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STM32 - First Trial

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Introduction

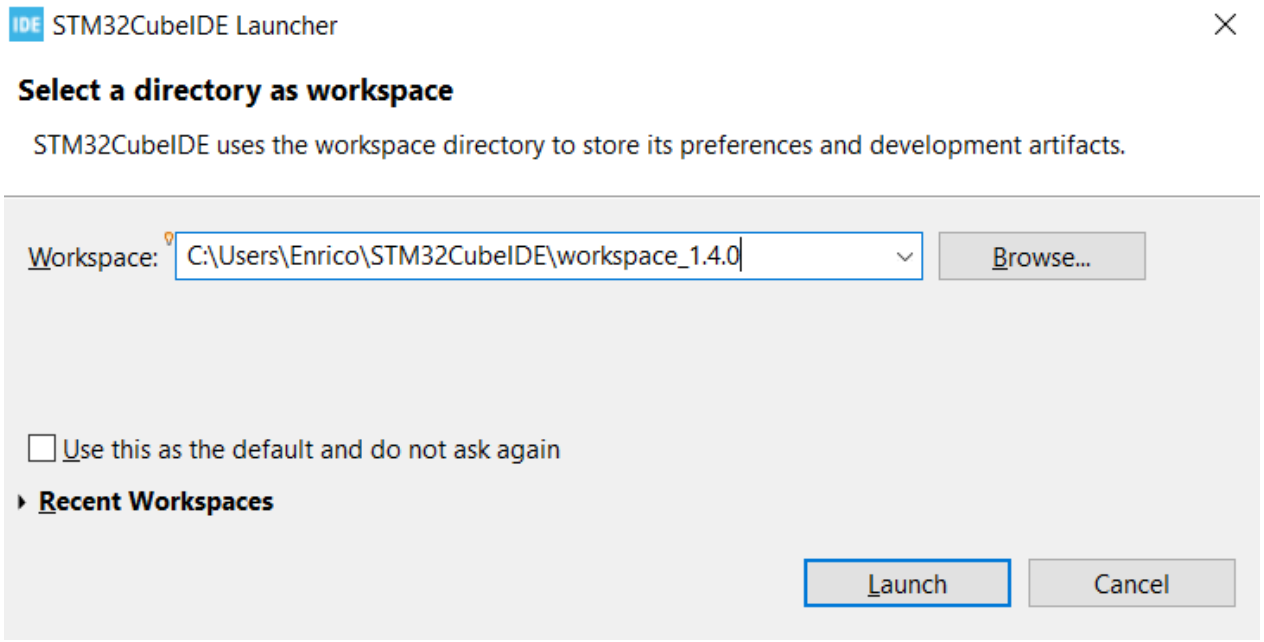
Objective of this first trial is to learn:

- how to create and configure a new project
- which is the structure of the Cube-generated code
- how to compile and debug a code

Last but not least it is useful to check if all the software and drivers have been correctly installed

