

STM32基于HAL库实现 LED 亮灭（中断模式）

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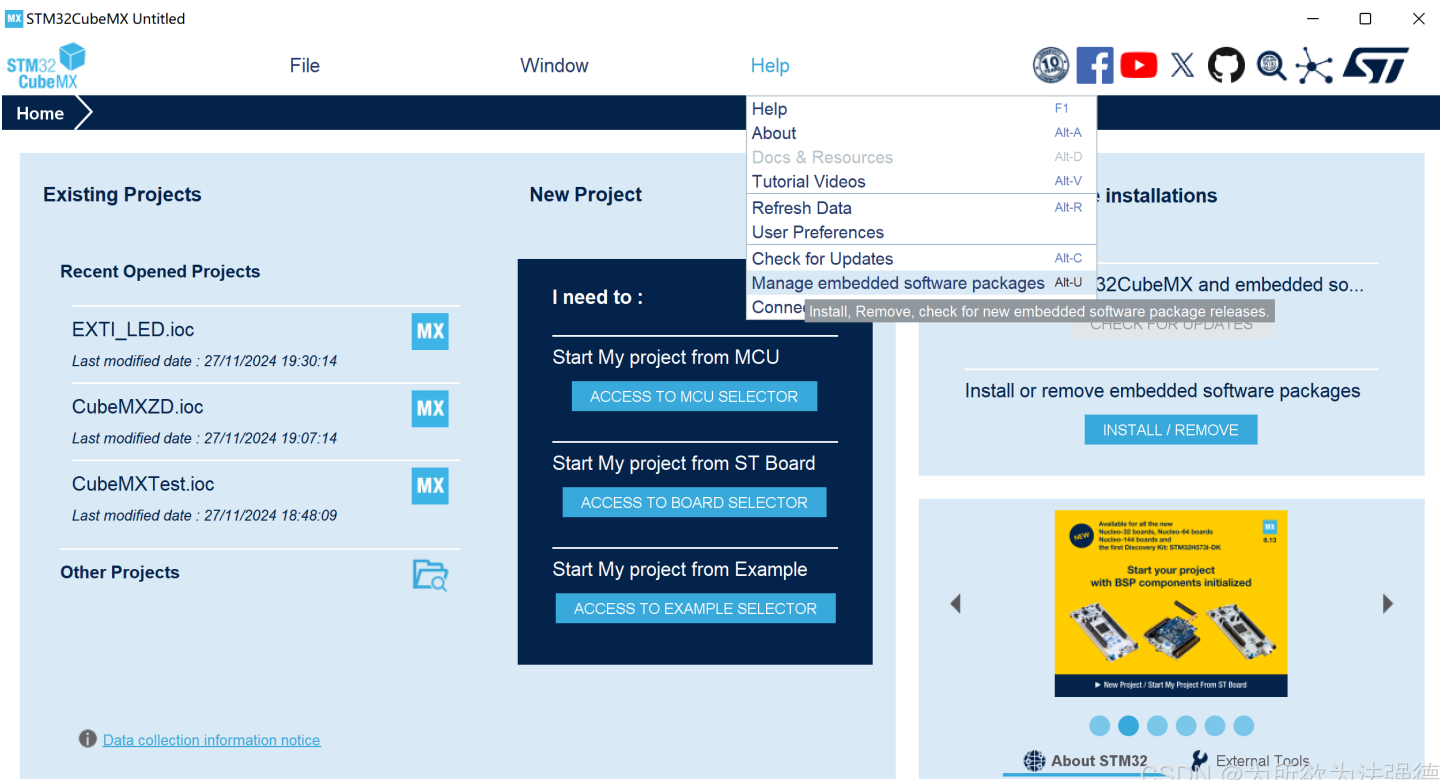
- 一、配置STM32开发环境
- 二、使用CubeMX生成代码
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- 四、参考文献

