

If you want to start electronic work, start with this "LED blinking"

- The first step to start electronic work "LED blinking"
- Learn the basics with a program to turn on the LED

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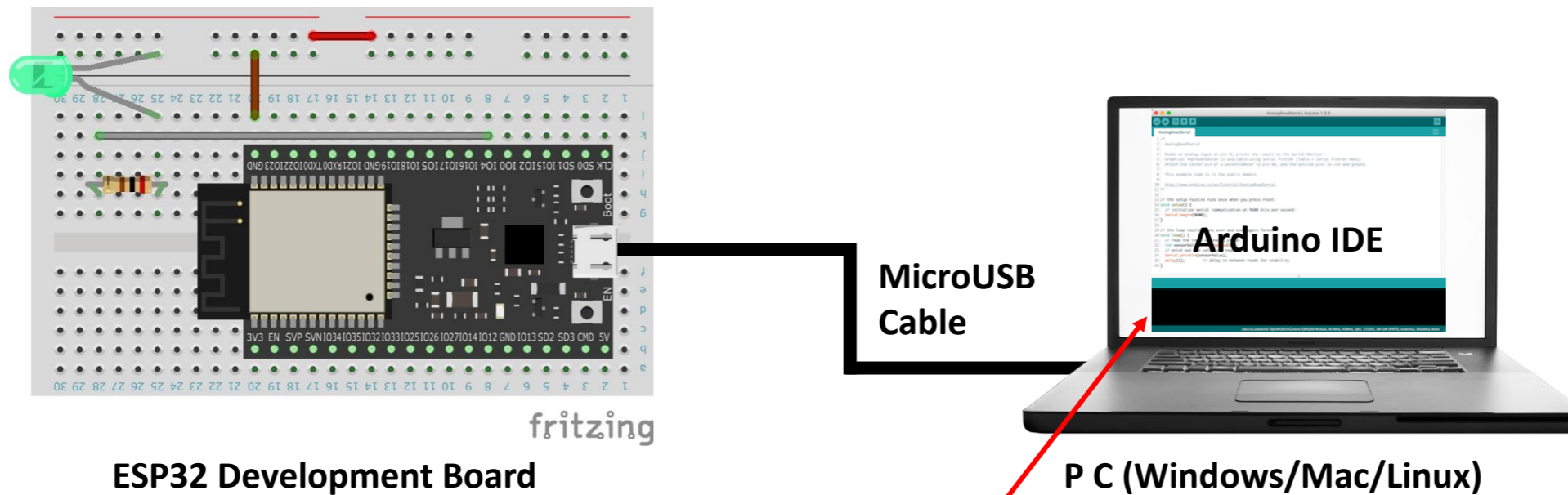
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4. Software
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1. Overall flow of Smart Remote Controller production

No	Item	Content	Hard	Soft	Note
1	Overview	Overall flow, system configuration, items used, reasons for selection, development environment, etc.	-	-	Delivered in another video
2	LED	Learn the basics for beginners. We will make "L blinking" that lights up and blinks the LED.	○	○	this time this video
3	Infrared receiving sensor	Description of infrared receiving sensor Schematic to Wiring, Software	○	○	Delivered in another video
4	Infrared transmission LED	Infrared transmission LED description Schematic to Wiring, Software	○	○	
5	LED operation with smartphone(at home)	We will create software to operate the LED with smartphone. (Web server function, SPIFFS operation)	-	○	
6	Remote control with smartphone(at home)	We will create software that to operate the remote control with smartphone indoors. (Button name, signal save/read)	-	○	
7	Operate from outside And AI speaker cooperation	We will create software to operate the remote control with smartphone from the outdoors, and AI speaker cooperation.	-	○	

1 – 2. The development environment Arduino

We will use Arduino as the development environment.