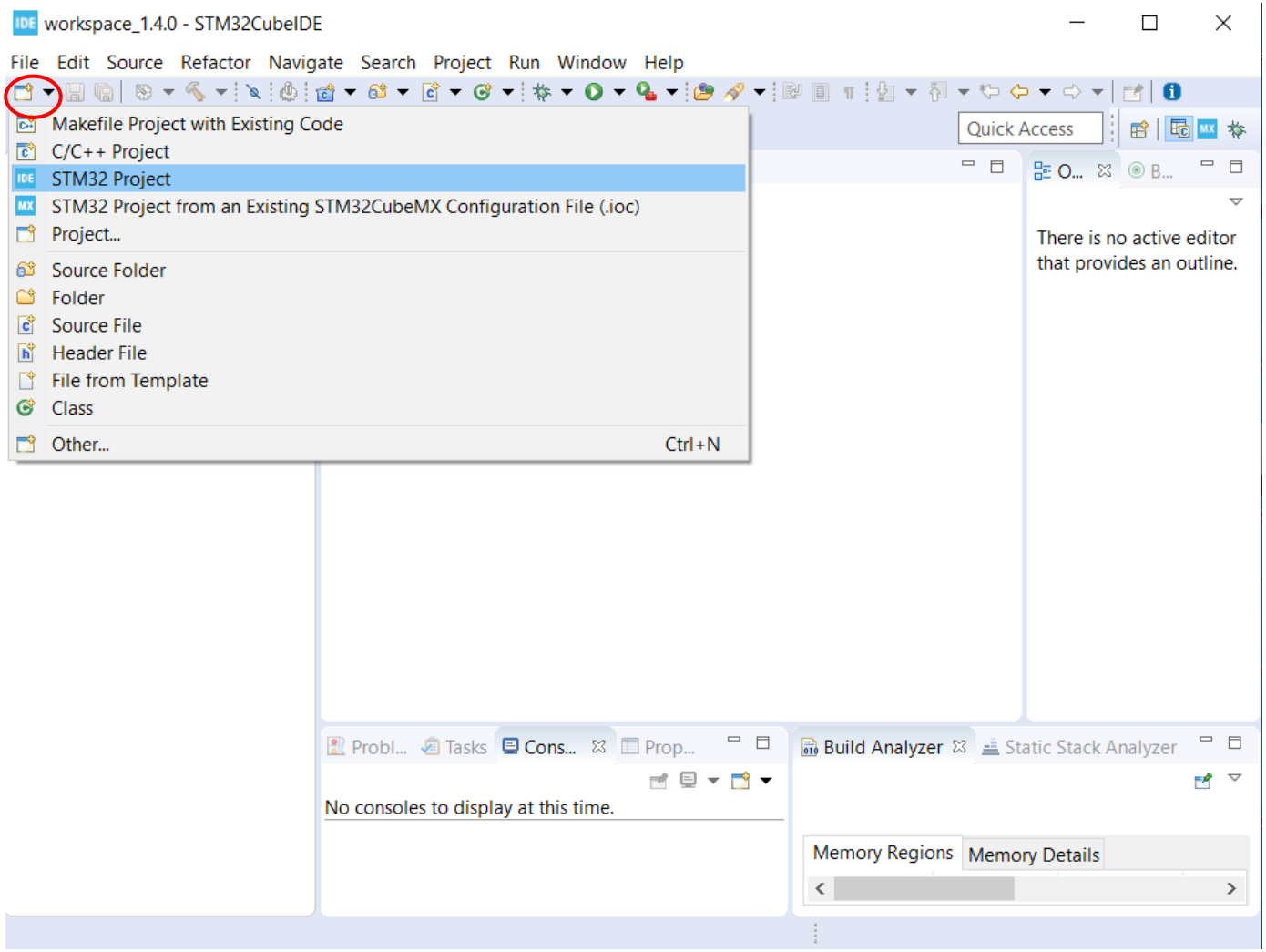
New project with Cube

- Open **STM32CubeIDE**
- Select a folder for the workspace and click “Lauch”
- Accept to download any eventual new library / update
  (the first time you use the SW it might prompt you to download libraries and updates, always accept and wait, they can take some minutes)



