GPIO Programming for ESP32

G V V Sharma*

Abstract—This manual shows how to program the GPIO pins of the ESP32 using the Arduino IDE.

1 COMPONENTS

The components required for this manual are listed in Table I.

Component	Value	Quantity
Breadboard		1
Resistor	$\geq 220\Omega$	1
ESP 32	Uno	1
Seven Segment Display	Common Anode	1
Jumper Wires		20

TABLE I

1.1 Hardware Setup

The breadboard can be divided into 5 segments. In each of the green segements, the pins are internally connected so as to have the same voltage. Similarly, in the central segments, the pins in each column are internally connected in the same fashion as the blue columns.

Problem 1. Plug the display to the breadboard in Fig. 1

The seven segment display in Fig. 2 has eight pins, a, b, c, d, e, f, g and *dot* that take an active LOW input, i.e. the LED will glow only if the input is connected to ground. Each of these pins is connected to an LED segment. The *dot* pin is reserved for the · LED.

*The author is with the Department of Electrical Engineering, Indian Institute of Technology, Hyderabad 502285 India e-mail: gadepall@iith.ac.in. All material in this manual is released under GNU GPL. Free to use for anything.
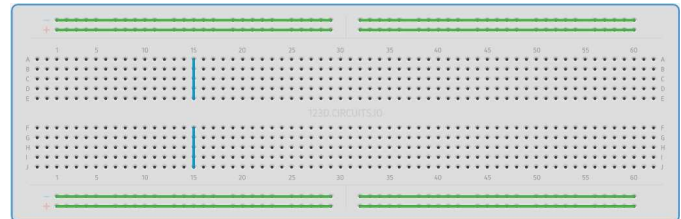

Fig. 1

Problem 2. Connect one end of the resistor to the COM pin of the display and the other end to an extreme pin of the breadboard.
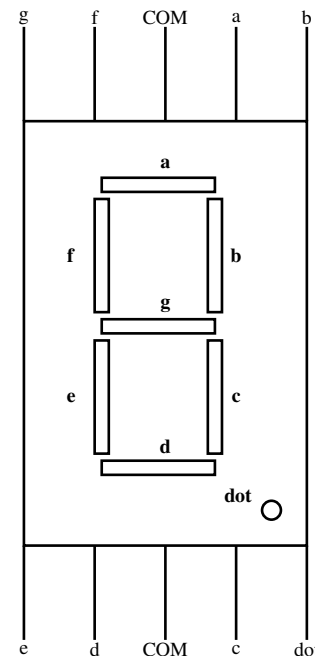

Fig. 2

Problem 3. Connect the 3.3V pin of the ESP 32 to an extreme pin that is in the same segment as the 1K resistor pin.

Problem 4. Connect the GND pin of the ESP 32

to the opposite extreme pin of the breadboard

Problem 5. Connect the ESP 32 to the computer.

Problem 6. Connect the *dot pin of the display to a pin in the same segment as the GND pin. What do you observe?*

Problem 7. Now connect the *dot pin of the display to pin D5 of the ESP 32.*

Problem 8. Run the following code. What do you observe?

```
int ledPin = 5;

void setup()
{
    pinMode(ledPin, OUTPUT);
    Serial.begin(115200);
}

void loop()
{
    digitalWrite(ledPin, HIGH);
    delay(500);
    digitalWrite(ledPin, LOW);
    delay(500);
}
```

Problem 9. Now make the connections as in Table II and write a program to generate the number 2 on the display.

D2	D4	D5	D18	D19	D21	D22	decimal
a	b	c	d	e	f	g	
0	0	1	0	0	1	0	2

TABLE II

Problem 10. Now generate all numbers between 0-9 using the above code.

Problem 11. Use a loop in the previous program to get a decade counter.