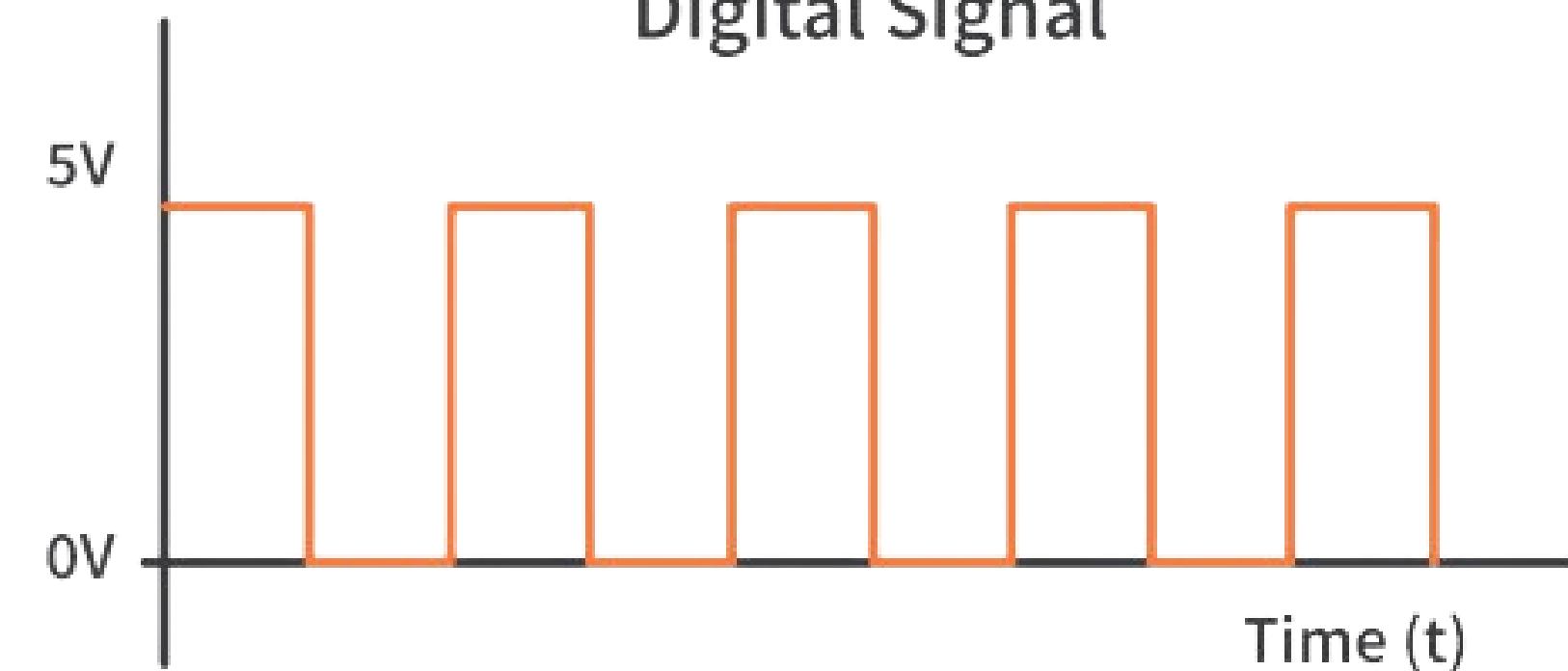


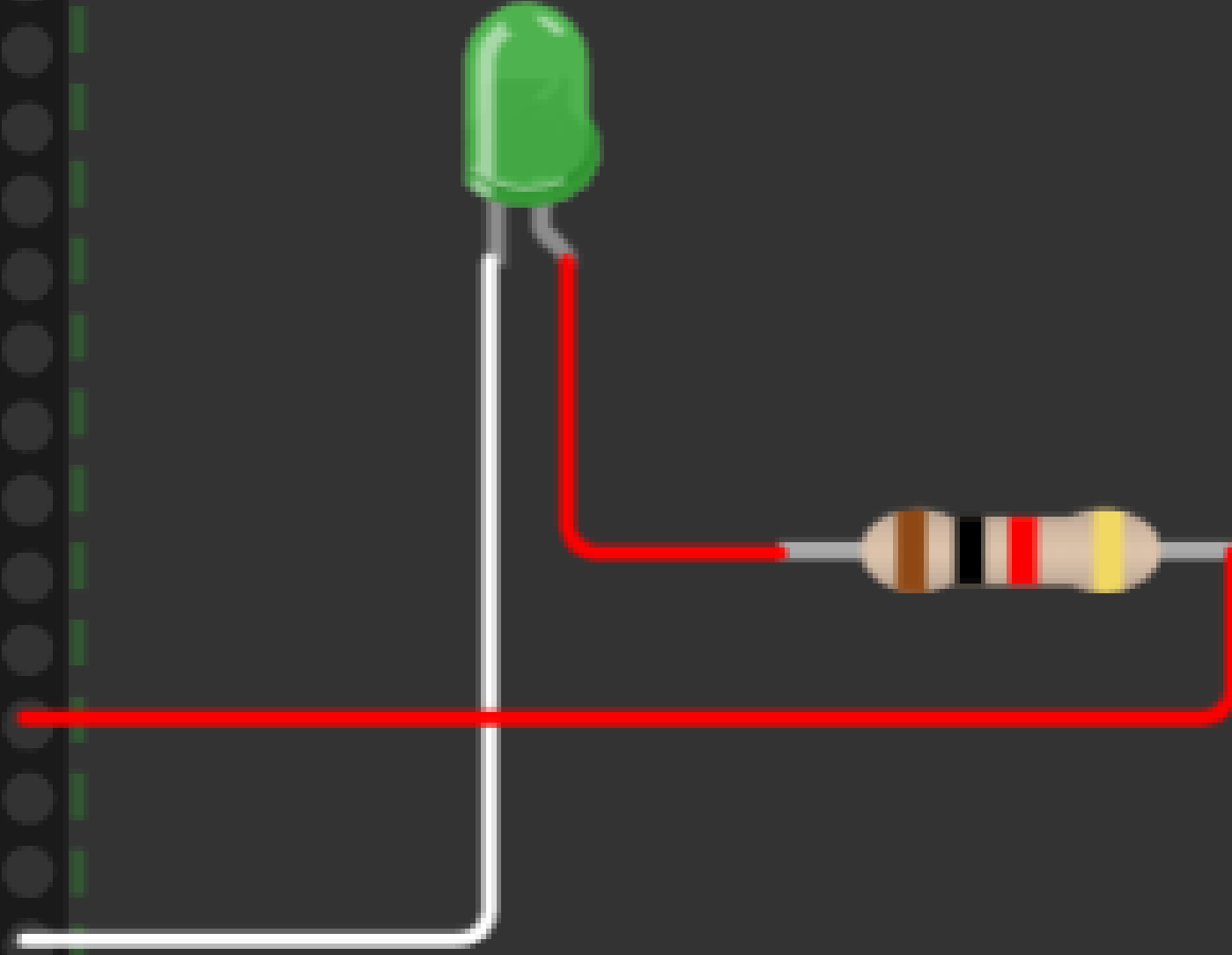
