ELEC 3300 – CubeMX

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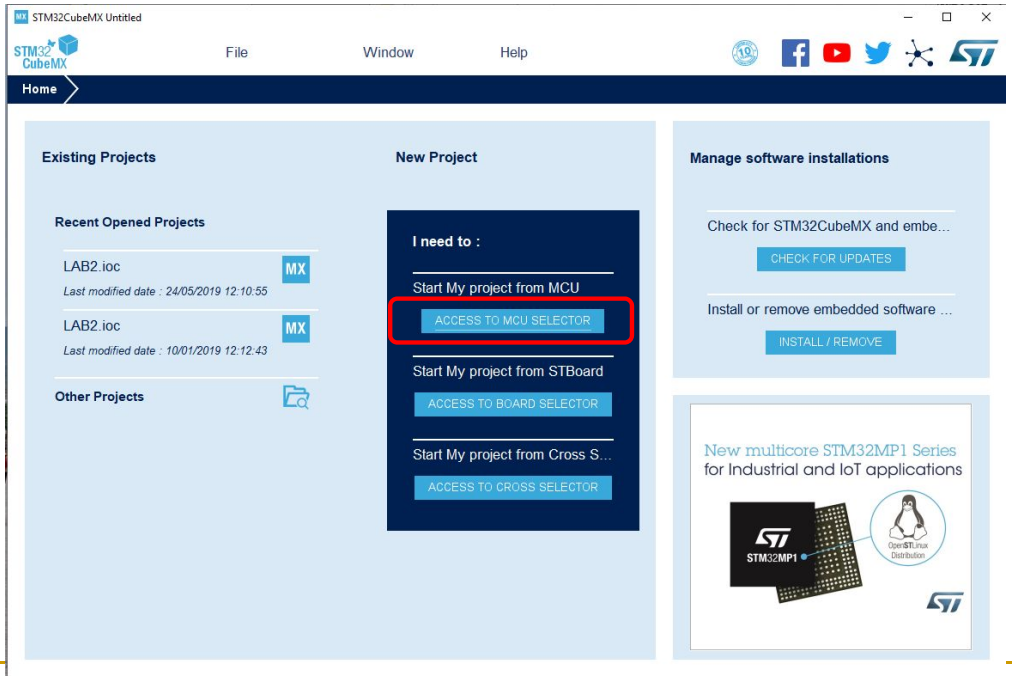
About CubeMX

- CubeMX is a official software to generate the initialization code for all the platforms.
- https://www.st.com/en/development-tools/stm32cubemx.html
- In our LABs, you need to use it to generate the Project Template

- Please note that this tutorial is just only for your troubleshooting and simple demonstration of how can we use the CubeMX to connect to our MINI V3 Board.
- For complete integration and connection for each LAB, you need to check the Canvas for both resources of CubeMX and the Development Tools.

