

**Experiment 6****Familiarization with STM32 Microcontroller**

The objective of this experiment is to familiarize yourself with the STM32 microcontroller, its IDE, and create one project. In the project, generate the code for the blinking of on board installed LED by configuring the STM32 microcontroller.

**Steps to be followed in this experiment:**

1. Download and install the STM32 microcontroller IDE, you can download the IDE from the local server, which is installed in the Lab, or from the blackboard.
2. Create one project each for two different STM board, which we have in the Lab (STM32F303RE and STM32L476RG).
3. Generate the code for blinking the on board installed LED by configuring the STM32 board. Test your code.

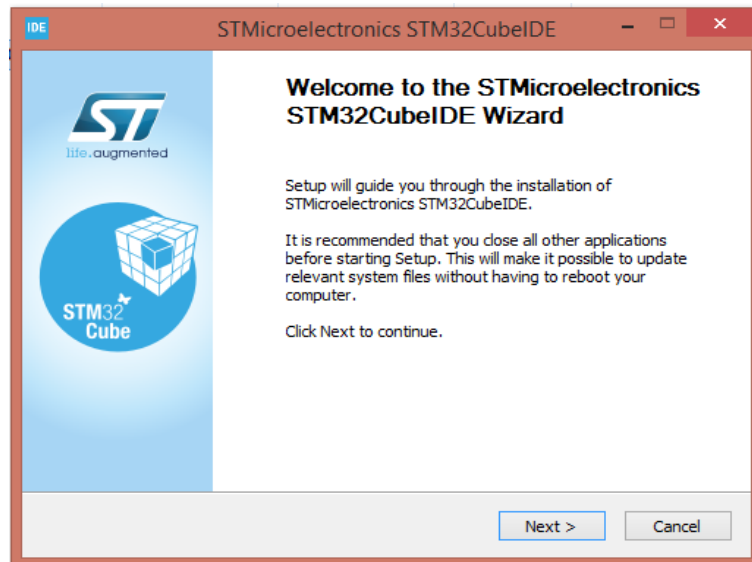
The details about the installation of IDE and how to create project in that IDE is given below.

# Instructions For Installing STM32CubeIDE

- 1) Download the .zip file from the Blackboard and extract the contents of the zip file. The below application will be visible after successful extraction. This application will be your STM32CubeIDE installation setup.

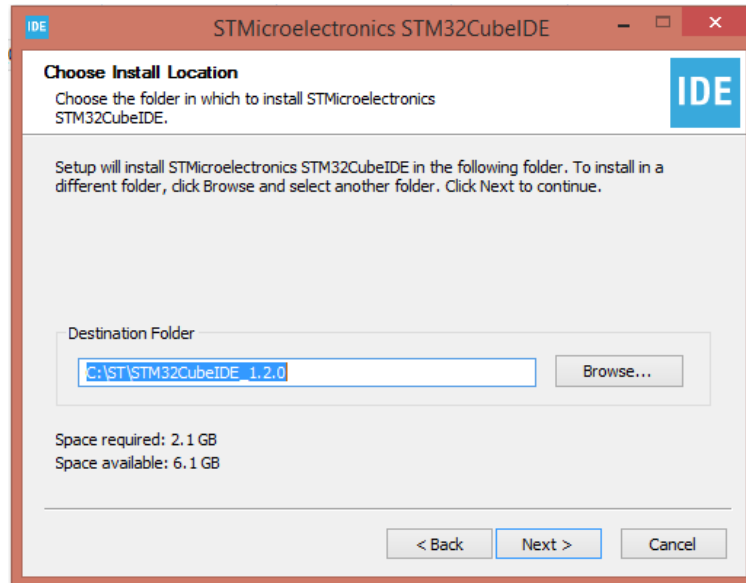
Name	Date modified	Type	Size
st-stm32cubeide_1.2.0_5034_20200108_0926_x86...	08-01-2020 12:17	Application	6,87,057 KB

- 2) Run the application and the **STMicroelectronics STM32CubeIDE Installation Wizard** will be visible as shown in the figure given below.