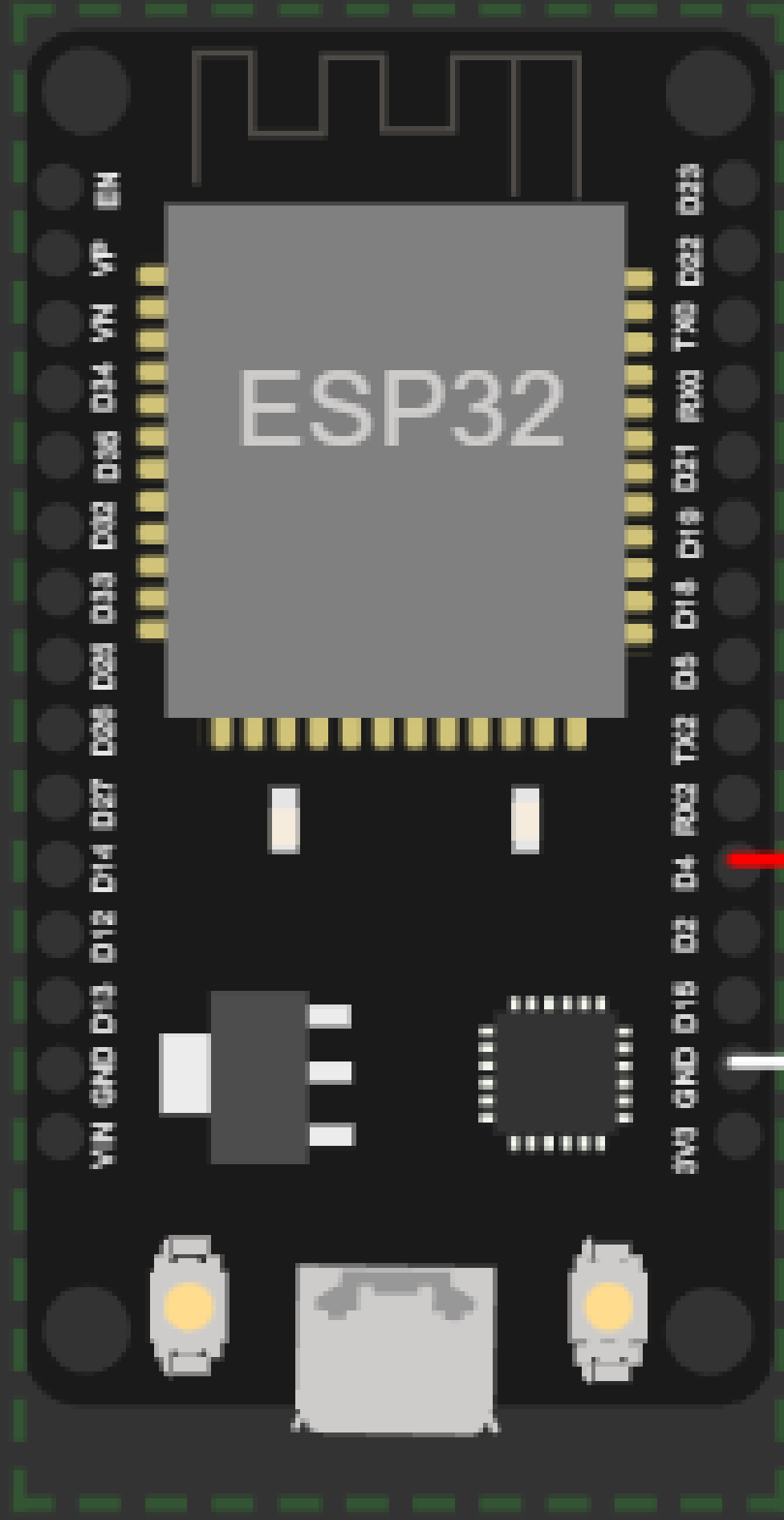
Average Voltage