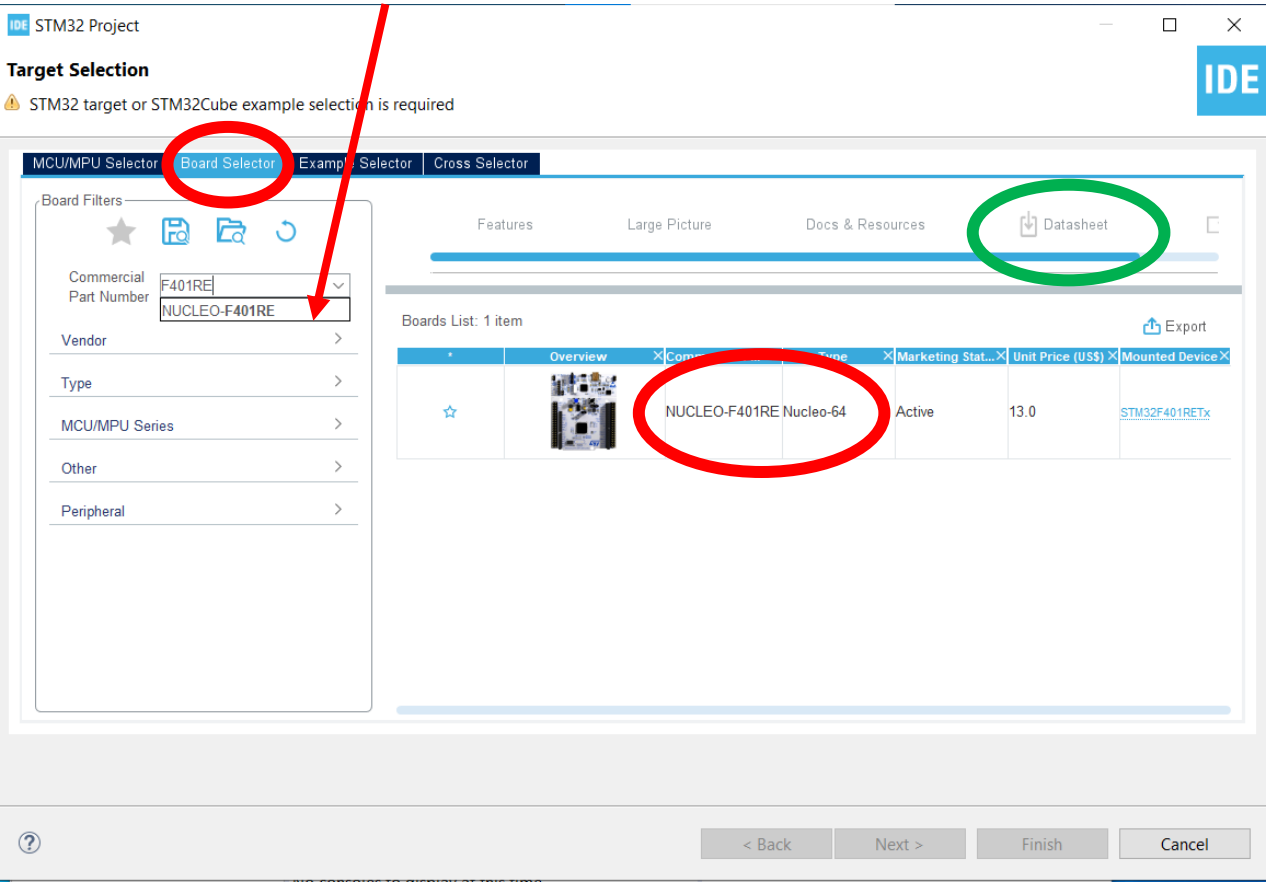
New project with Cube

- Click on the downwards arrow next to “New” → STM32 Project
  [Setup from existing STM32CubeMX projects can be imported by choosing “STM32 Project from an Existing STM32CubeMX Configuration file (.ioc)”]