一、配置STM32开发环境

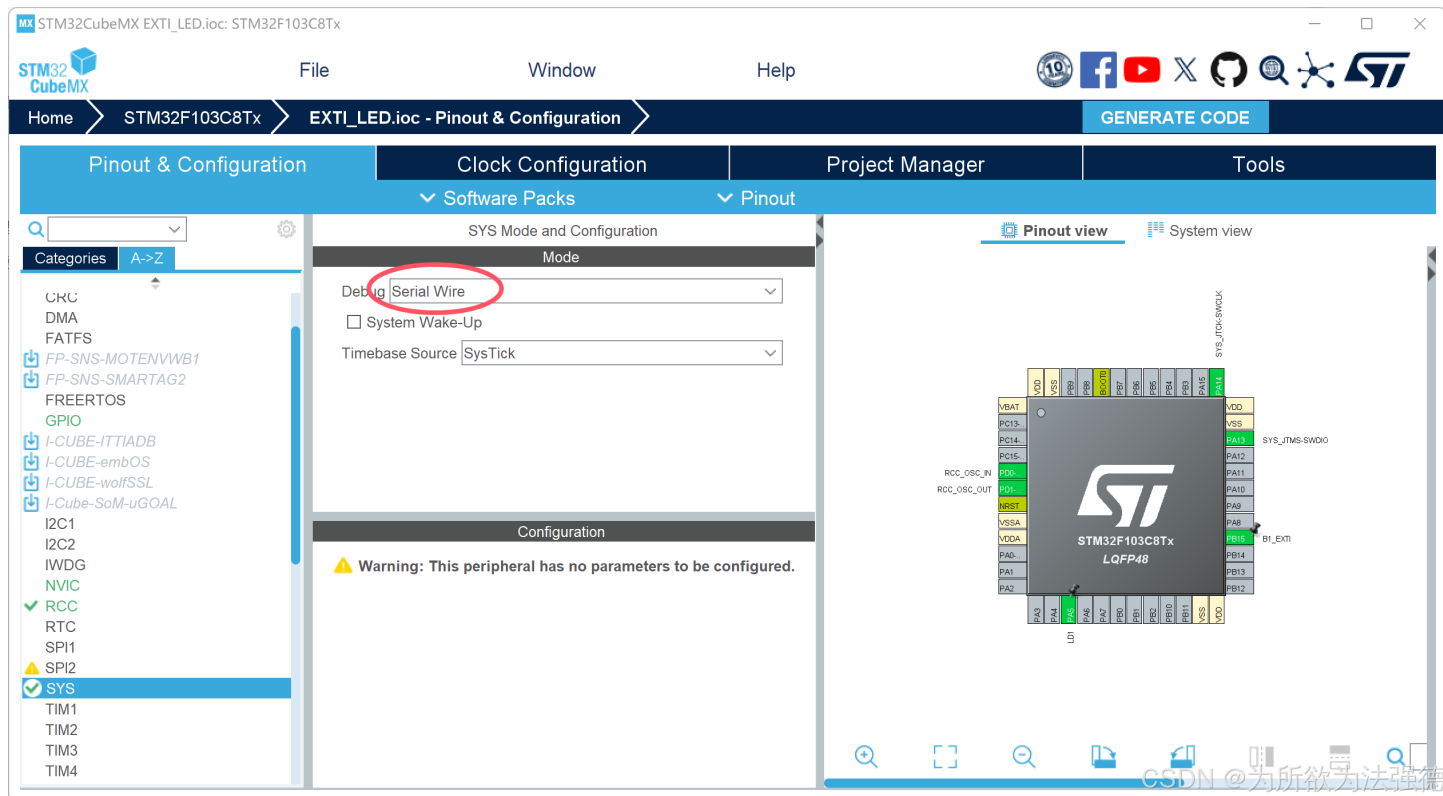
参考博客：STM32基于HAL库的流水灯实验-CSDN博客

二、使用CubeMX生成代码

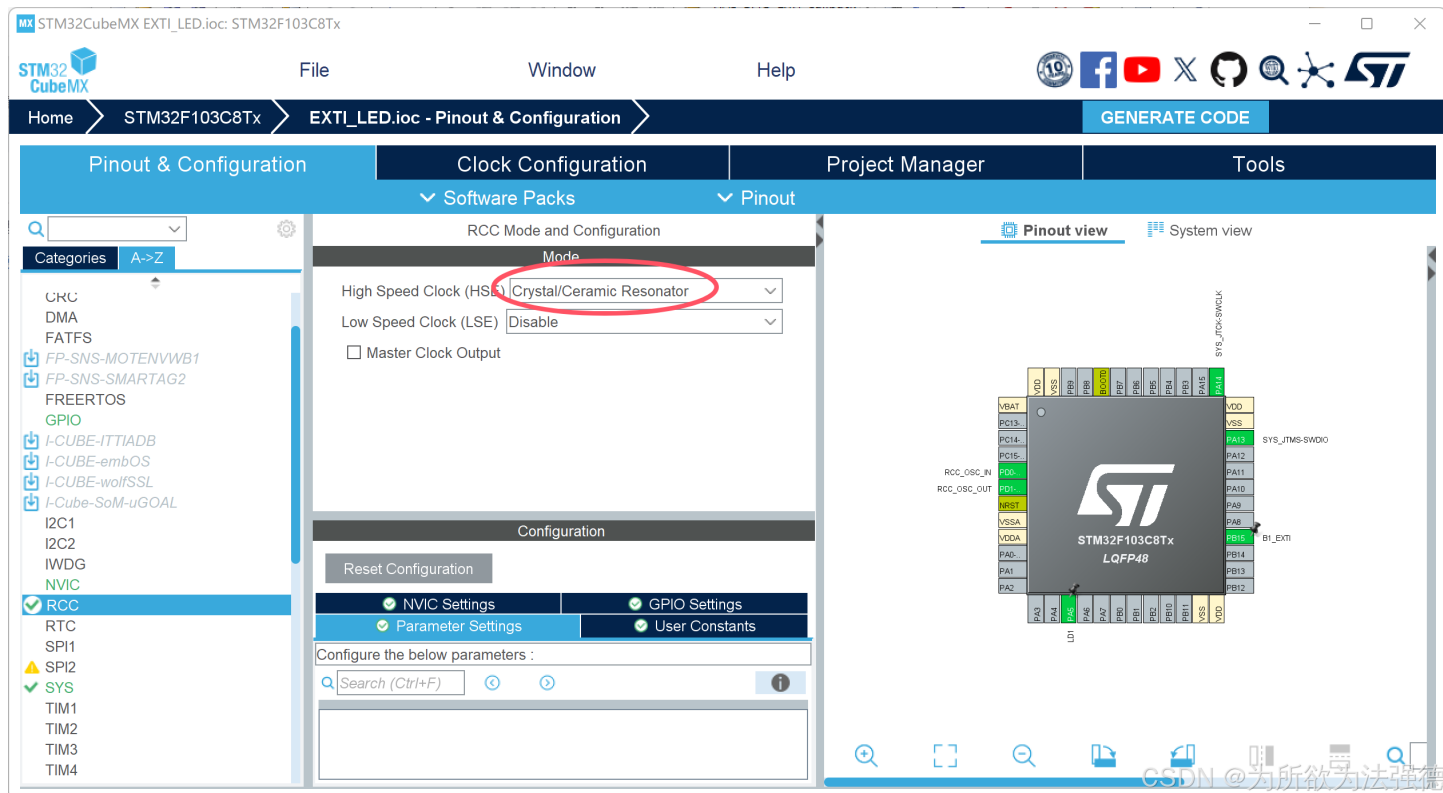
1.创建新工程



2.SYS选择Senal Wire



3. RCC选择Crystal/Ceramic Resonator



2. 选择芯片类型

New Project from a MCU/MPU

MCU/MPU Selector Board Selector Example Selector Cross Selector

MCU/MPU Filters

Commercial Part Number: **STM32F103C8T6**

PRODUCT INFO

- Segment
- Series
- Line
- Marketing Status
- Price
- Package
- Core
- Coprocessor

MEMORY

- Flash = 64 (kBytes)
- EEPROM = 0 (Bytes)
- RAM Total = 20 (kBytes)
- RAM = 20 (kBytes)
- CCM RAM = 0 (kBytes)

STM32F1 Series

STM32F103C8T6

Mainstream Performance line, Arm Cortex-M3 MCU with 64 Kbytes of Flash memory, 72 MHz CPU, motor control, USB and CAN

Unit Price for 10k (US\$) : **2.7946**

LQFP 48 7x7x1.4 mm

The STM32F103xx medium-density performance line family incorporates the high-performance Arm® Cortex®-M3 32-bit RISC core operating at a 72 MHz frequency, high-speed embedded memories (Flash memory up to 128 Kbytes and SRAM up to 20 Kbytes), and an extensive range of enhanced I/Os and peripherals connected to two APB buses. All devices offer two 12-bit ADCs, three general purpose 16-bit timers plus one PWM timer, as well as standard and advanced communication interfaces: up to two I²Cs and SPIs, three USARTs, an USB and a CAN. The devices operate from a 2.0 to 3.6 V power supply. They are available in both the -40 to +85°C temperature range and the -40 to +105 °C extended temperature range. A comprehensive set of power-saving mode allows the design of low-power applications. The STM32F103xx medium-density performance line family includes devices in six different package types: from 36 pins to 100 pins. Depending on the device chosen, different sets of peripherals are included, the description below gives an overview of the complete range of peripherals proposed in this family.

