

Toggling a LED

Objective:

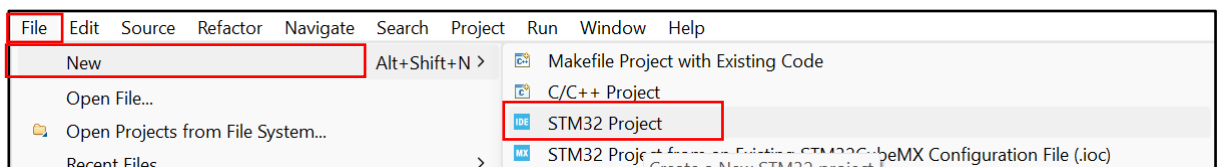
The main objective of this experiment is to understand the basics of GPIOs, how a pin can be configured as an output or an input pin etc. By understanding these, we will configure the **PA 5** pin of the microcontroller as a **GPIO Output** pin, because the LD2, which is in-built on the microcontroller, is connected to this pin. Then with the help of code we will change the state of the LED.

Requirements:

- STM32 Cube IDE software.
- STM32 Microcontroller.
- USB Cable for the microcontroller.
- PC or Laptop.

Procedure:

1. Click on **File**→**New**→**STM32 Project** to start your project on Cube IDE.



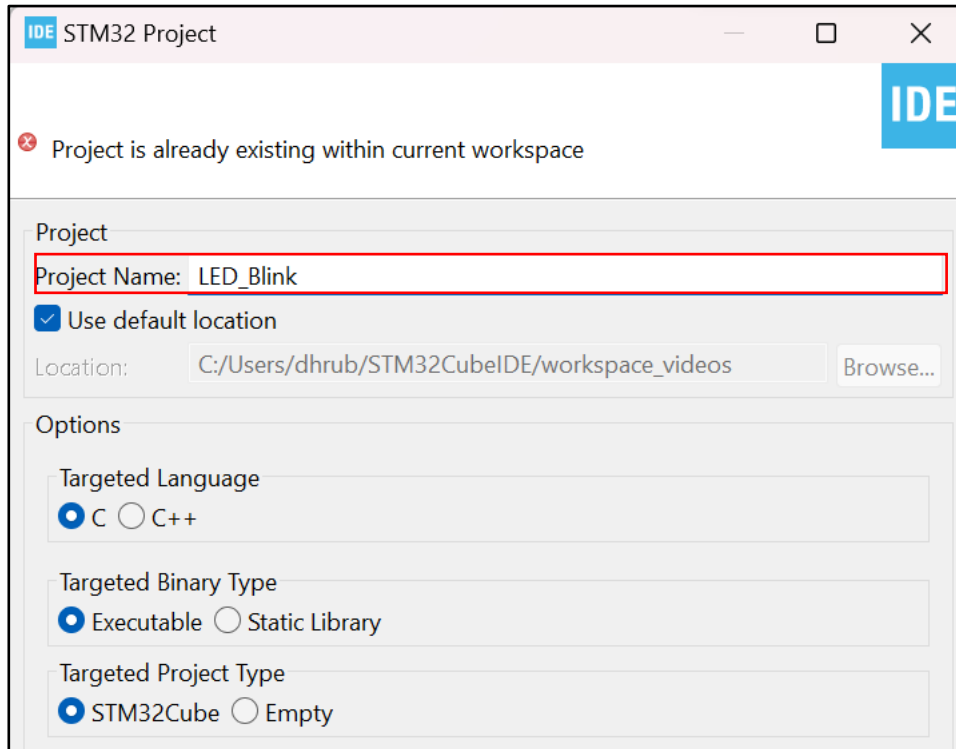
2. A **Target Selection** window will open. Click on **Board Selector**, where you need to select the microcontroller board you are working with.



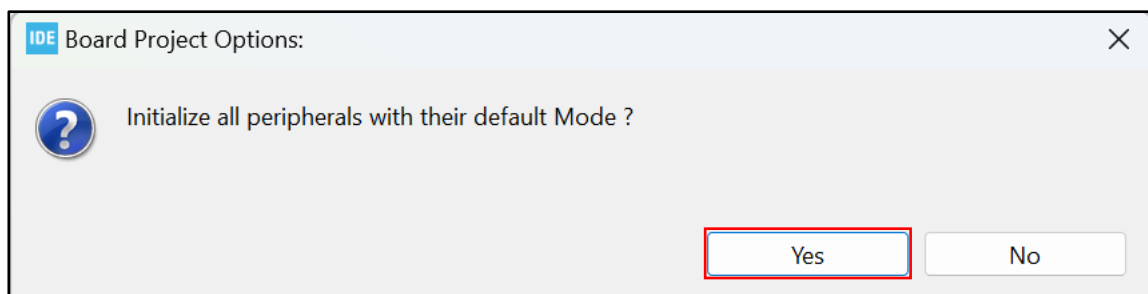
3. After this on the right-hand side of the window, under **Board List** you will see the board you have selected. Click on the board and then click on **Next**.