【Arduino Official site】

<https://www.arduino.cc/>

Downloadable

1 – 3. Reason for selecting ESP32 microcomputer

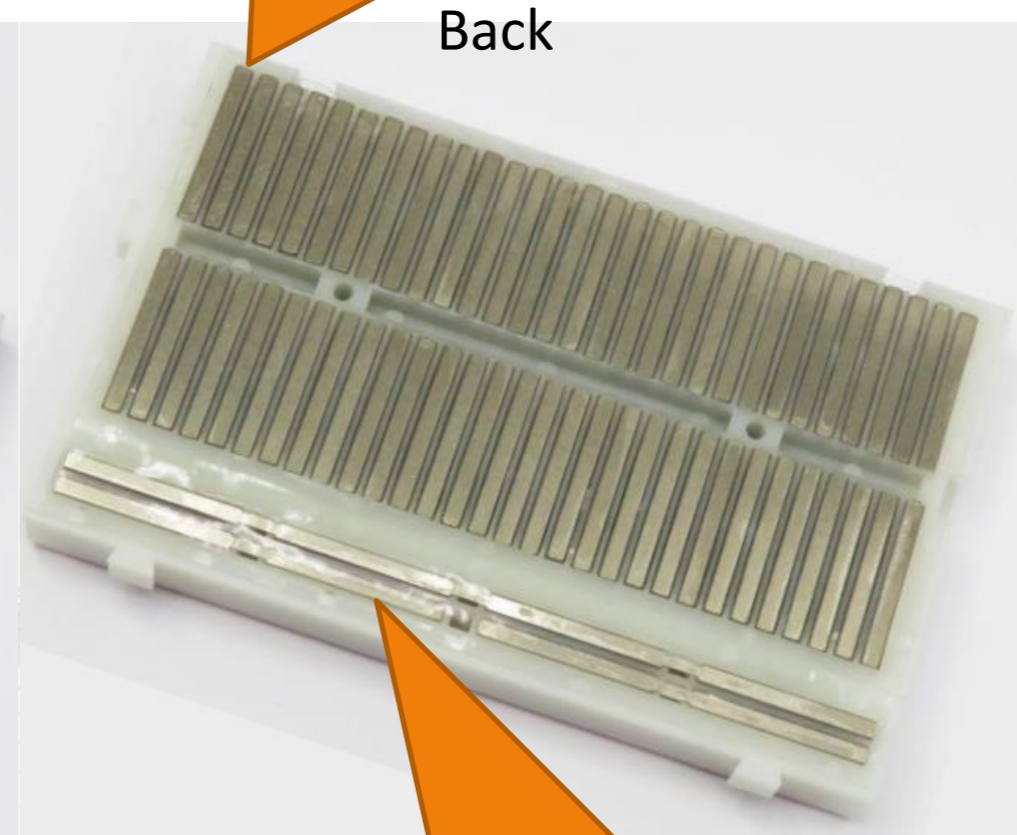
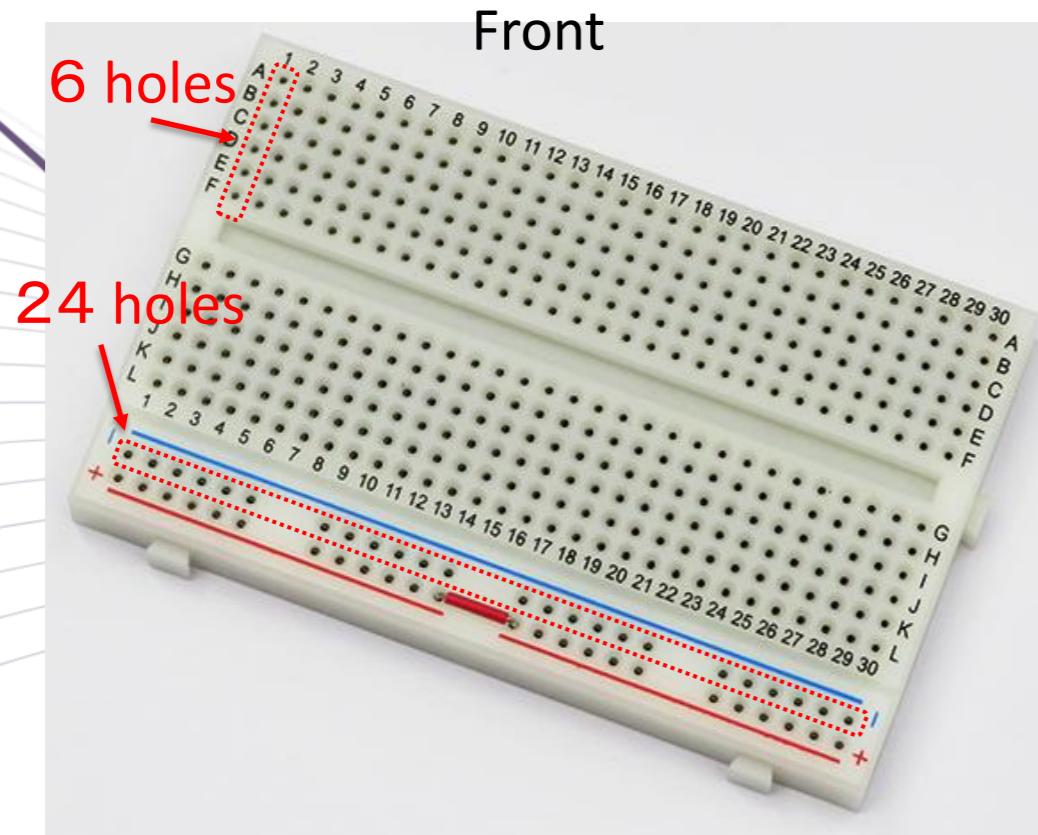
	ArduinoUNO [Arduino genuine]	ESP32 [Arduino Compatible]	RaspberryPi
		This time, here.	
Ease of learning	○ Arduino available	○ Arduino available	× Linux
Performance (CPU, memory, functions, etc.)	△ Low compared to ESP32	○ Sufficient performance for use with IoT devices	◎ high performance
Versatility	○ Sufficient for electronic work	○ Sufficient for electronic work	◎ AI can also be developed and has high versatility