MCUs/MPUs List: 2 items

Commercial Part No.	Part No.	Reference	Marketing St...	Unit Price for 10k...	Board	Package	Flash	RAM	I/O	Frequ...
STM32F103C8T6	STM32F103C8T6	STM32F103C8Tx Active		2.7946		LQFP 48 7x7x1.4 mm	64 kBytes	20 kBytes	37	72 MHz
STM32F103C8T6...	STM32F103C8T6...	STM32F103C8Tx Active		2.7946		LQFP 48 7x7x1.4 mm	64 kBytes	20 kBytes	37	72 MHz

3.GPIO端口选择配置

选择 LED 灯引脚 PA5，设置引脚为输出模式 GPIO_Output;

选择作为外部中断的引脚 PB15，设置为与中断线 GPIO_EXTI15 连接

STM32CubeMX EXT1_LED.ioc: STM32F103C8Tx

File Window Help

Home > STM32F103C8Tx > EXT1_LED.ioc - Pinout & Configuration

GENERATE CODE

Pinout & Configuration Clock Configuration Project Manager Tools

Software Packs Pinout

GPIO Mode and Configuration

Configuration

Group By Peripherals

GPIO RCC SYS NVIC

Search Signals

Search (Ctrl+F)

Show only Modified Pins

Pin	Signal	GPIO	GPIO Mode	GPIO P...	Maxim...	User L...	Modified
PA5	n/a	Low	Output...	No pull...	Low	LD1	✓
PB15	n/a	n/a	Extern...	No pull...	n/a	B1_EXTI	✓

Select Pins from table to configure them. Multiple selection is Allowed.