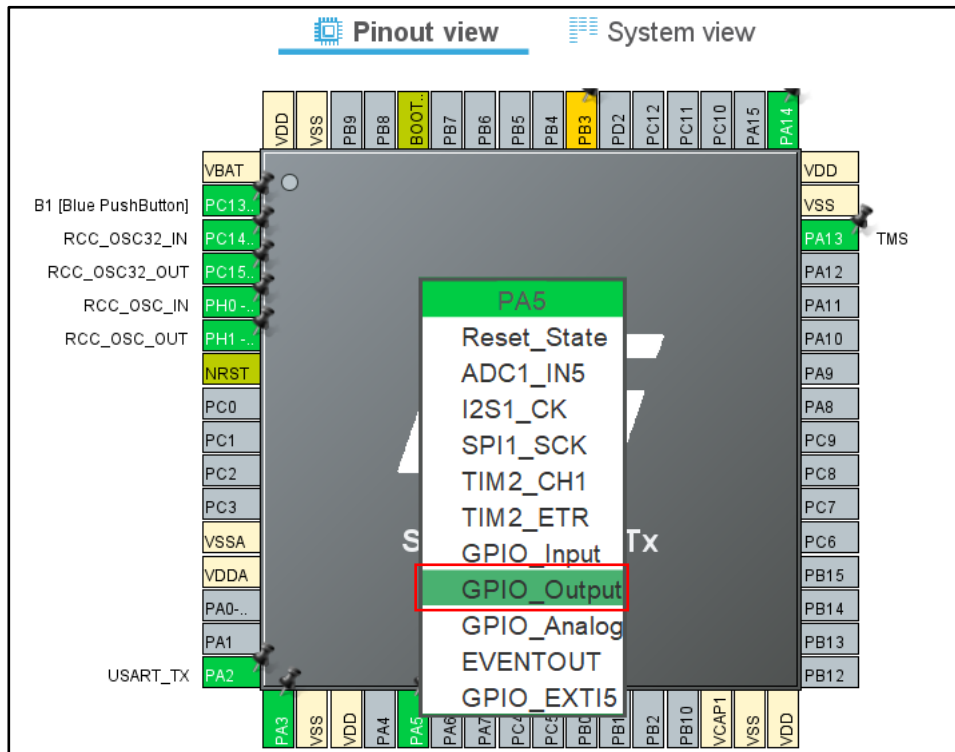
4. Give your project a name, rest of the things will remain as default. Click on **Finish**.



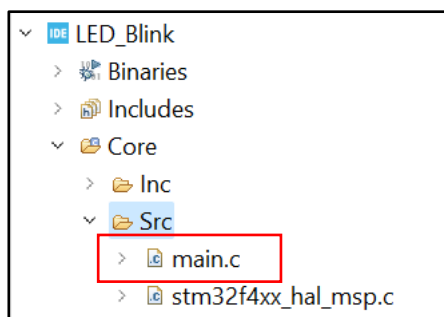
5. Cube IDE will ask if you want to initialize all peripherals with their default mode, click on **Yes**.



6. In the **Pinout & Configuration** tab, click on **PA5** pin and select it as **GPIO_OUTPUT**, if it is not selected by default.



- Press **Ctrl+S** to generate your code or you can go to **Project → Generate Code**. On the left-hand side of the Cube IDE, under **Project Explorer** go to the project you have created (For example I have named my project as LED_Blink) **LED_Blink → Core → Src → main.c** (double click to load the code).




- Cube IDE automatically generates a code format based on the configurations you have done. Cube IDE used HAL libraries. Below are the code snippets, put your code in the appropriate places in the **main.c** file. You can blink an LED with two different coding methods. Two separate code snippets are provided for these two methods.

```

95  /* Infinite loop */
96  /* USER CODE BEGIN WHILE */
97  while (1)
98  {
99      HAL_GPIO_WritePin(GPIOA, GPIO_PIN_5, GPIO_PIN_SET);
100     HAL_Delay(500);
101     HAL_GPIO_WritePin(GPIOA, GPIO_PIN_5, GPIO_PIN_SET);
102     HAL_Delay(500);
103     /* USER CODE END WHILE */

```




```
95  /* Infinite loop */
96  /* USER CODE BEGIN WHILE */
97  while (1)
98  {
99      HAL_GPIO_TogglePin(GPIOA, GPIO_PIN_5);
100     HAL_Delay(500);
101     /* USER CODE END WHILE */
```

9. Now click on the build  symbol on the top left corner on your Cube IDE. If you have done everything correctly your code should be built without any errors.

```
CDT Build Console [LED_Blink]

Finished building: LED_Blink.list

19:41:55 Build Finished. 0 errors, 0 warnings. (took 1s.369ms)
```

10. Next connect your STM32 board to your PC and click on the **Debug**  icon to start the Debugging process. An **Edit Configuration** window will open, click on **OK**, without making any changes.
11. In debugging mode click on the **Resume** icon  to run your code. You should be able to see the led on-board your STM32 board blinking.
12. To move out of the debugging mode, click on the **Terminate** icon . You will be moved out of the debugging mode. Congratulations you have just completed your first project on STM32 Cube IDE!

Note: All important steps and parts are highlighted with a red colour box for the proper understanding of the user. This document is for the use of education purpose only.