1 – 4. Types of microcomputer ESP32 development boards

	Espressif System		Third-party
	ESP32-WROOM	ESP32-WROVER	ESP32
	This time, here.		
Legal compliance	○ Fits in most cases		△ Rare violation of law
Flash memory	○ 4Mbyte [SRAM: 512Kbyte]	◎ 8Mbyte	-
Price	○ Inexpensive compared to other products	○ Inexpensive compared to other products	◎ Cheaper than regular product

1 – 5. Bread board

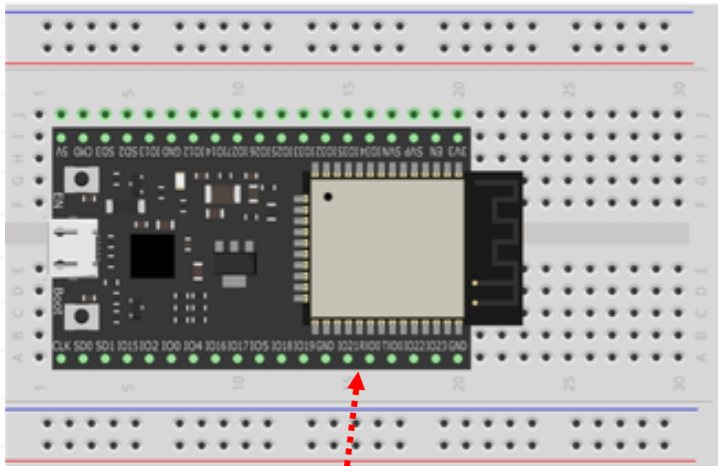
All 6 holes on the side are all conducting