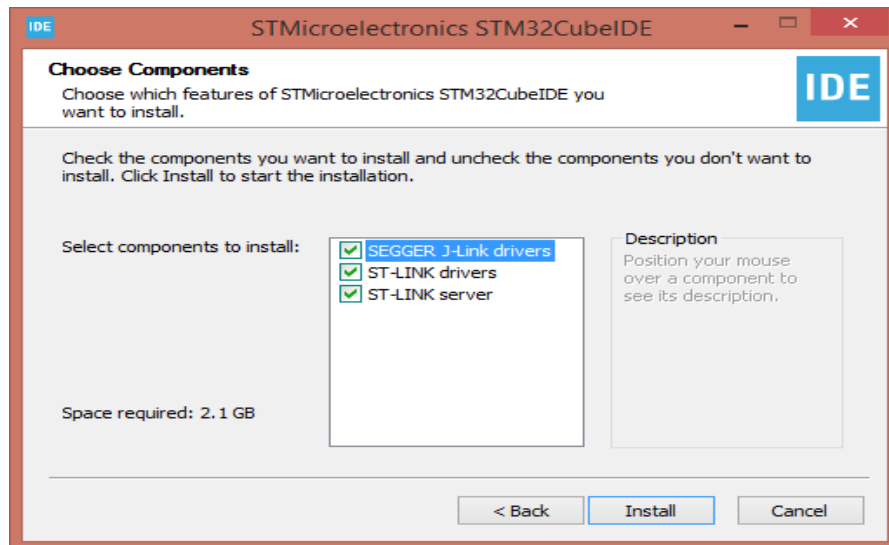


- 3) Click on **Next** and choose the destination location for the installation. It's preferable to install in C drive.

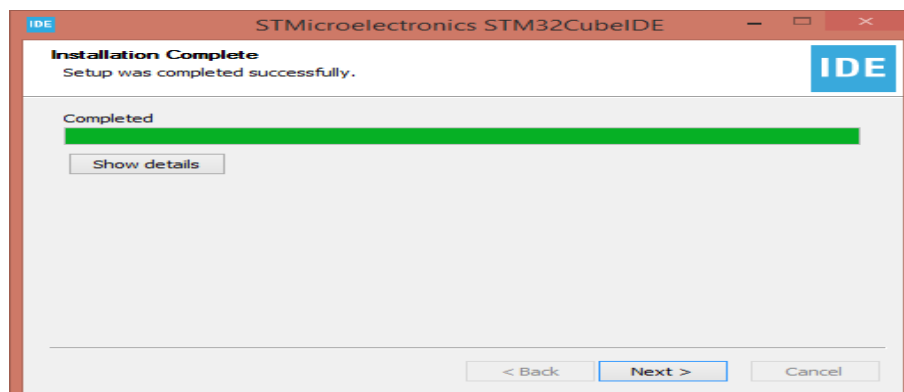
# Instructions For Installing STM32CubeIDE



- 4) Click on **Next** and ensure that all three components are selected for installation. Once you select all three options, click on **Install**.

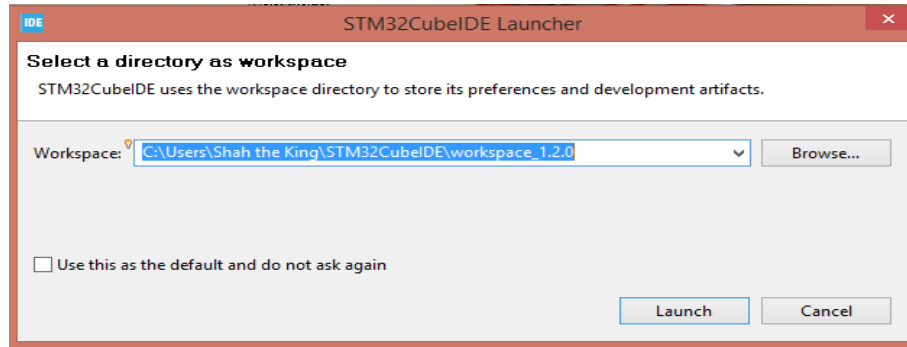


- 5) A successful installation will display the following message.