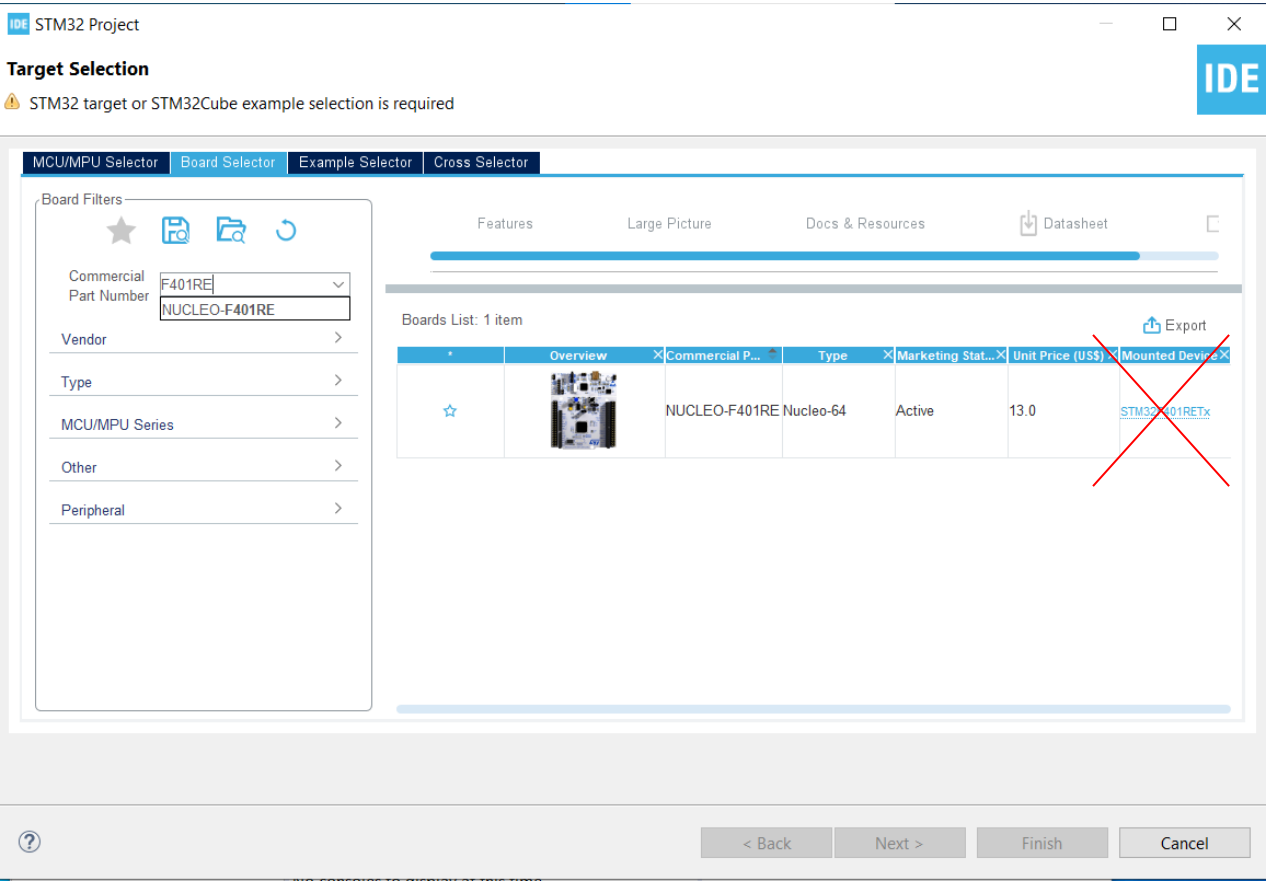
Board Selection

NUCLEO-F401RE



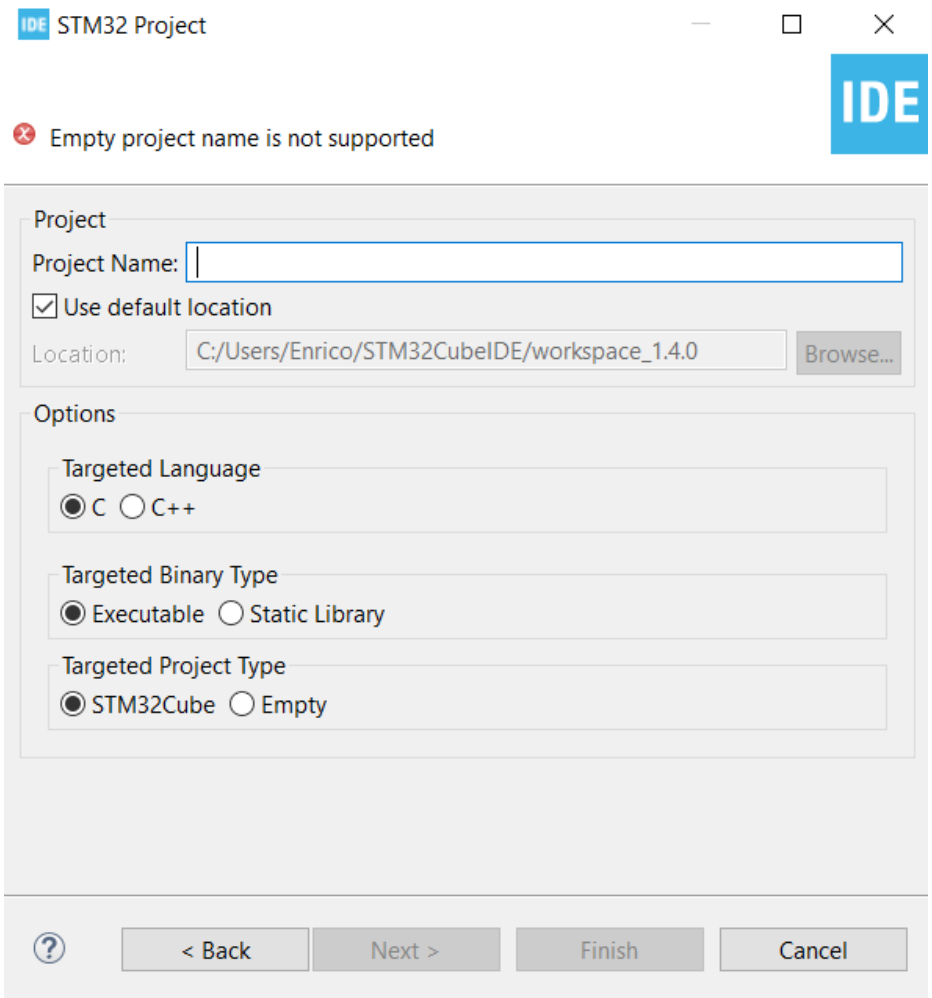
- Select **NUCLEO-F401RE**
- If you need, download datasheet and other documentation
- **Click “Next”**