Each vertical 2Line is conducting

6-2. Breadboard selection <<ESP32 development board (genuine) 19pin * 2 lines>>

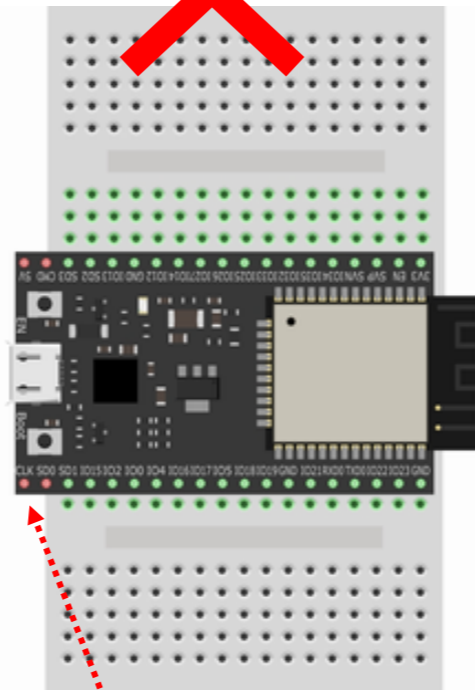
① Breadboard 5 holes * 30 rows



Since there is no empty hole for wiring on one side, the following measures are necessary

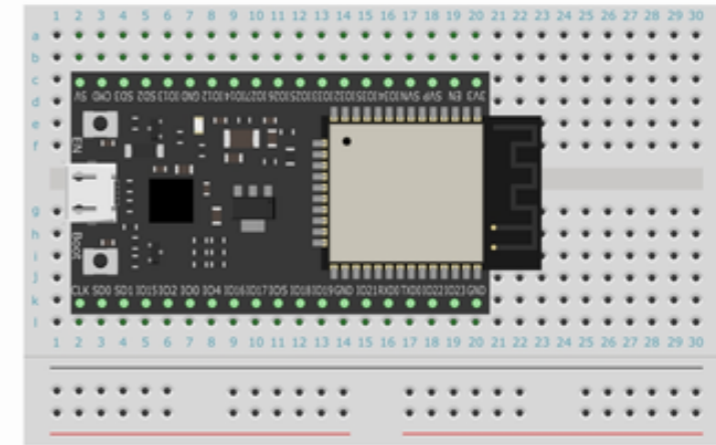
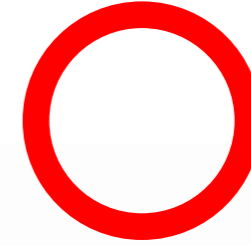
- Use only one side.
- Use by wiring under ESP32
- Use with two breadboards