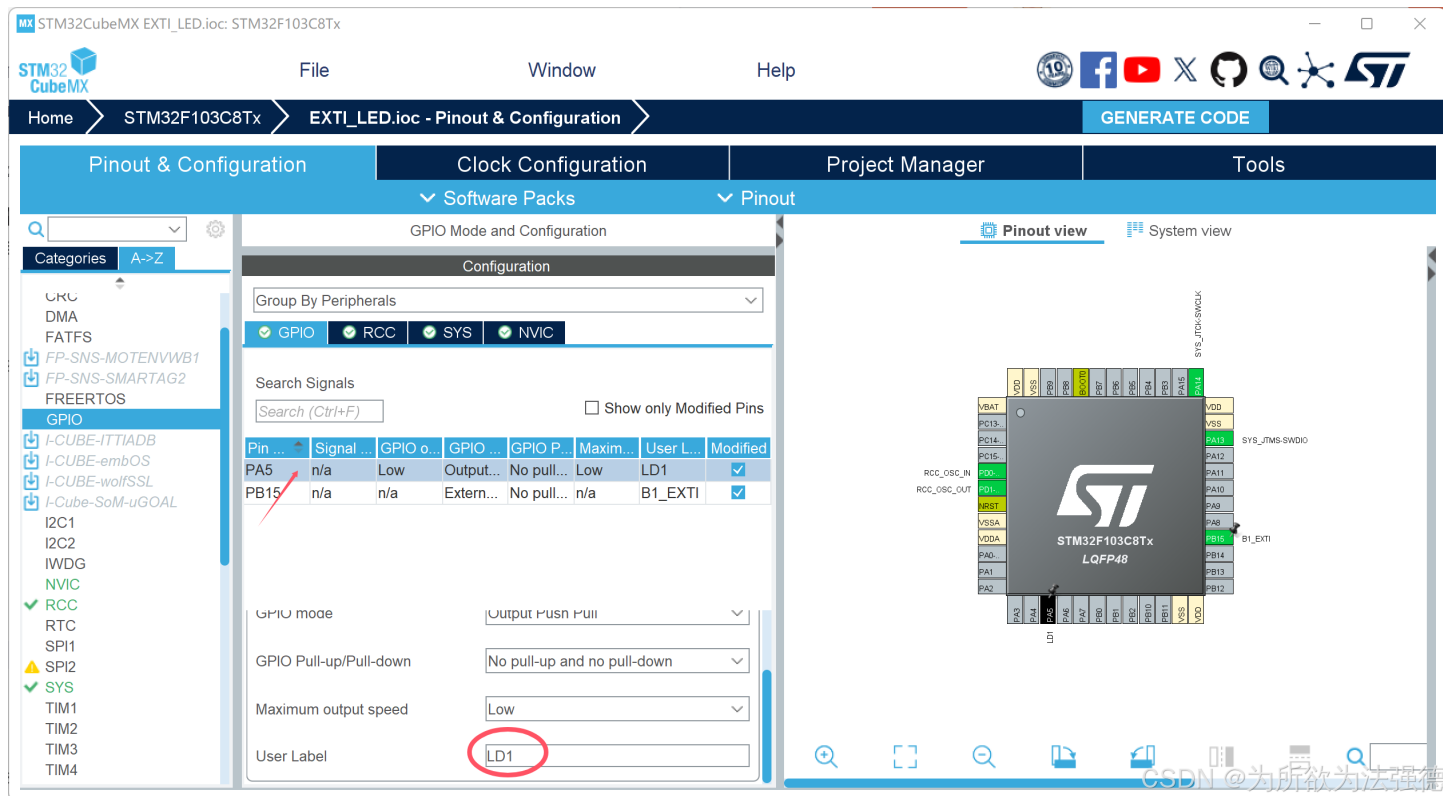
Pinout view System view

STM32F103C8Tx LQFP48

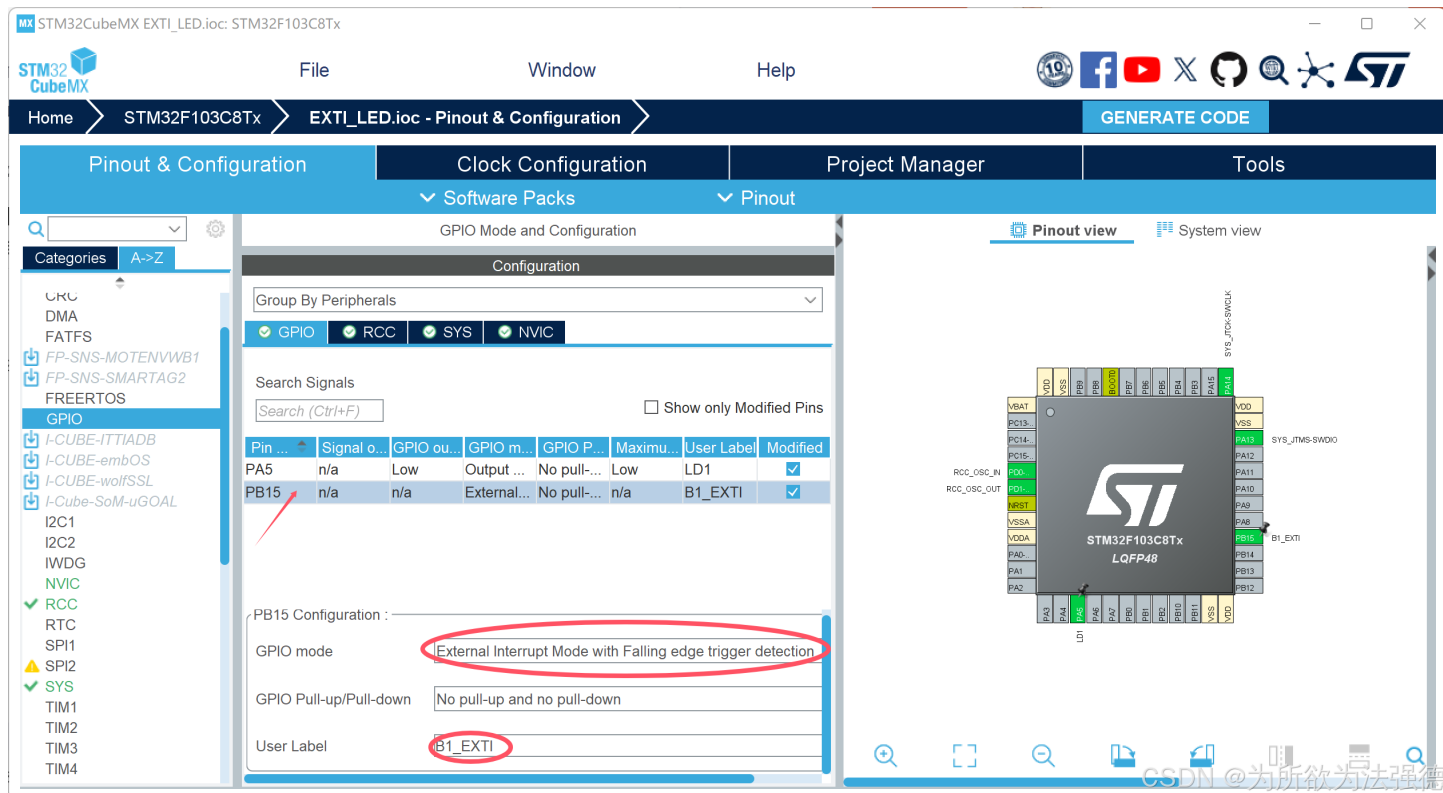