- 6) Select a directory for creating the workspace. Then click on **Launch**

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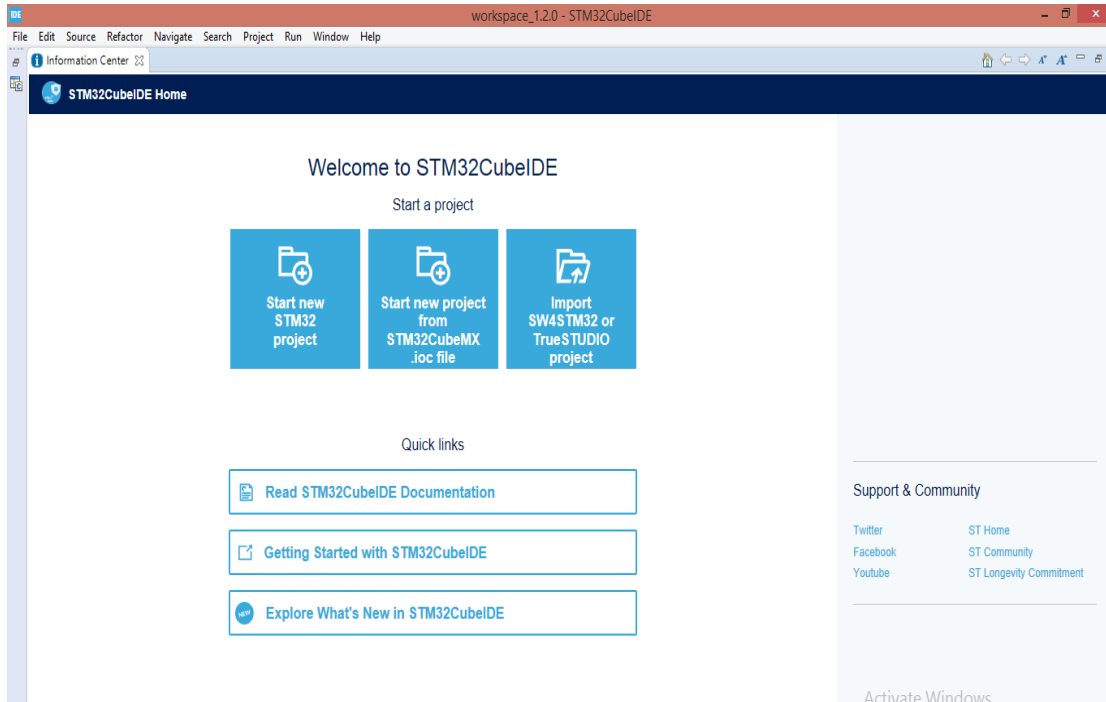


- 7) It may prompt for giving administrative access. Allow the application to proceed. This completes the installation process.