Board selection



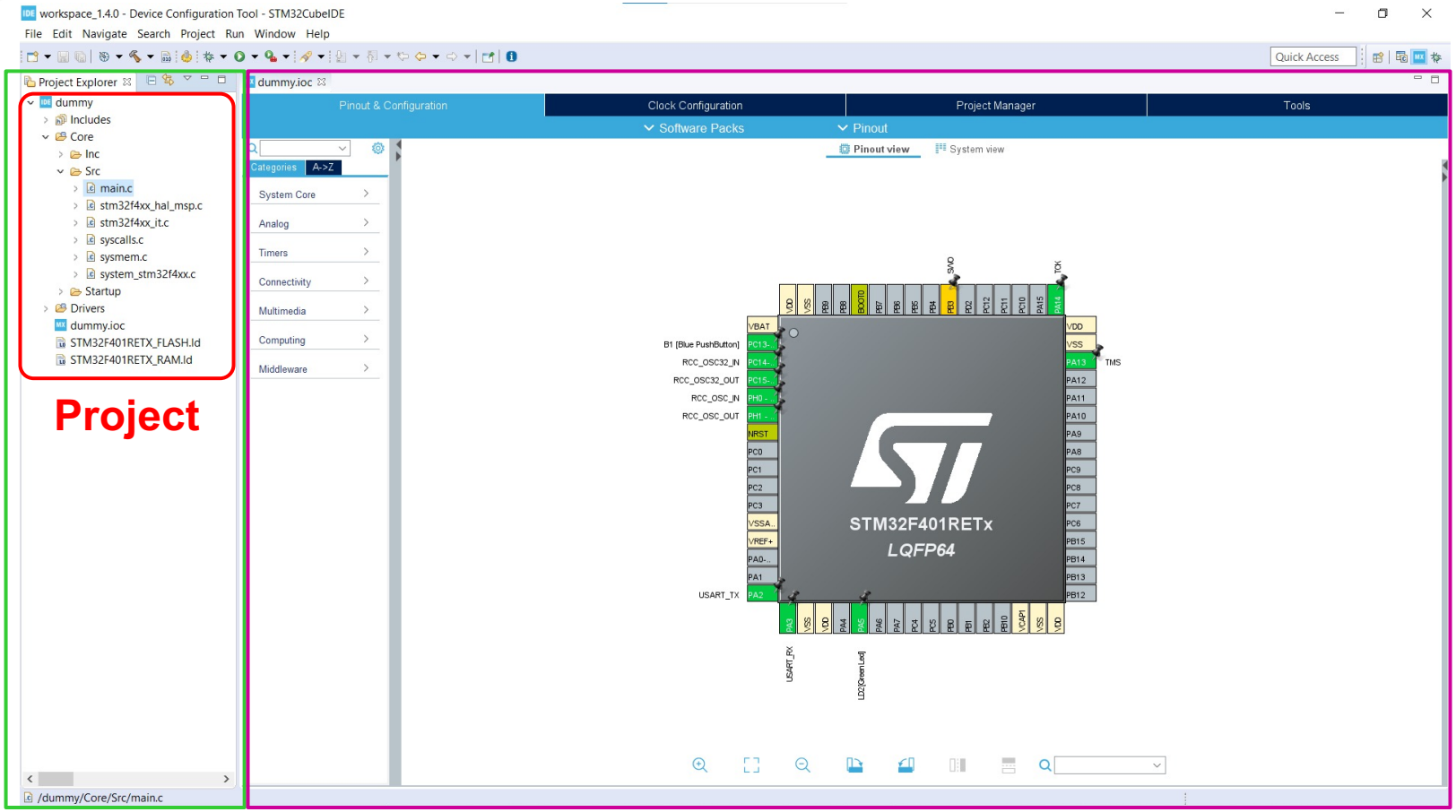
- **DO NOT SELECT THE BOARD USING THIS LINK**
- **Otherwise you are selecting an uninitialized version of the board which will not work.**