PA5

PB15

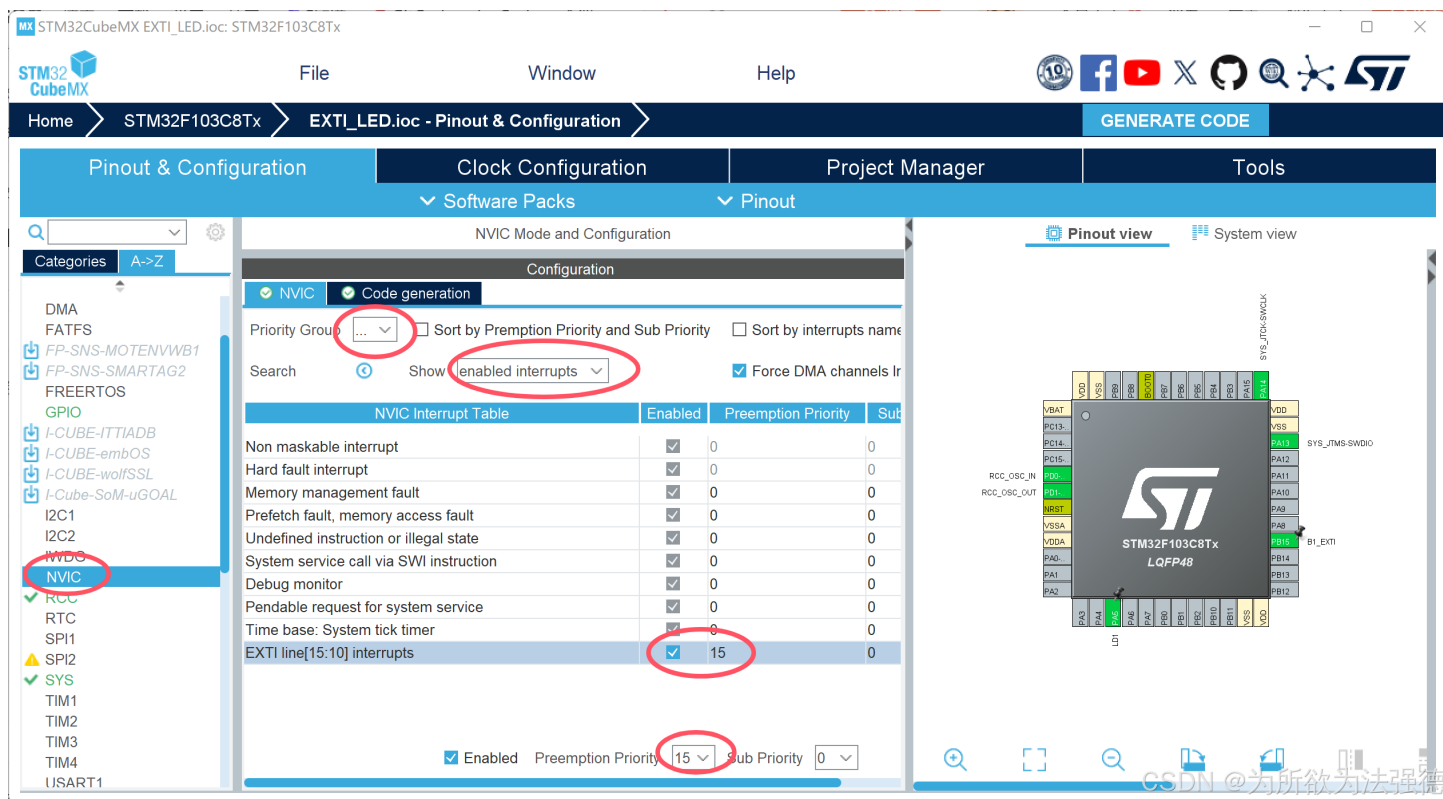
将 GPIO_PA5 命名为 LD1



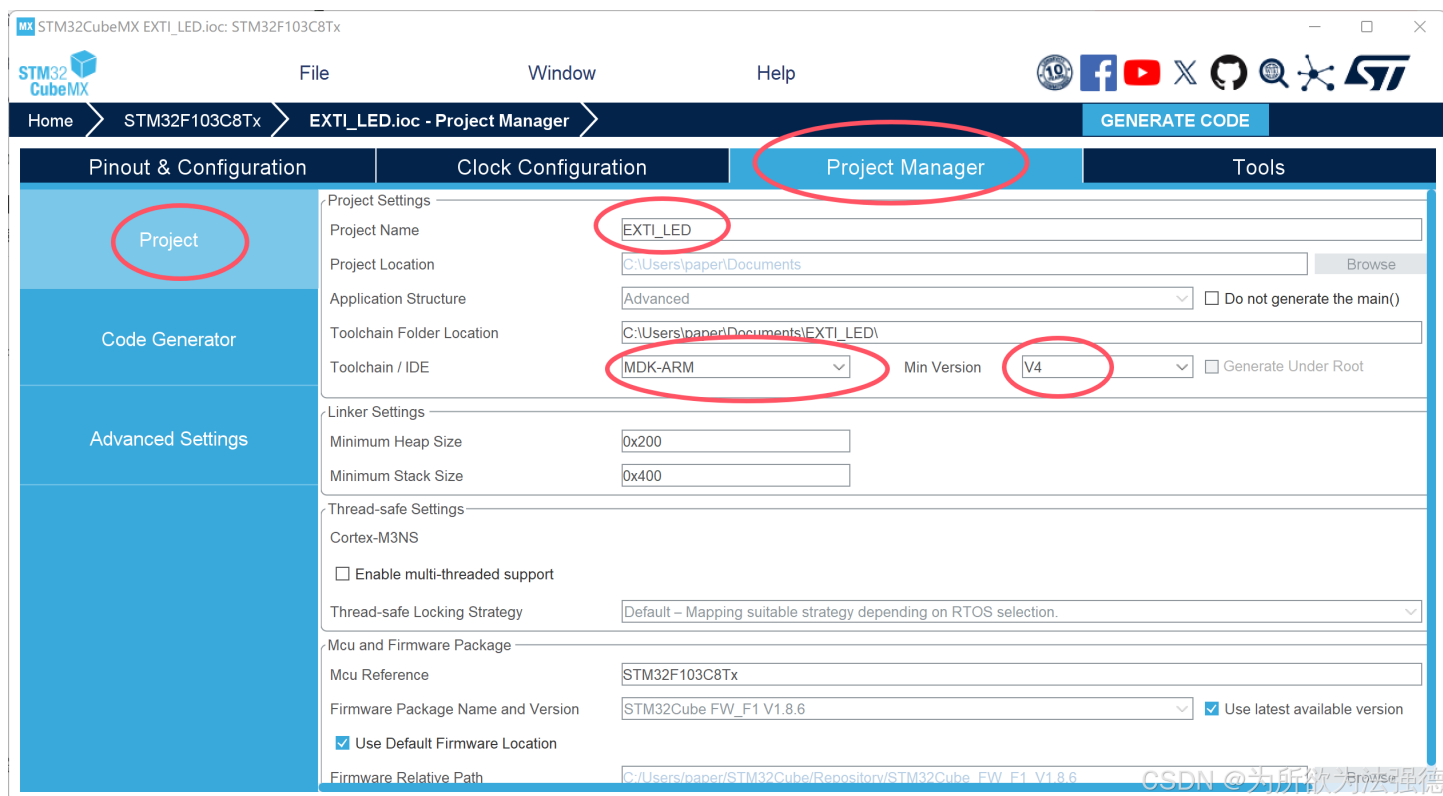