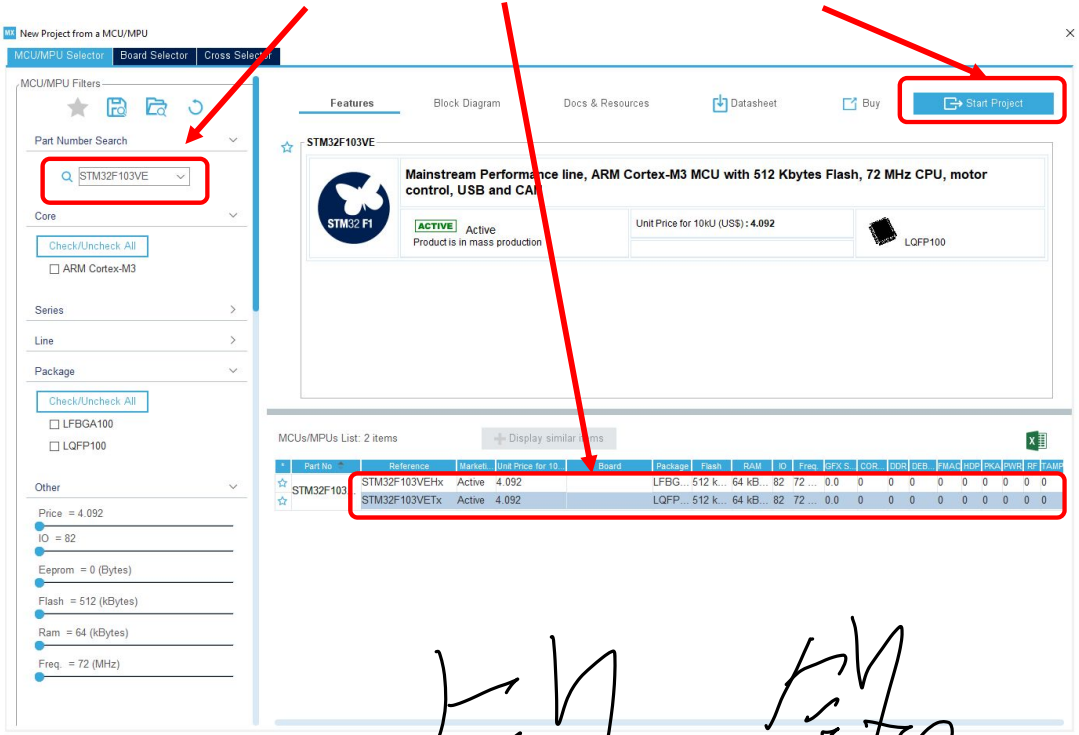
MCU Selector

- After installation, choose MCU Selector



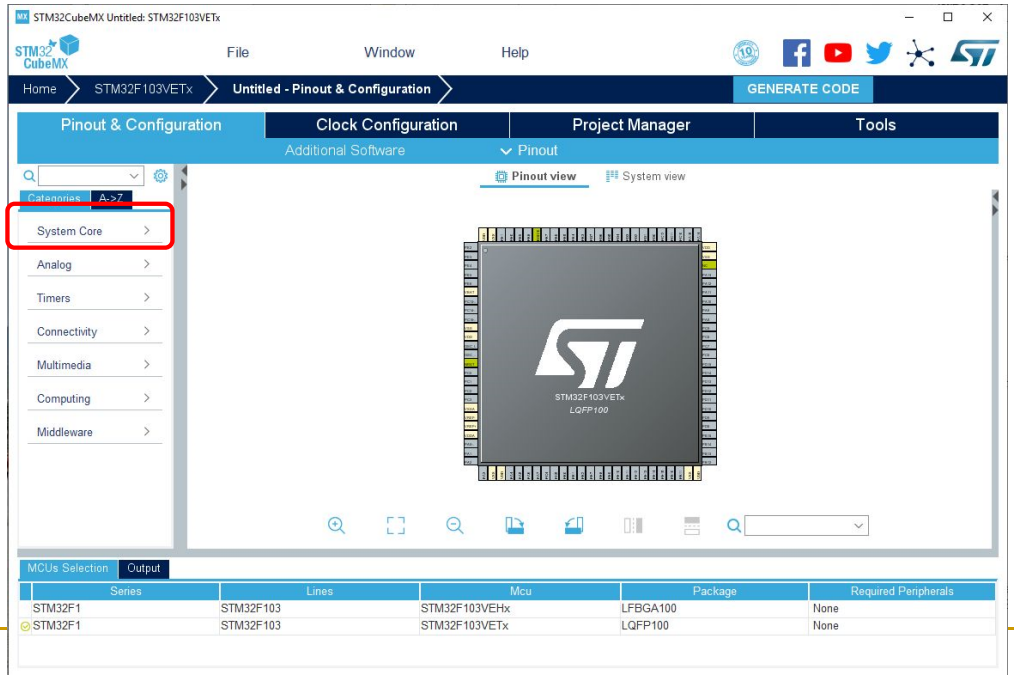
Choose MCU

- Choose STM32F103VE, LQFP100, then Start Project



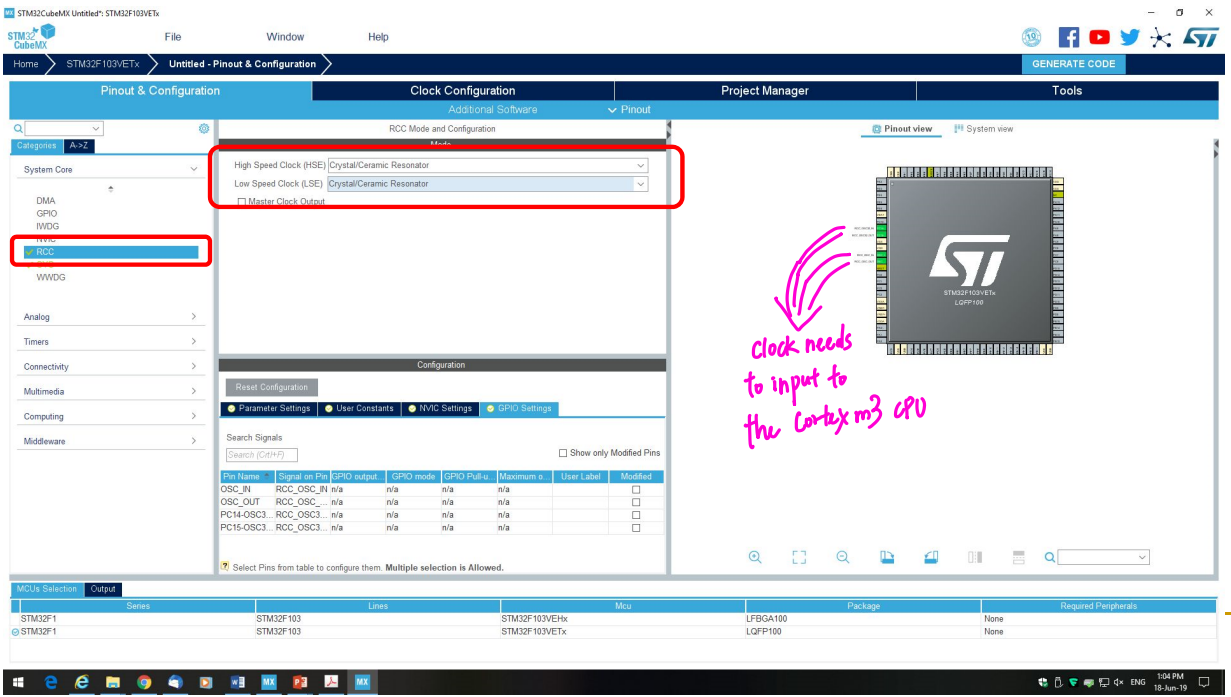
Set Clock

- You will go to this screen, first we need to set the clock, Expand System Core



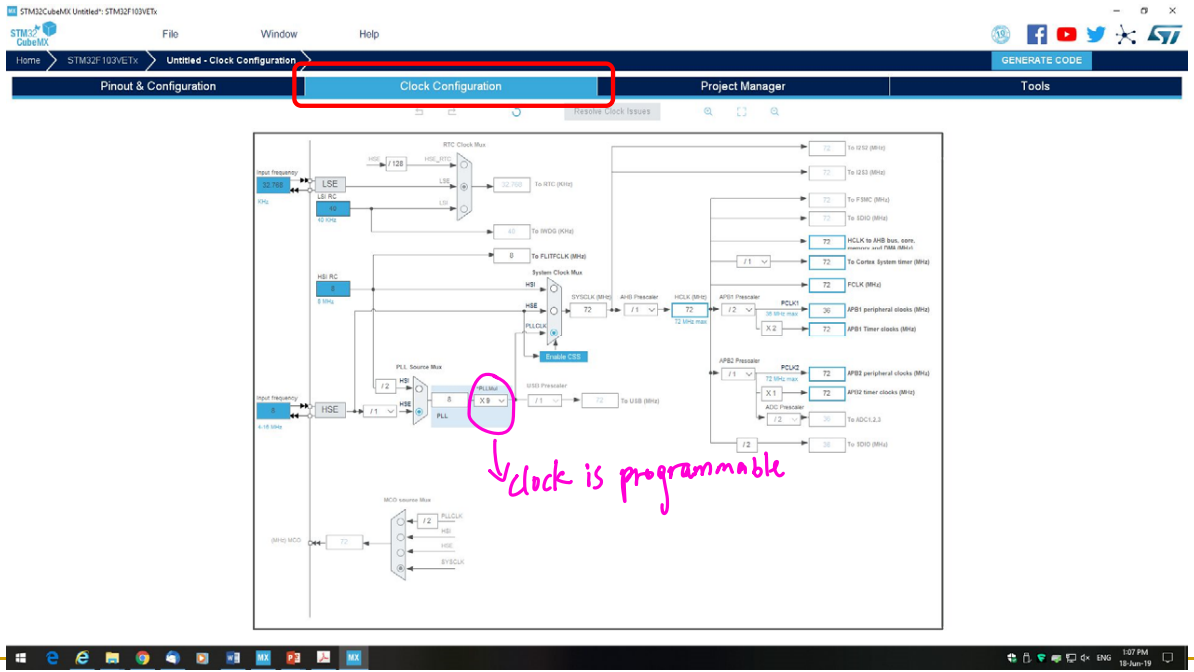
Change Clock to Crystal

- Click RCC, enable the High Speed Clock and Low Speed Clock to
  - Crystal/Creamic Resonator