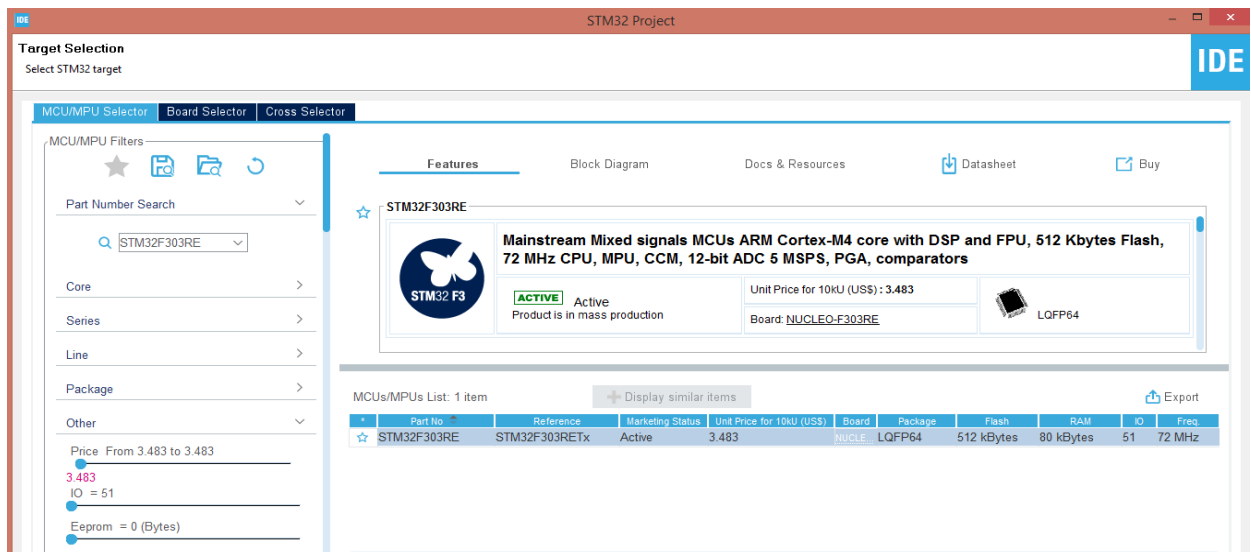


- 8) Once you launch the **STM32CubeIDE**, you will see the below screen. Click on **Start new STM32 Project**.

# Instructions For Installing STM32CubeIDE

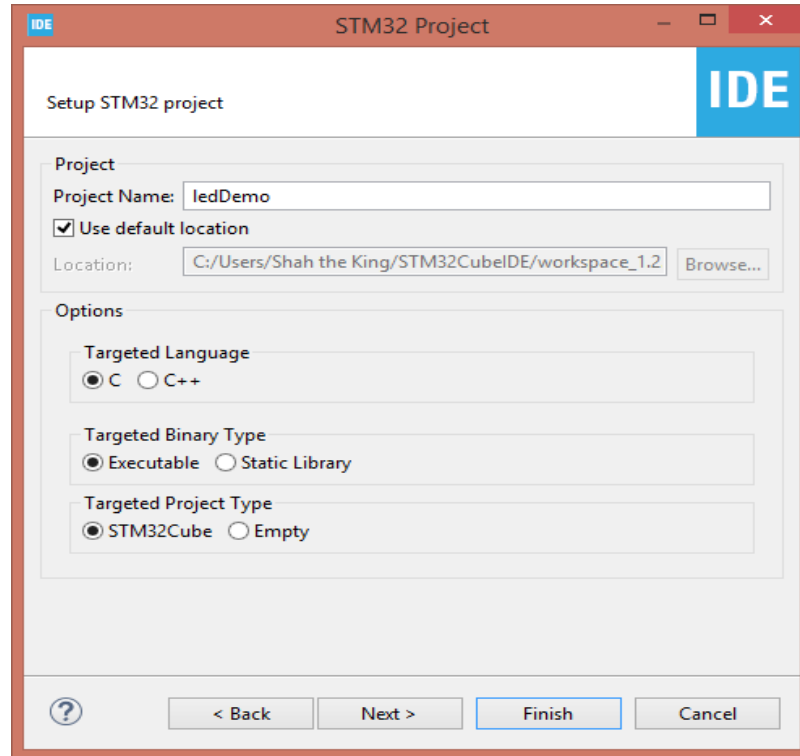


- 9) A screen will appear as shown below. Enter the desired target microcontroller board in the **Part Number Search**. For example, type **STM32F303RE**, select STM32F303RE from the MCU List, and proceed.