将 GPIO_PB15 命令为 B1_EXTI，触发方式选择下降沿触发

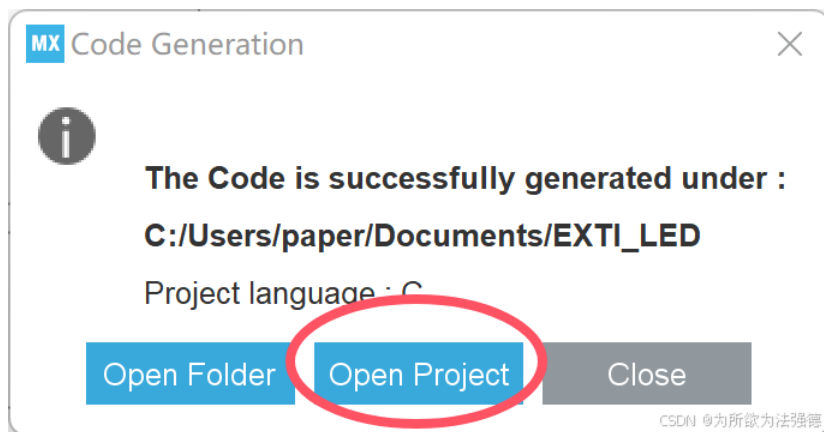
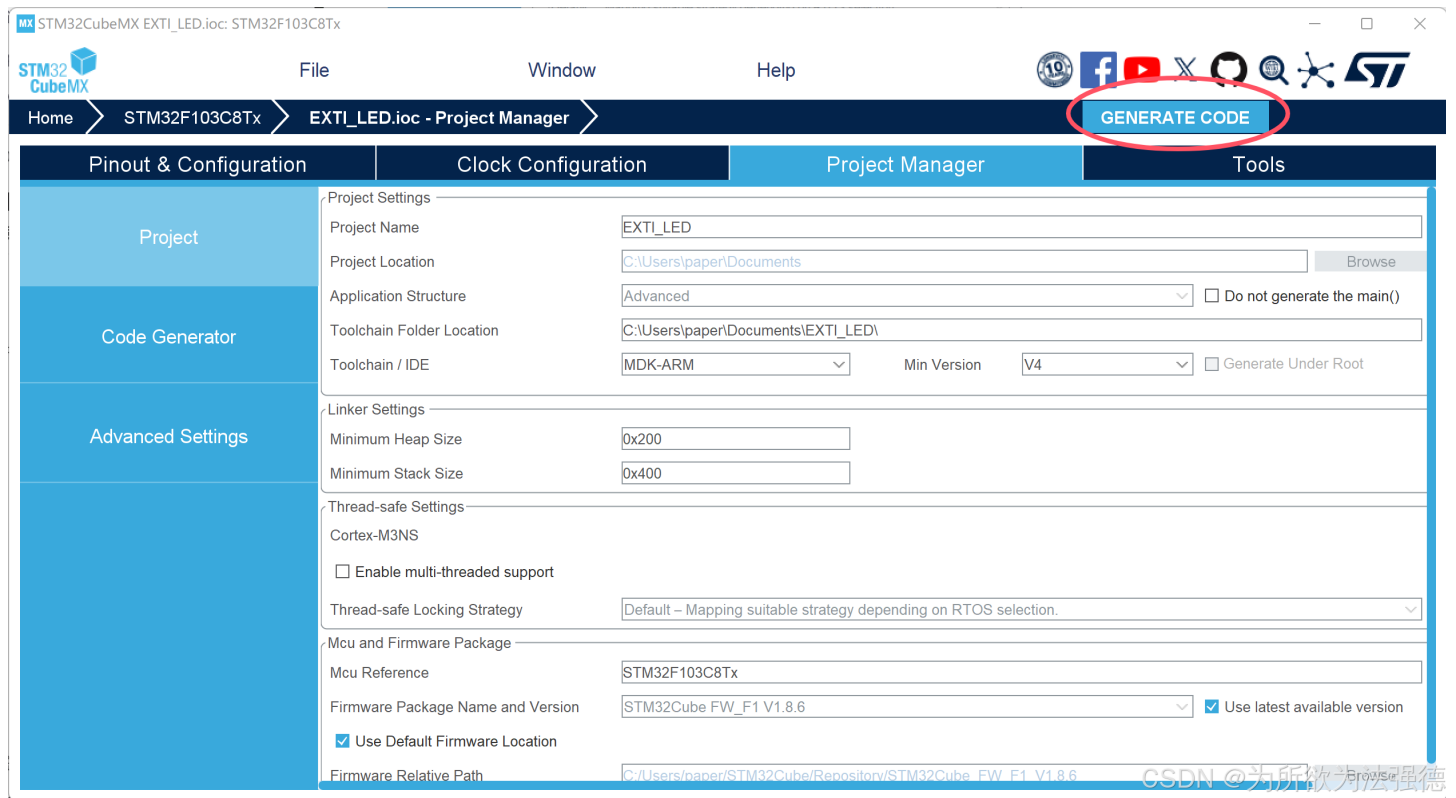