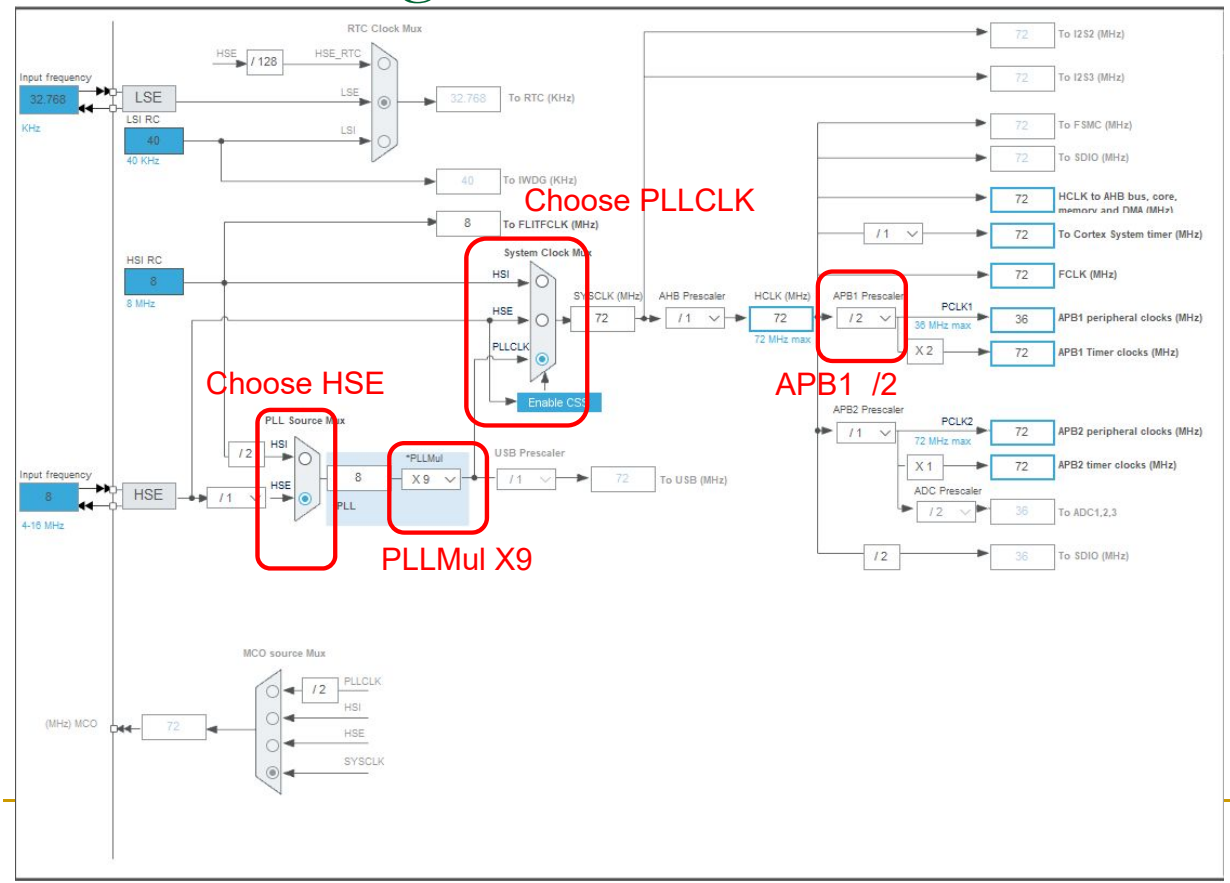


Clock Configuration

- Go to Clock Configuration

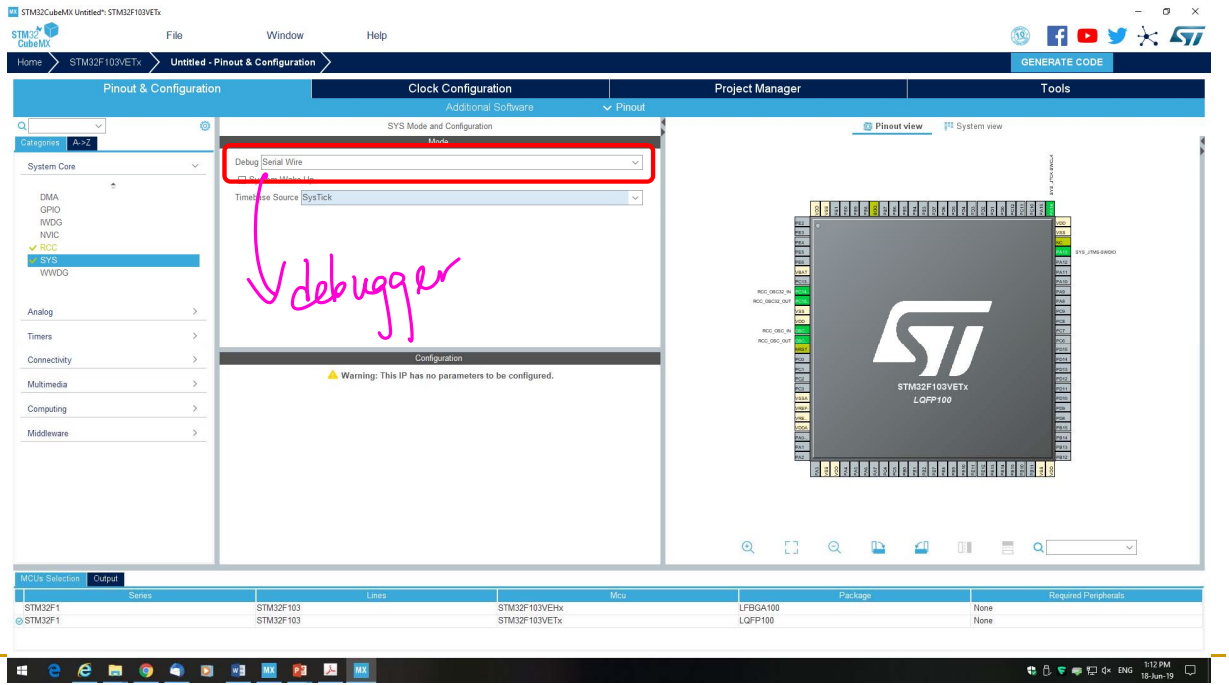


Clock Configuration



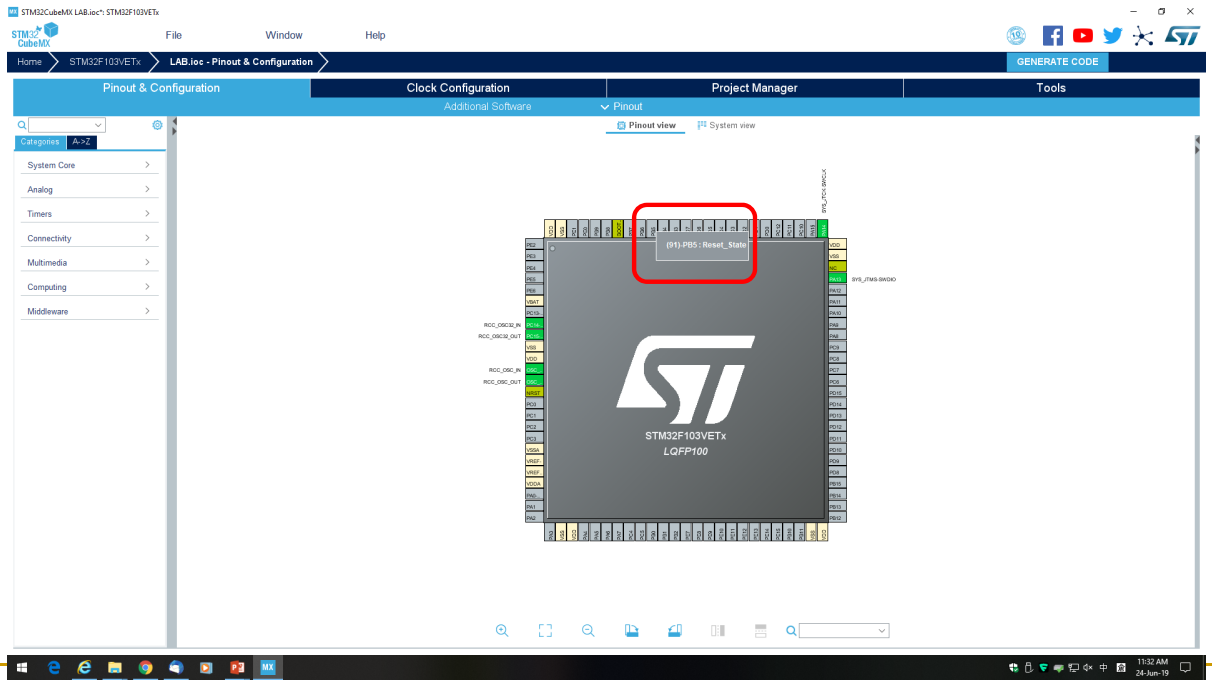
Communicate with Debugger

- Go to Pinout & Configuration, in SYS, Choose Serial Wire for Debug



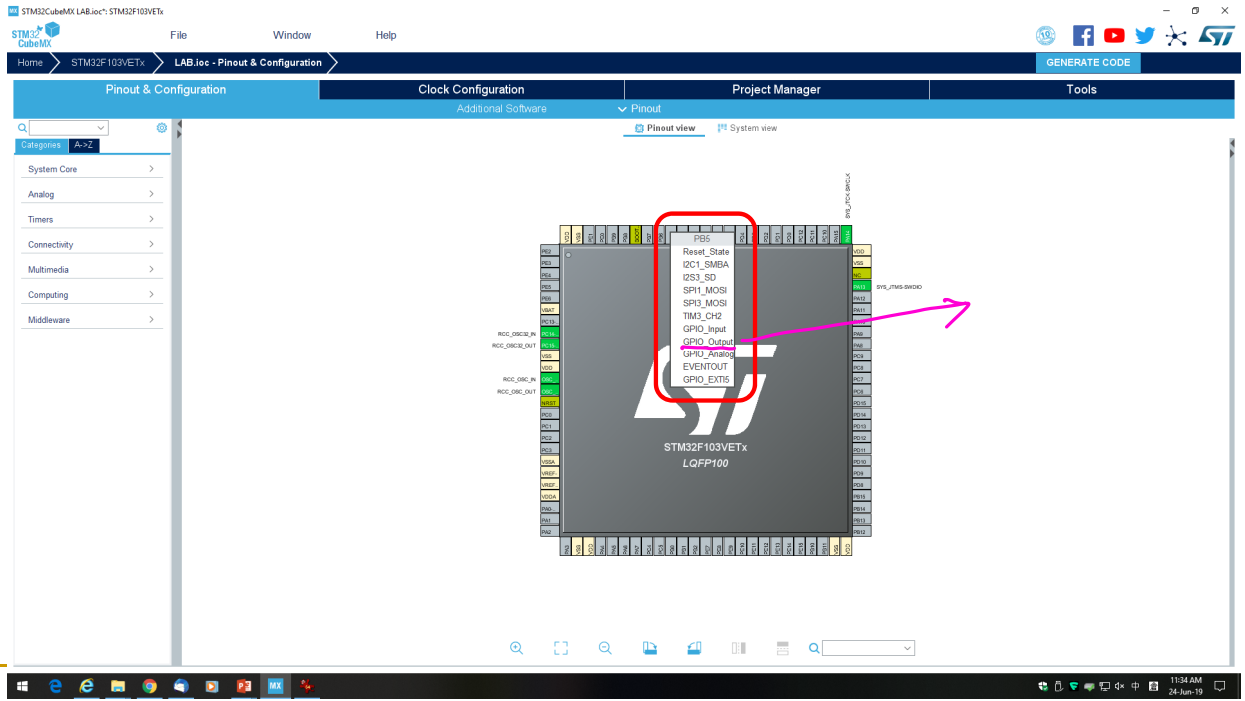
Define PB.5

- We now try to Define PB.5, go to PB.5



Define PB.5

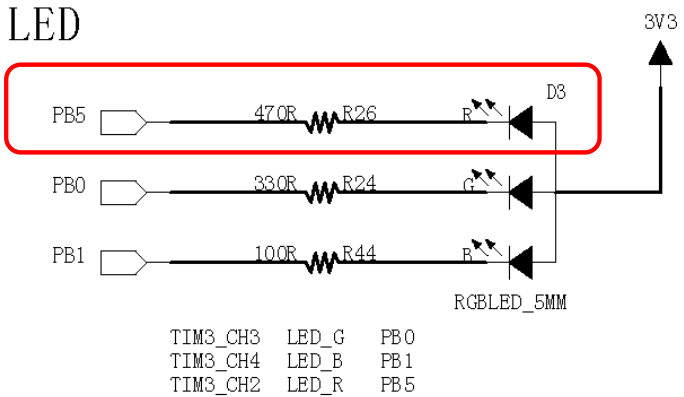