② Mini breadboard



Since there are only 17 rows, 19pin cannot be entered

③ Breadboard 6 holes * 30 rows



Adopted
this time

fritzing

2. Schematic and resistance calculation

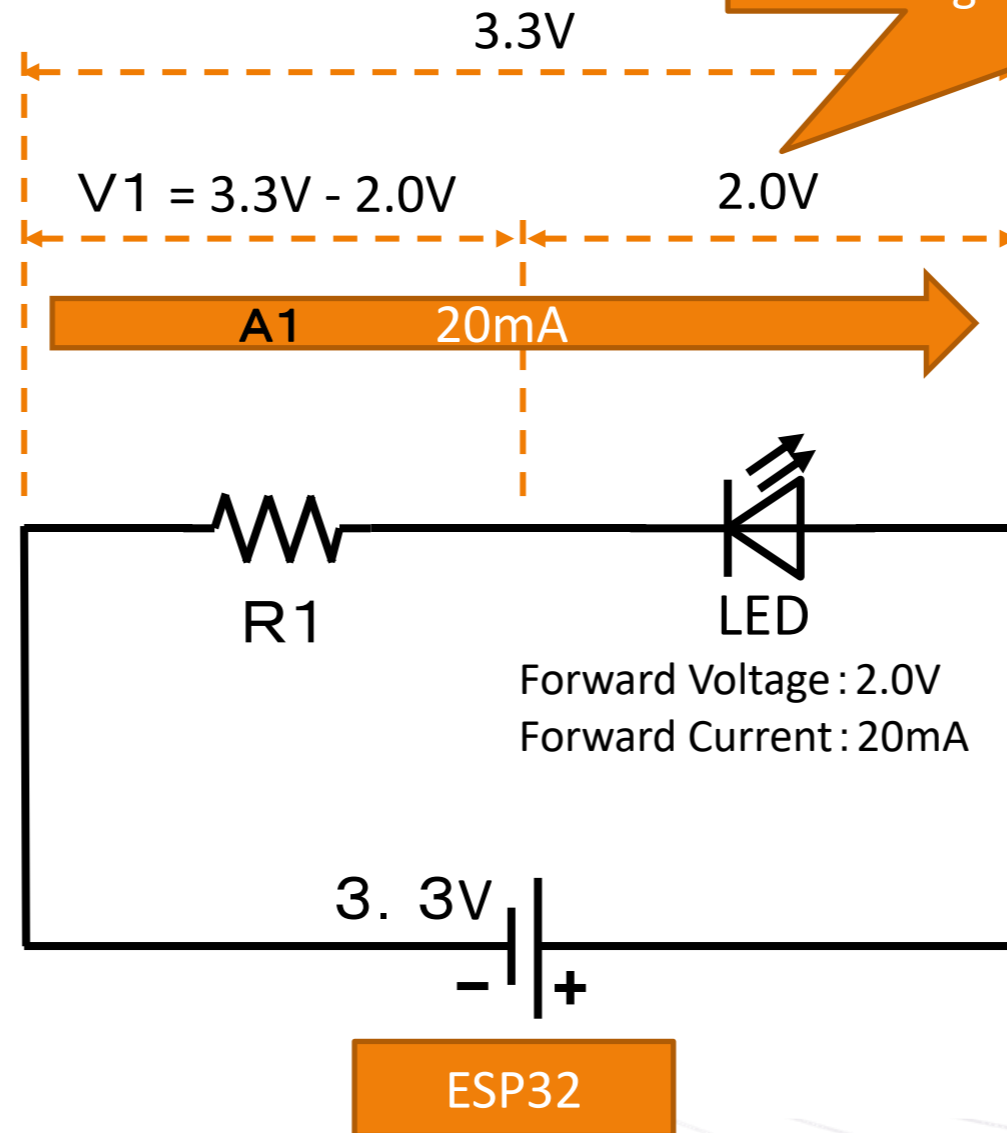
[Calculation of resistance value]

(Ohm's law)

$$R1 = \frac{V1}{A1}$$
$$= \frac{3.3V - 2.0V}{0.02A(20mA)} = 65 \Omega$$

It was too bright with 65Ω,
so there is no problem with a larger
Resistance.