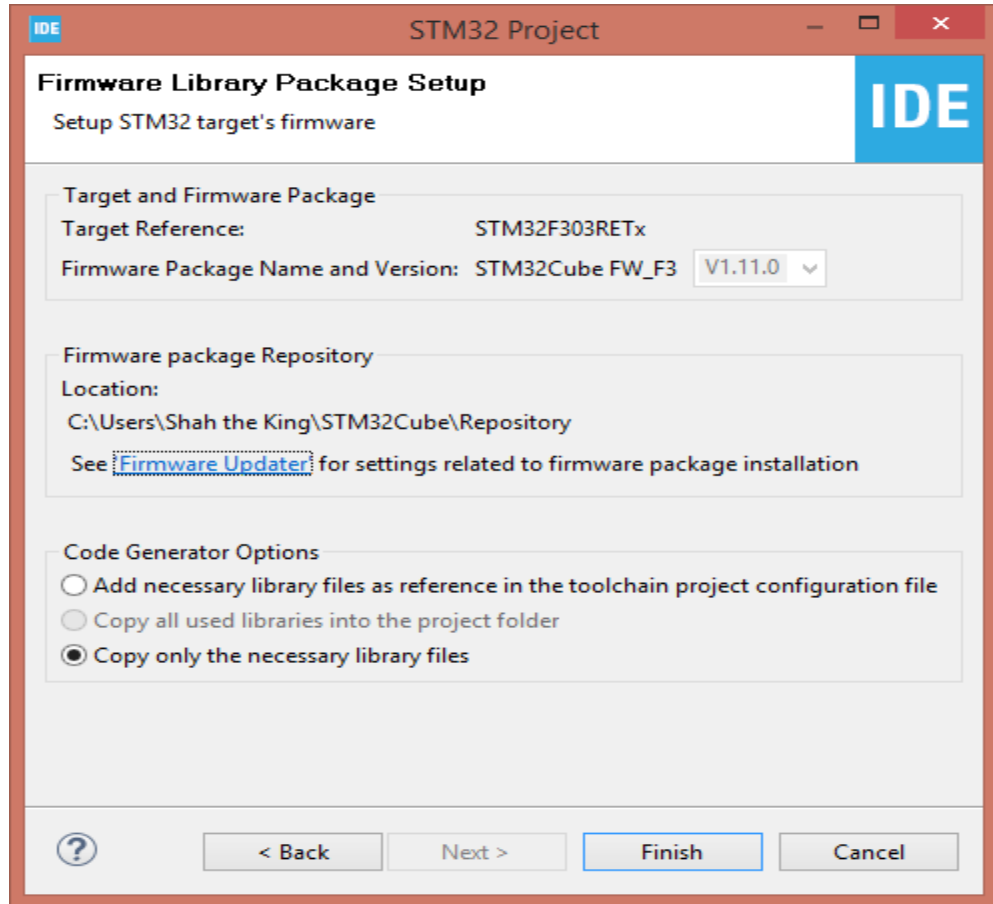
- 10) Fill the necessary project details as shown below then click on **Next**.

# Instructions For Installing STM32CubeIDE

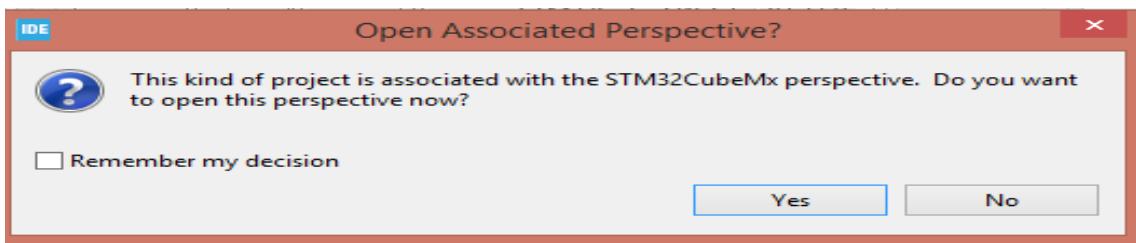


- 11) In this window, ensure that your Firmware Package Name and Version are as desired. In our case it is STM32CubeFW\_F3. This will automatically install any support packages required for STM32F303RE MCU. This will be done only once, which is the first time you use any new type of Microcontroller Board. In the code Generator Options, Select **Copy only the necessary library files**. Click on **Finish**.