- Left Click, you will see a list



About PB.5

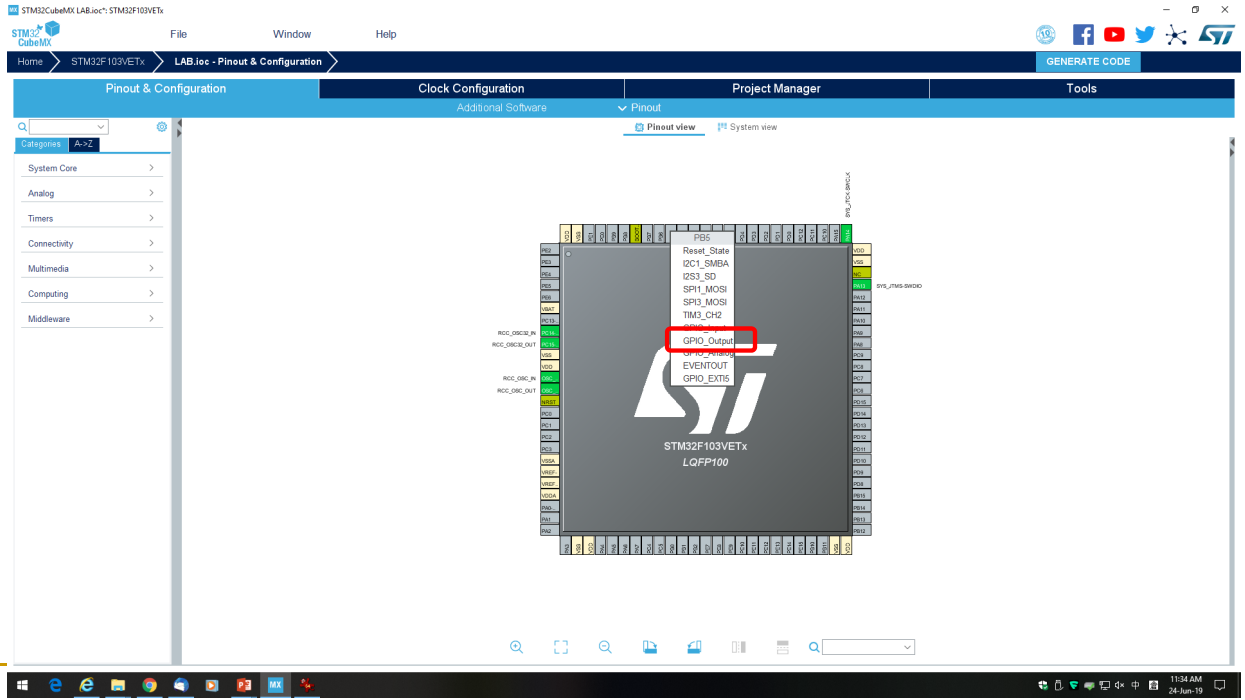
GPIO - output

- Since PB.5 in the development board is connected to the Red LED. We want to define it to be Output and with Push Pull, so that we can turn on and off.
- Note that the LED is LOW activated, we do not want it to turn on once we download the program, as a result, we need to initialize it to a HIGH state at the beginning