Volts (V)



Volts (V)





CODE FOR LED

```
1 import machine
2 import time
3
4 # Define the LED pin
5 led_pin = machine.Pin(2, machine.Pin.OUT)
6
7 # Loop to blink the LED
8 while True:
9     led_pin.on()      # Turn on the LED
10    time.sleep(1)      # Delay for 1 second
11    led_pin.off()      # Turn off the LED
12    time.sleep(1)      # Delay for 1 second
13
```

CODE FOR LED PWM

```
1 from machine import PWM , Pin
2 import time
3
4 led = PWM(Pin(4) , 5000)
5
6 while True:
7     for duty_cycle in range(0,1023,50):
8         led.duty(duty_cycle) →
9         print(duty_cycle)
10        time.sleep(0.1)
11
12    for duty_cycle in range(1023,-1,-50):
13        led.duty(duty_cycle) →
14        print(duty_cycle)
15        time.sleep(0.5)
```

DUTY - THIS ARGUMENT IS THE VALUE YOU PROVIDE TO SET THE DUTY CYCLE.

IT SHOULD BE IN THE RANGE OF 0 TO 1023.

A DUTY CYCLE OF 0 MEANS THE SIGNAL IS ALWAYS OFF, AND A DUTY CYCLE OF 1023 MEANS THE SIGNAL IS ALWAYS ON.

THANK YOU

dypiu.ac.in