# Instructions For Installing STM32CubeIDE

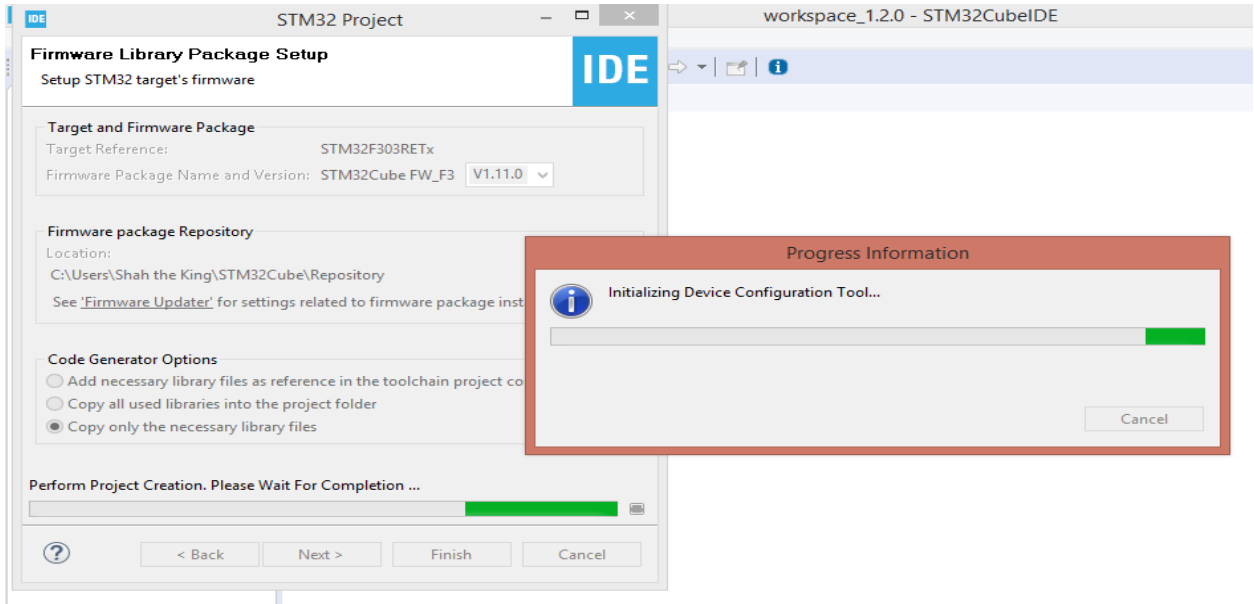


- 12) This will then prompt for opening the project in STM32CubeMX perspective. You may wish to select **Remember my Decision** and Click **Yes**.

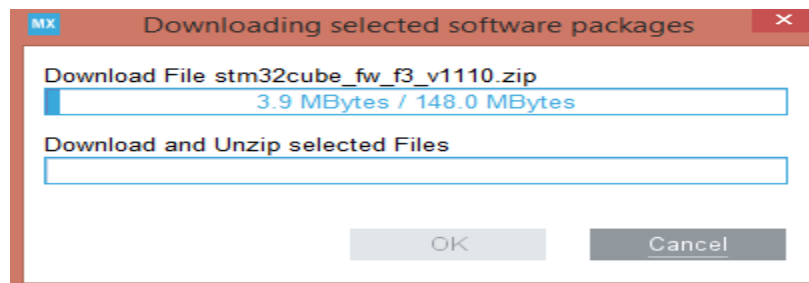


- 13) Your STM32CubeIDE software will then start **Initializing Device Configuration Tool**.

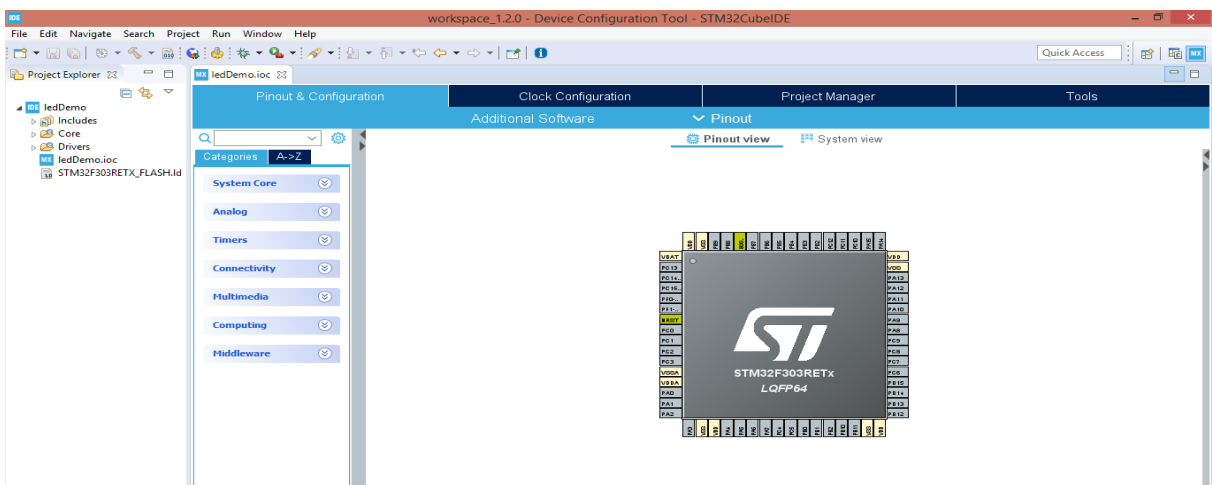
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- 14) In case this is the first time you are using a particular variant of STM32 MCU, it will automatically connect to its server and start downloading the Software packages for that MCU.