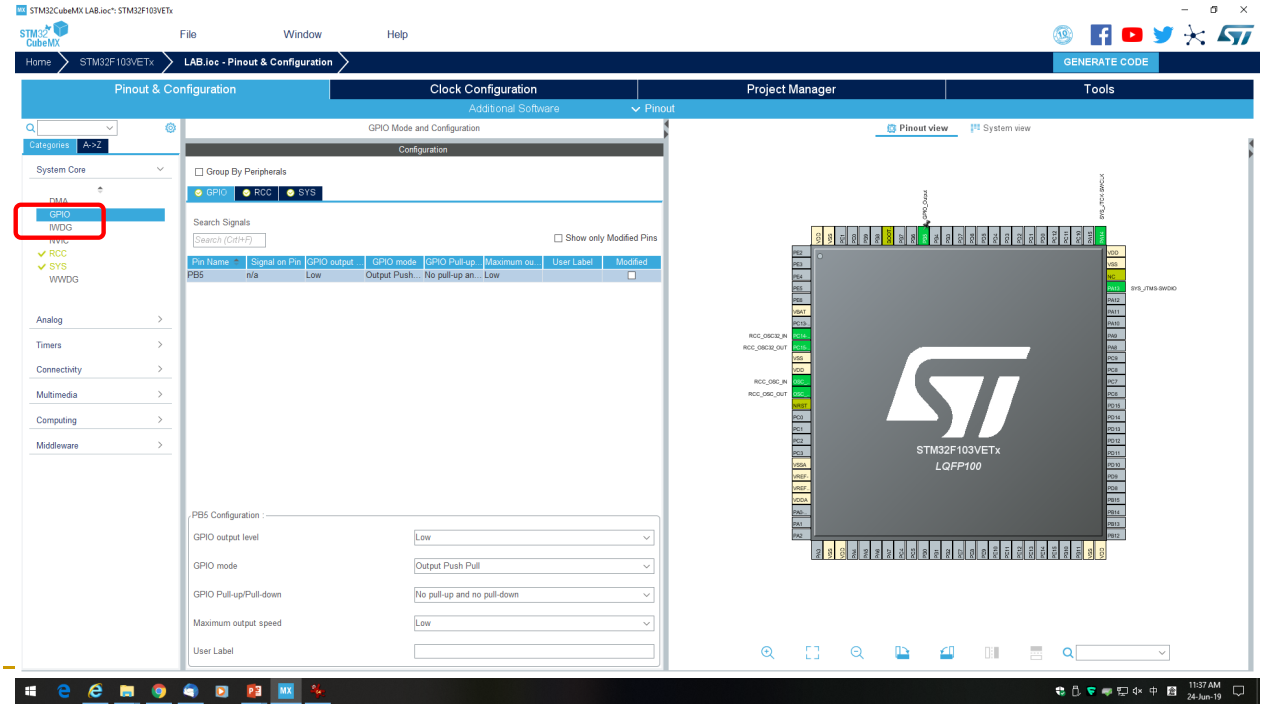
Define PB.5

- Choose GPIO_Output



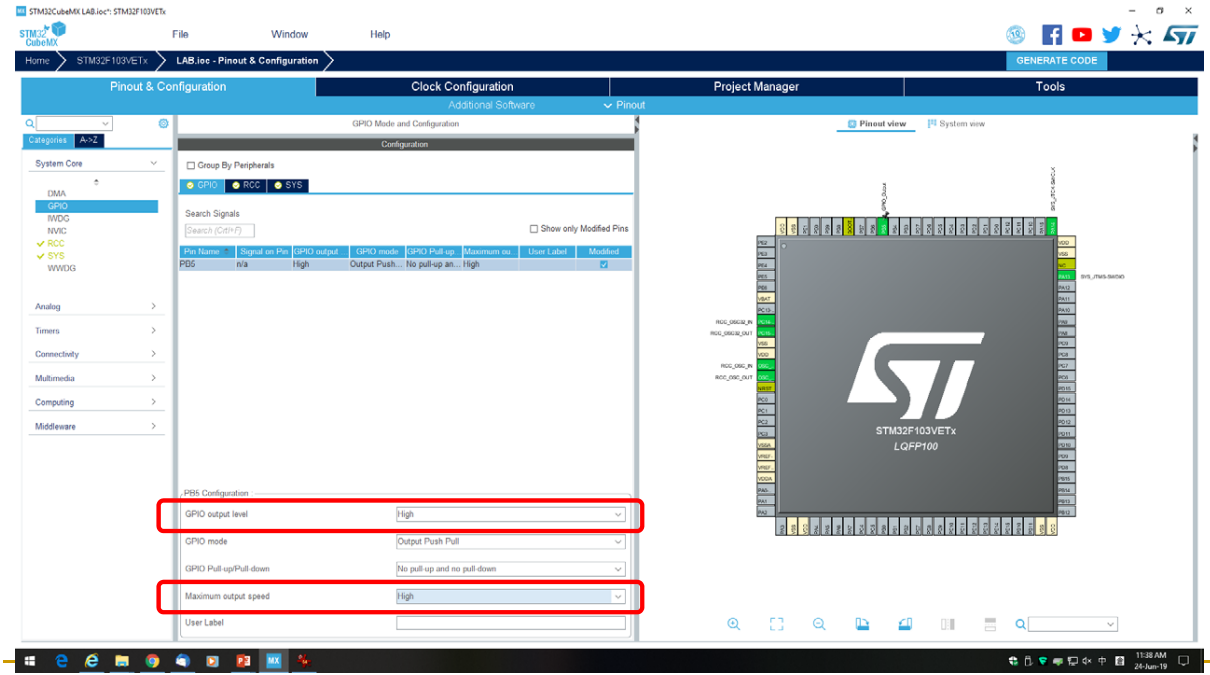
Define PB.5

- On left, click GPIO, you can then modify the parameters



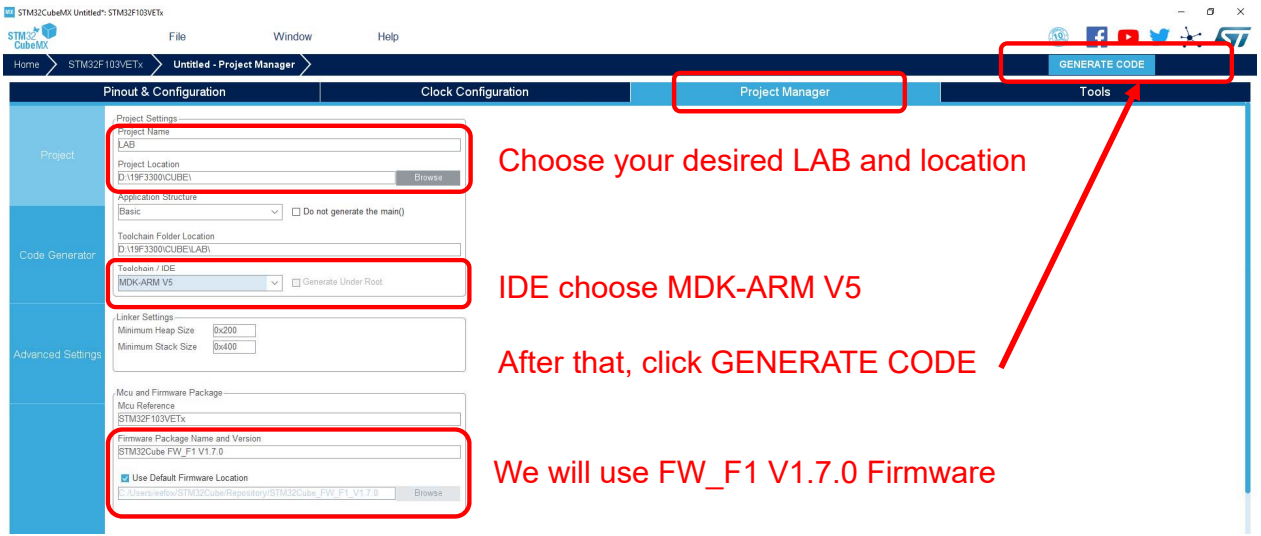
Define PB.5

- Modify Output Level → High, Maximum output speed → High