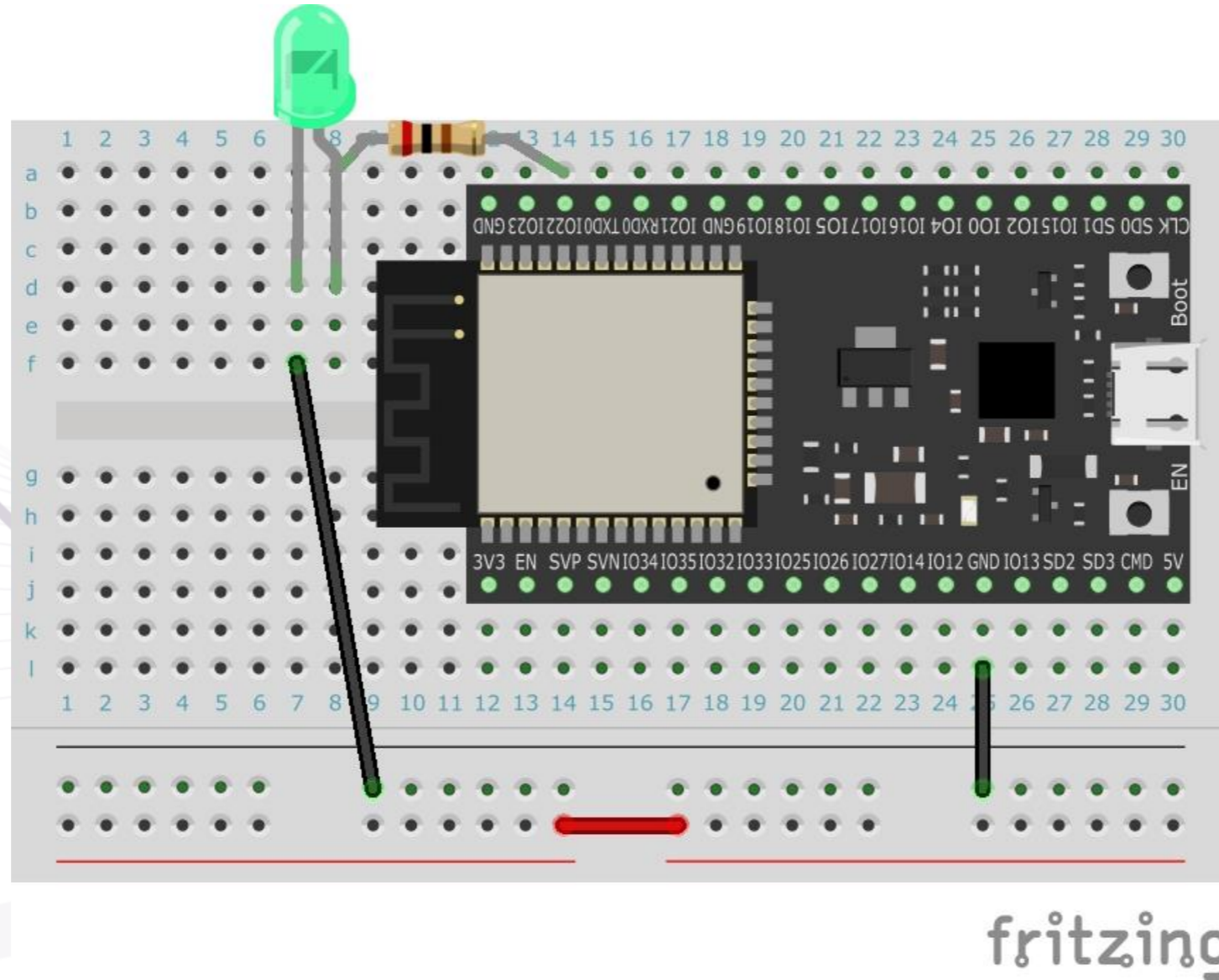
Therefore, **200Ω** is adopted this time