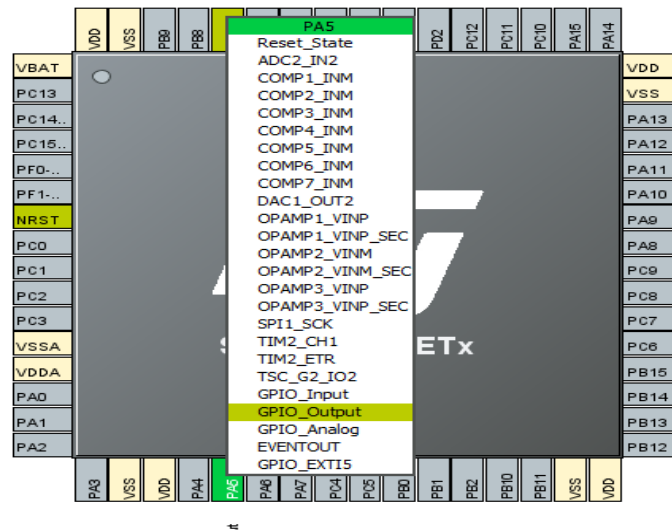
- 15) A successful installation will display the screen as shown below. This completes the process of creating a new project.



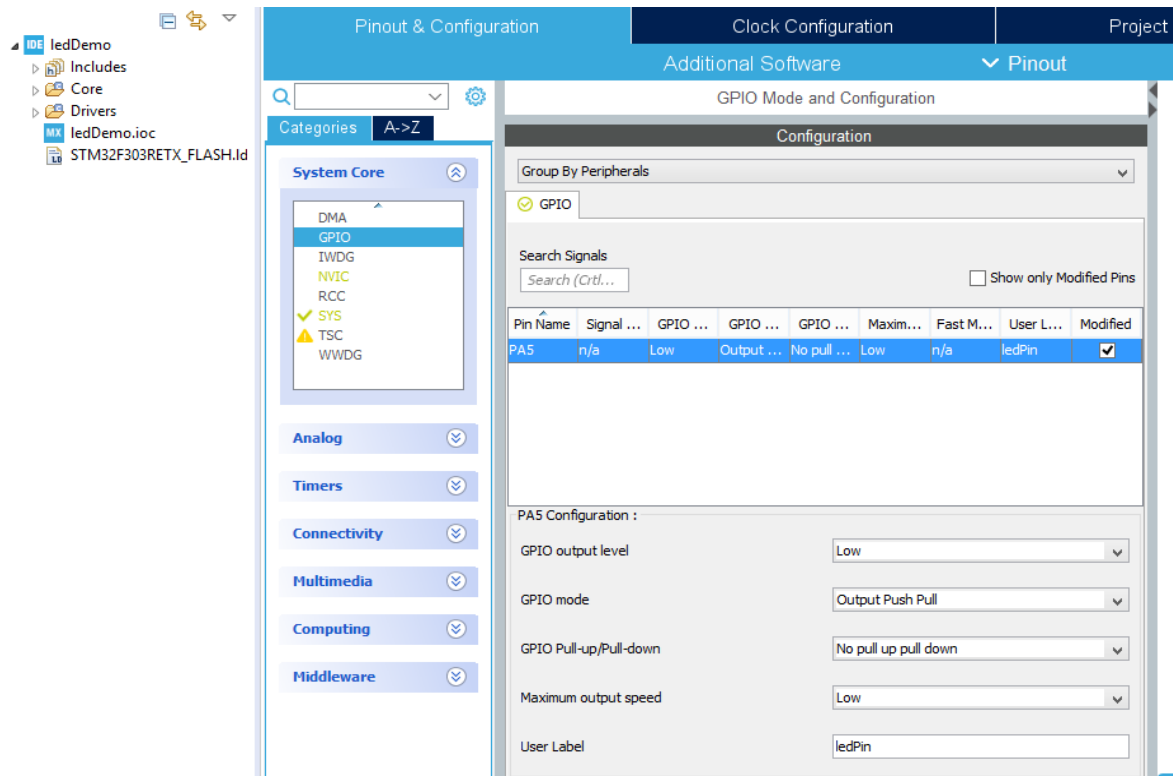
- 16) **LED Blink Program Instruction:** Select the Pin configuration by clicking on the PA5 pin as GPIO\_Output.