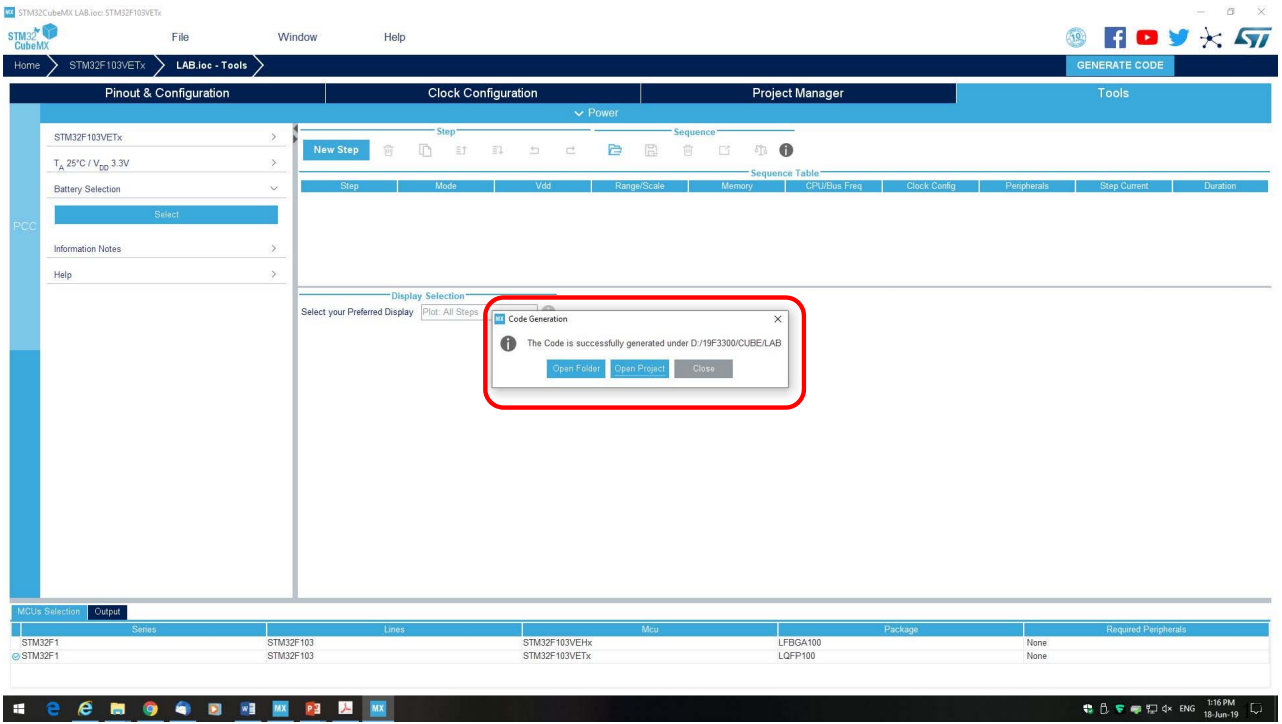
Generate Code

- Now, we can generate the Project Template, go to Project Manager
  - For the first time of generating code, user will be asked to confirm downloading "Firmware Pack STM32 Cube FW_F1 V1.7.0"