配置中断优先级



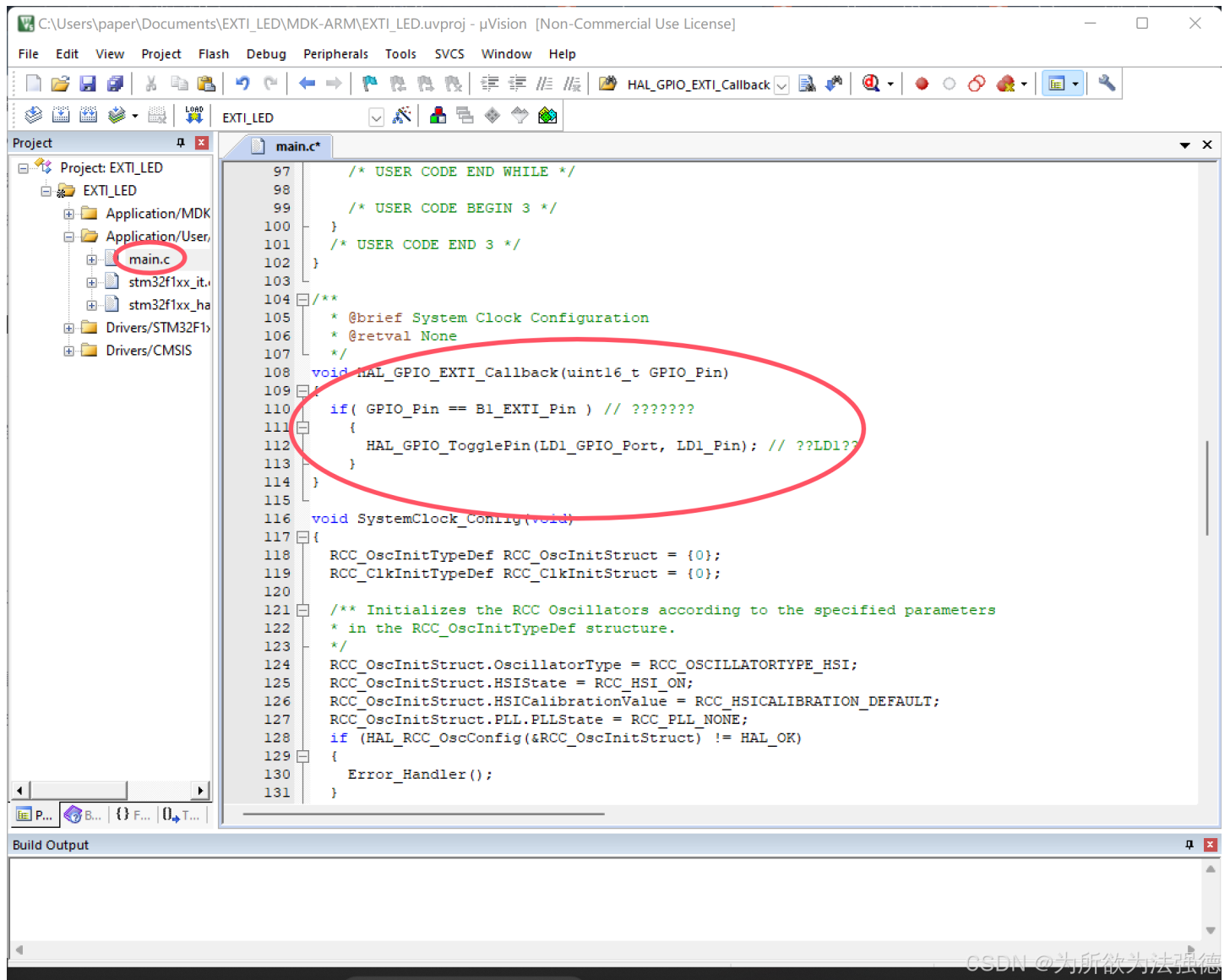
4.生成并打开代码





5.修改代码

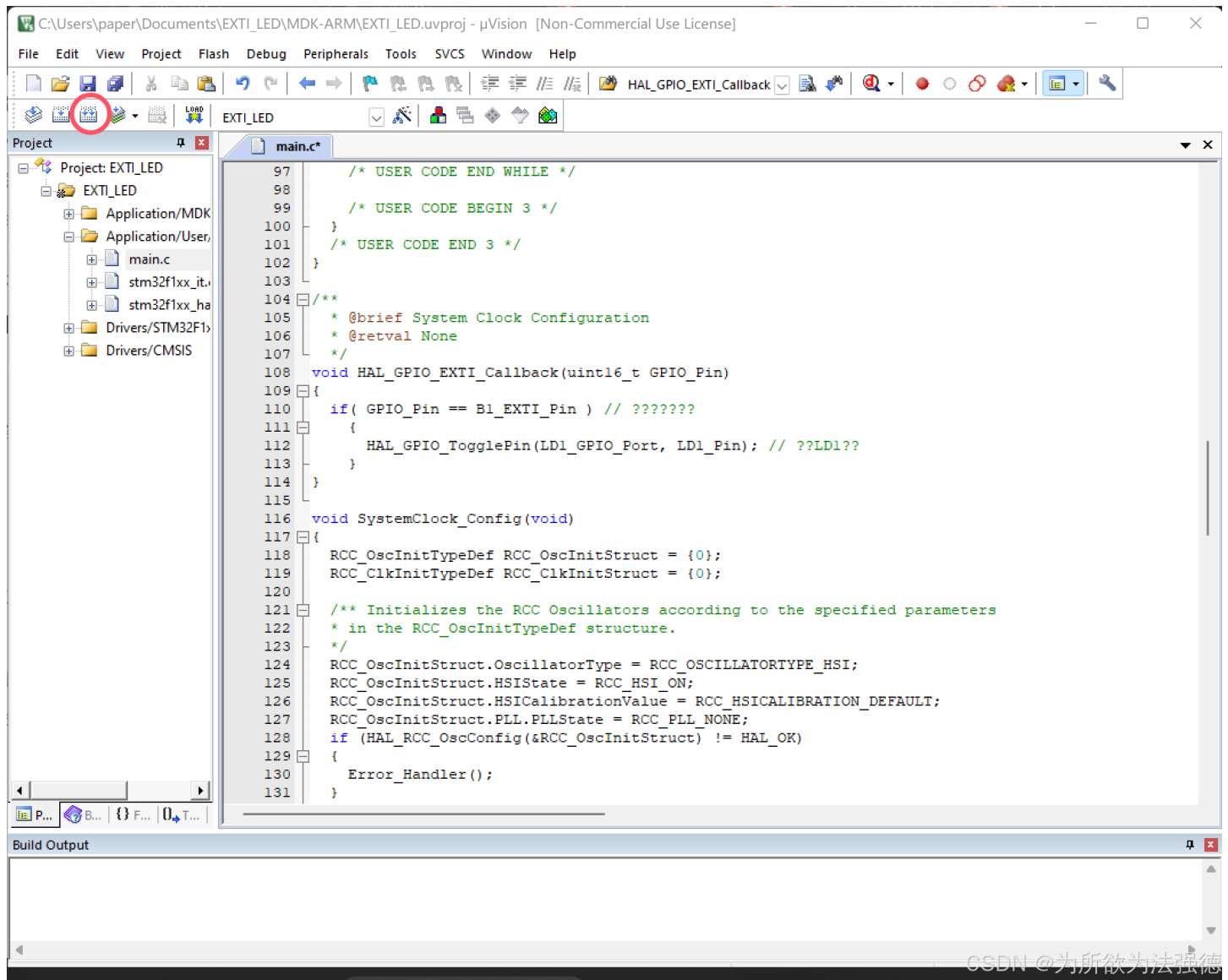
在main函数中添加函数

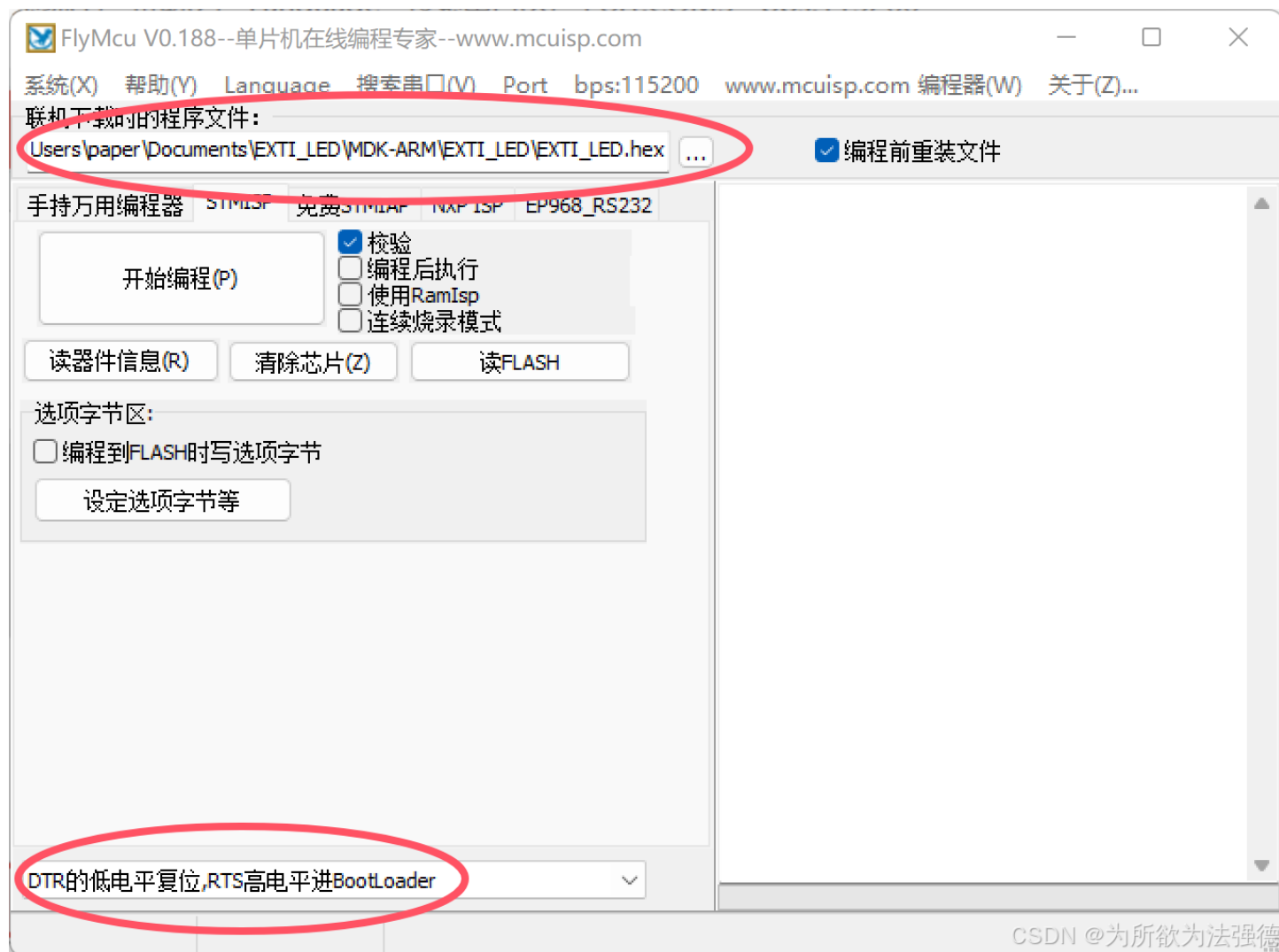


GSDN @为所欲为法强德

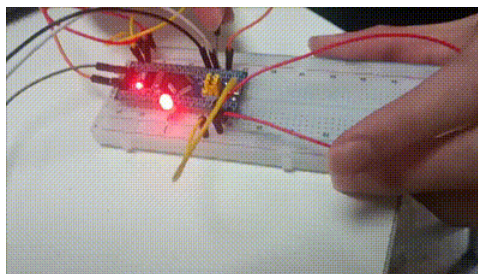
```
1
2 void HAL_GPIO_EXTI_Callback(uint16_t GPIO_Pin)
3 {
4     if( GPIO_Pin == B1_EXTI_Pin ) // 判断外部中断源
5     {