# Instructions For Installing STM32CubeIDE

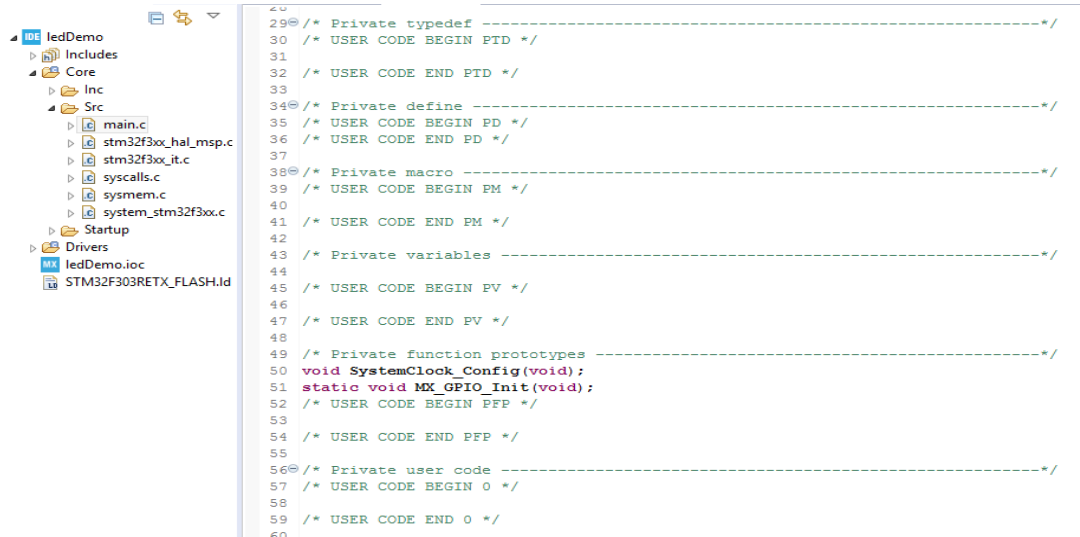


- 17) In **Pinout and Configuration** tab, select GPIO in System Core. Here you will be able to see pin **PA5** configured as GPIO Output Mode. You may wish to provide specific nomenclature to your pins by entering the desired name in the **User Label** area.



- 18) Now click on Project in the menu bar and select Generate Code in the drop-down menu. This will generate the following C/C++ code which can be accessed in **Src** folder (available in **Core** folder under Project Explorer). **Main.c** is the file which is of specific interest for the developer.

# Instructions For Installing STM32CubeIDE



19) Type the following code inside the **while(1)** loop.

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

    /* USER CODE BEGIN 3 */
    HAL_GPIO_TogglePin(GPIOA, GPIO_PIN_5);
    HAL_Delay(3000);
}
/* USER CODE END 3 */
```

20) In the **Menu bar** you will find a **Bug** symbol. Click on the arrow adjacent to the bug. Hover the cursor on **Debug As** and select **STM32 Cortex-M C/C++ Application**. Your main code and its dependencies would then be compiled and loaded onto the MCU. Click **Resume** button for establishing the communication between MCU and PC.