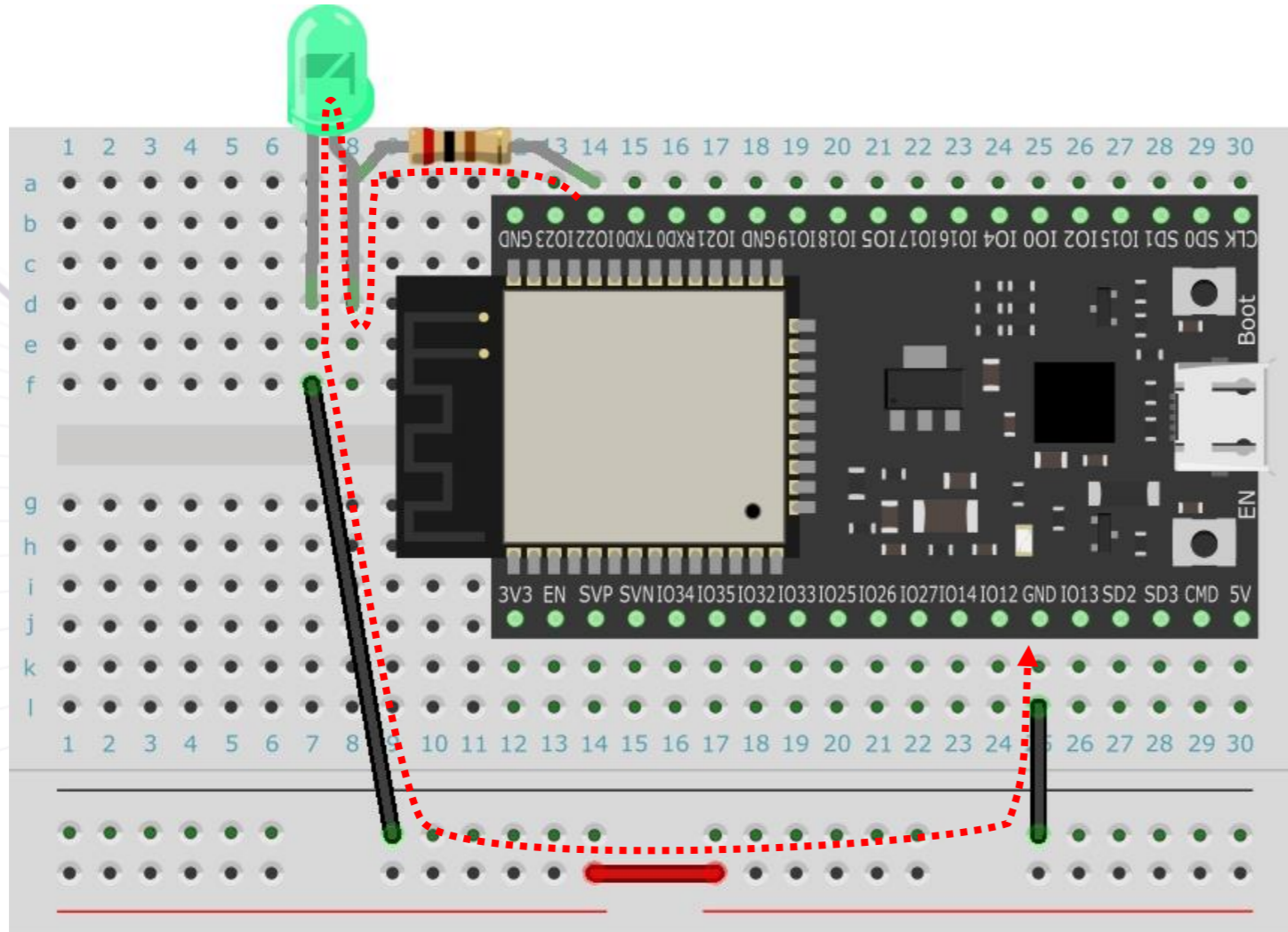
Due to the performance of the LED,
the voltage is constant at 2.0V,
so the resistance value is obtained by the
following formula to flow a current of 20mA.

ESP32

3-1. Wiring diagram



3-2. Current flow

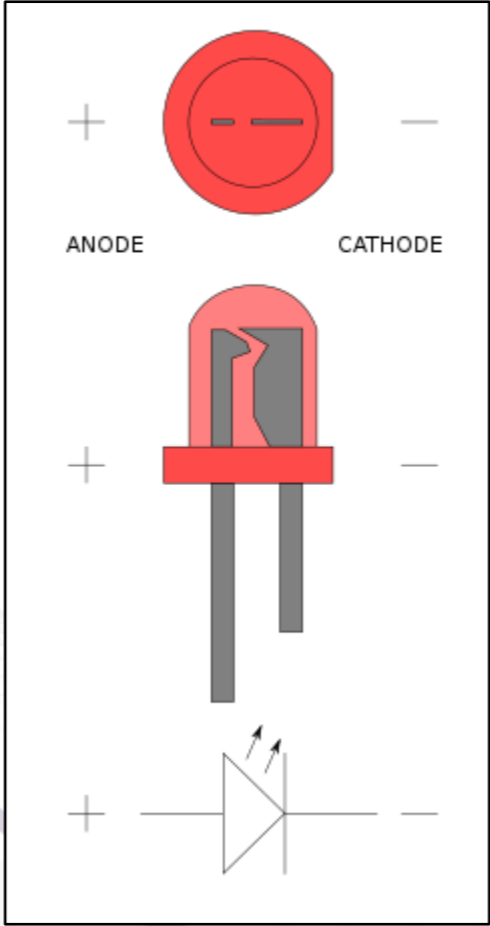


- Program to send current to ESP32 pin

```
const byte LED_PIN = 22;
```

```
digitalWrite(LED_PIN, HIGH);
```

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Arduino Software Specifications