6         HAL_GPIO_TogglePin(LD1_GPIO_Port, LD1_Pin); // 翻转LD1状态
7     }
8 }
```

6.生成编辑生成.hex文件

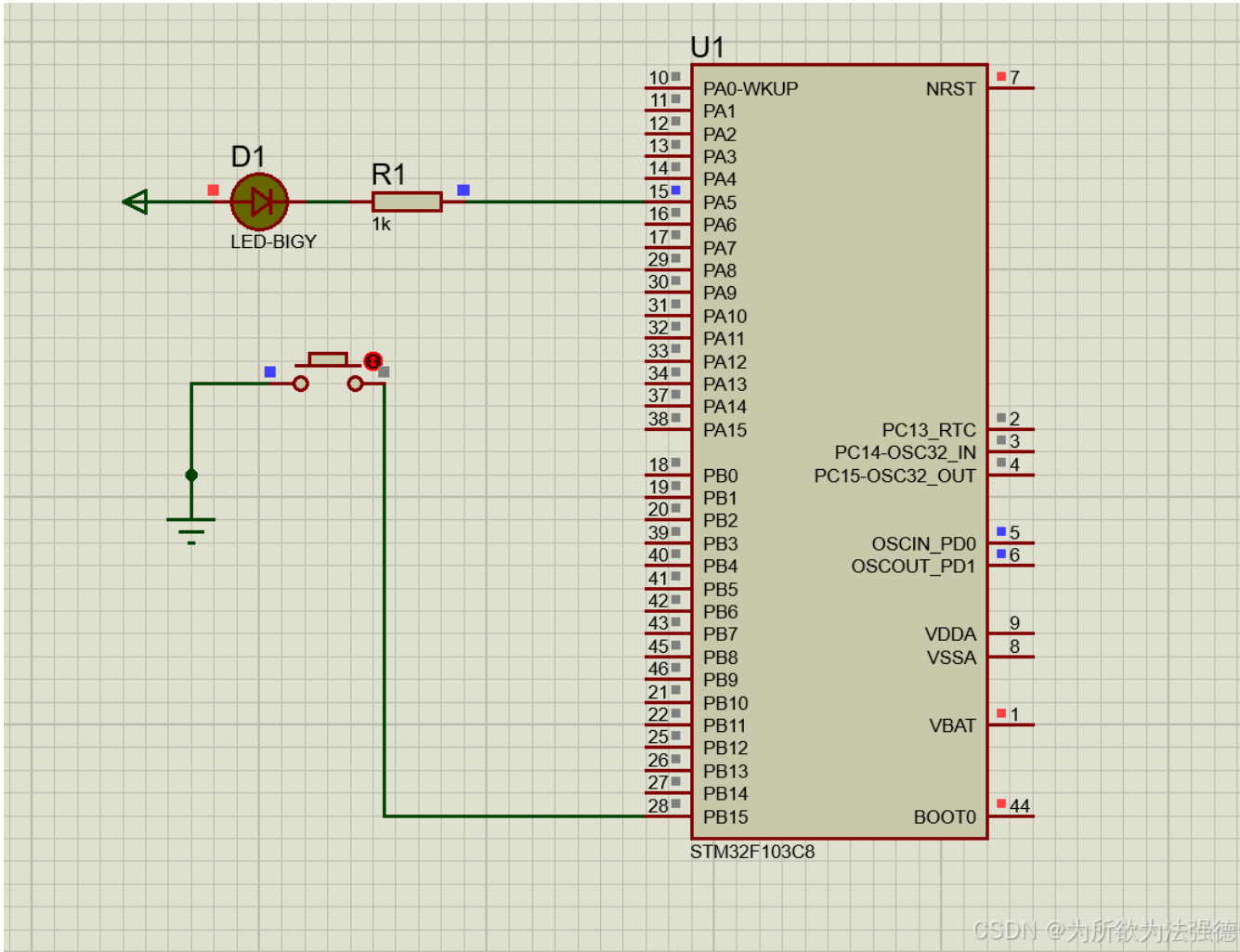




7.效果图



三、proteus仿真



四、总结

使用CubeMX生成代码能比较方便地实现中断控制灯的亮灭，但需要注意GPIO引脚高低电平的设置和优先级的处理。在实验中是用杜邦线模拟代替开关，不考虑消抖，如果是按键开关就需要延迟消抖处理。

五、参考文献

HAL 库 STM32CubeMX 实现 LED 亮灭----中断模式_stm32f103 中断控制两个led同时亮灭-CSDN博客