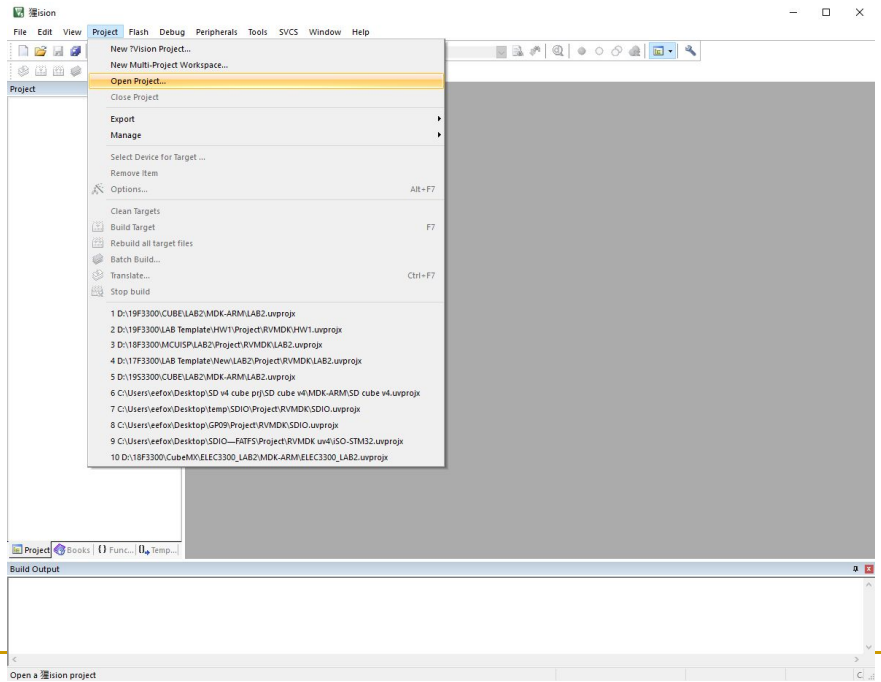
Generate Code

- If successful, it will create a folder



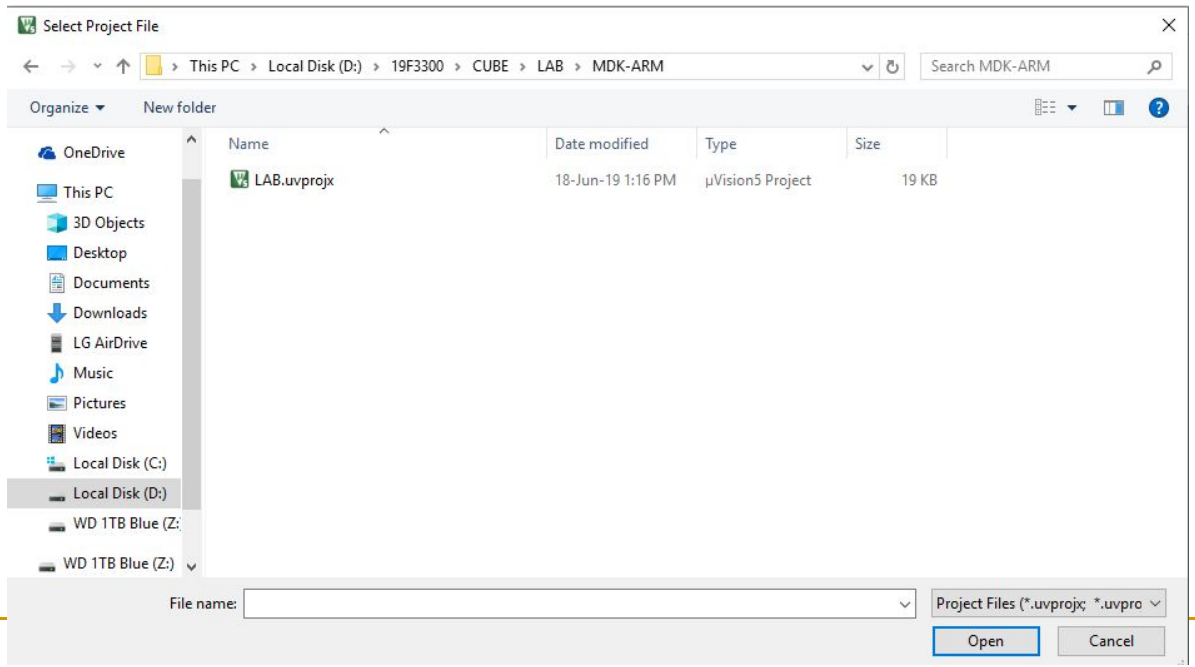
Open the Project

- Open Keil, Go Project → Open Project... Navigate to your folder



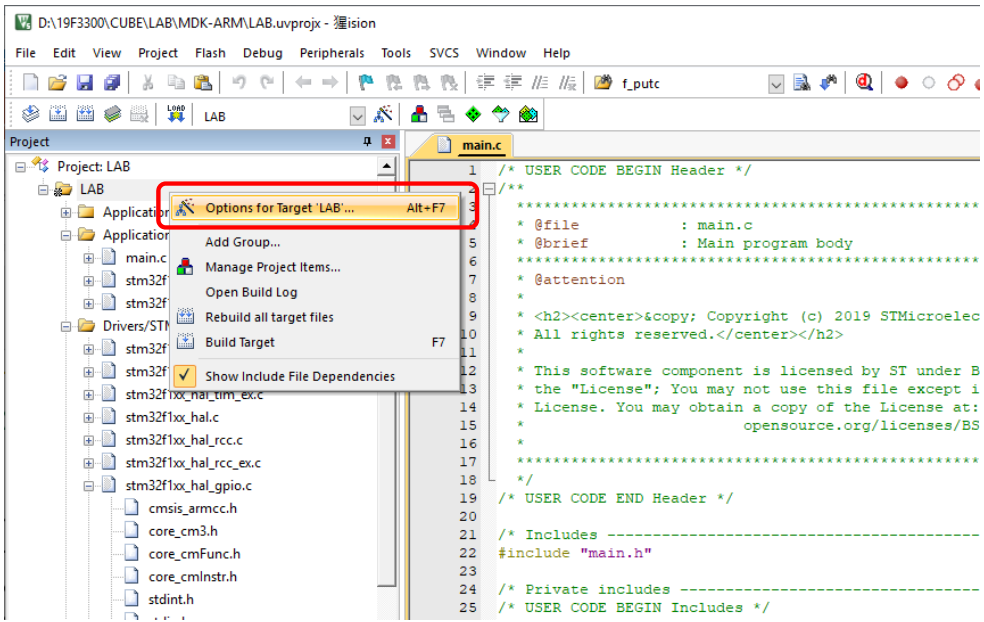
Open the Project

- There will be a MDK-ARM folder, under that, there will be a project file with uvprojx, in this example is LAB.uvprojx,



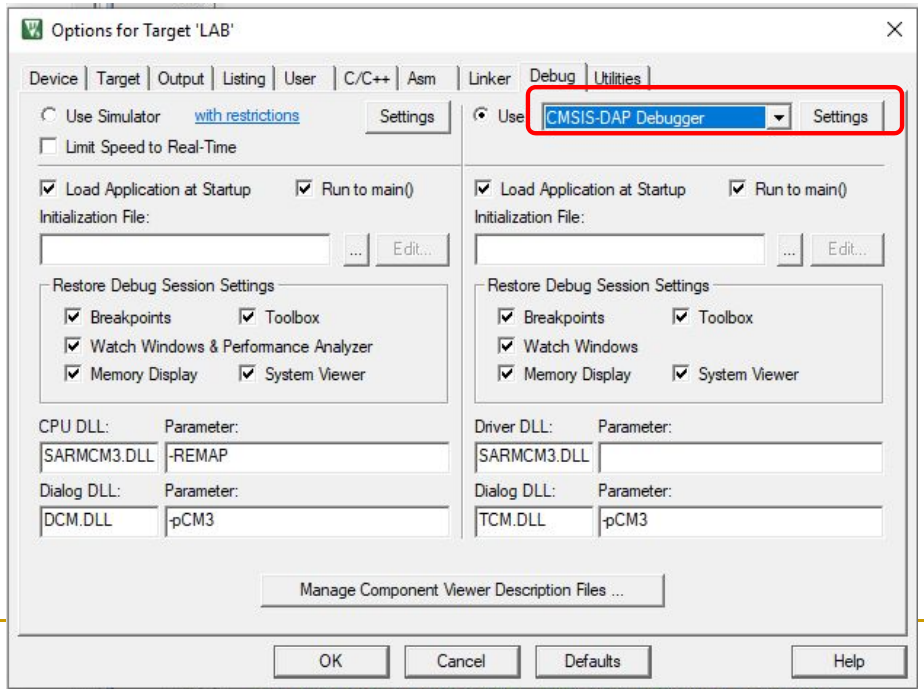
Modify Debugger Setting

- On the Project pane, right click on the Project and click on Options for Target



Modify Debugger Setting

- In Debug Window, change the debugger to CMSIS-DAP Debugger



Compile your Project

- Go to Project → Rebuild your Project File, there should be no error.

Add your Implementation Code

- Double Click the main.c, you should see a while(1) loop, as below

```
/* Infinite loop */
  /* USER CODE BEGIN WHILE */
  while (1)
  {
    /* USER CODE END WHILE */

    /* USER CODE BEGIN 3 */
  }
  /* USER CODE END 3 */
}
```

Content inside Red will be retained after re-generation of code

Content outside Red box will be deleted after re-generation of code

Add your Implementation Code

- You can add the code between the USER CODE BEGIN and END

```
/* Infinite loop */
 /* USER CODE BEGIN WHILE */
 while (1)
 {
   Code added here will be retained after re-generation of code
   because it is in between /* USER CODE BEGIN WHILE */ and /* USER CODE END WHILE */
   /* USER CODE END WHILE */
   Code added here WILL BE DELETED after re-generation of code
   because it is in between /* USER CODE END WHILE */ and /* USER CODE BEGIN 3 */
   /* USER CODE BEGIN 3 */
   Code added here will be retained after re-generation of code
   because it is in between /* USER CODE BEGIN 3 */ and /* USER CODE END 3 */
 }
 /* USER CODE END 3 */
}
```

Add your Implementation Code

- Add the code in Red, compile the code and run, you should see the Red LED Blinking.

```
 /* Infinite loop */
  /* USER CODE BEGIN WHILE */
  while (1)
  {
    /* USER CODE END WHILE */
    /* USER CODE BEGIN 3 */
         HAL_GPIO_WritePin(GPIOB,GPIO_PIN_5,GPIO_PIN_RESET);
         HAL_Delay(1000);
         HAL_GPIO_WritePin(GPIOB,GPIO_PIN_5,GPIO_PIN_SET);
         HAL_Delay(1000);
  }
  /* USER CODE END 3 */
}
```

END