Project generation



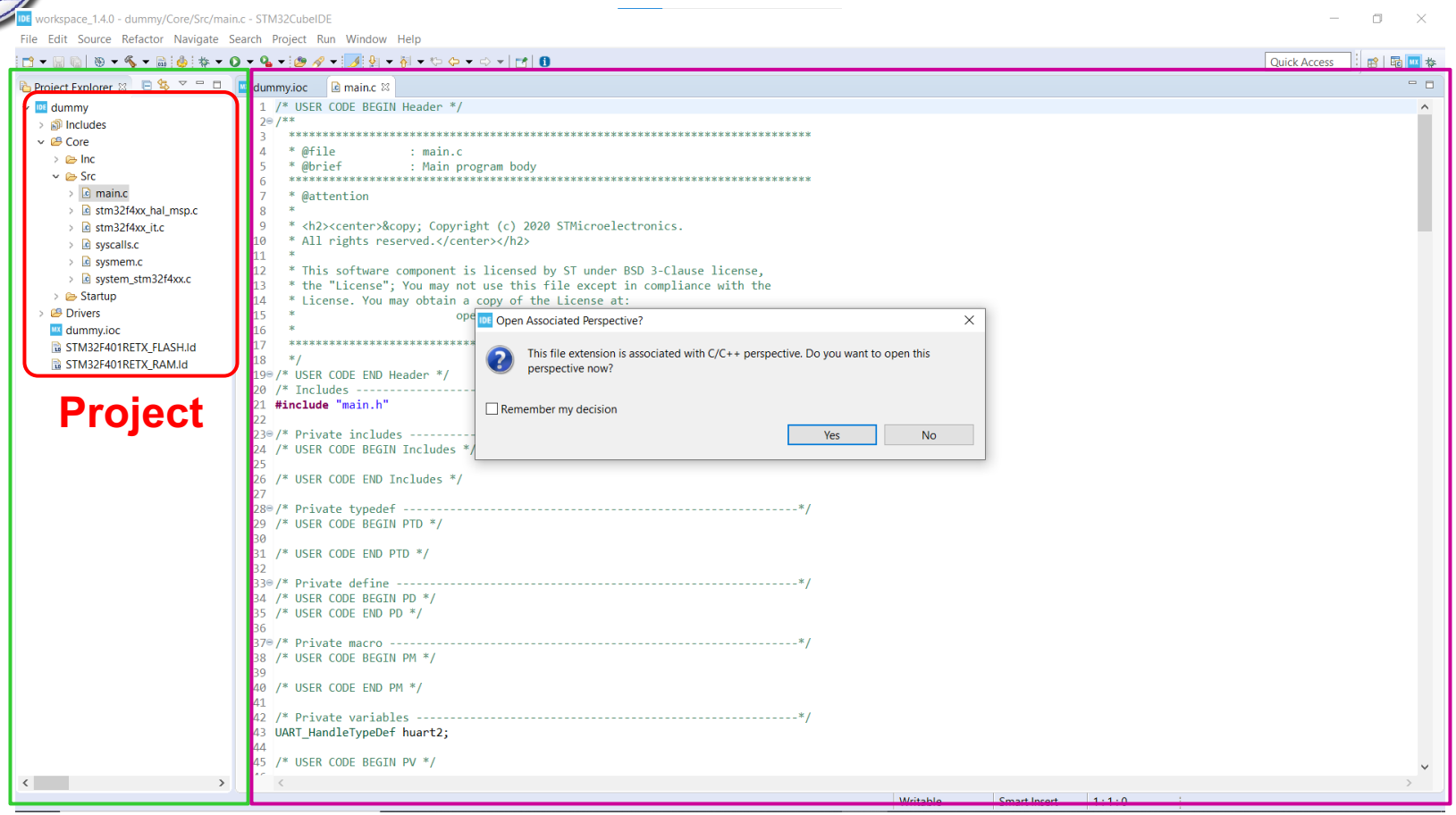
- Choose a **Project Name**
- Click "**Finish**"
- Click "**Yes**" on the prompt "**Initialize all peripherals with their default mode?**"
- Let the code generator run

STM32CUbeIDE interface



- Double click “main.c”

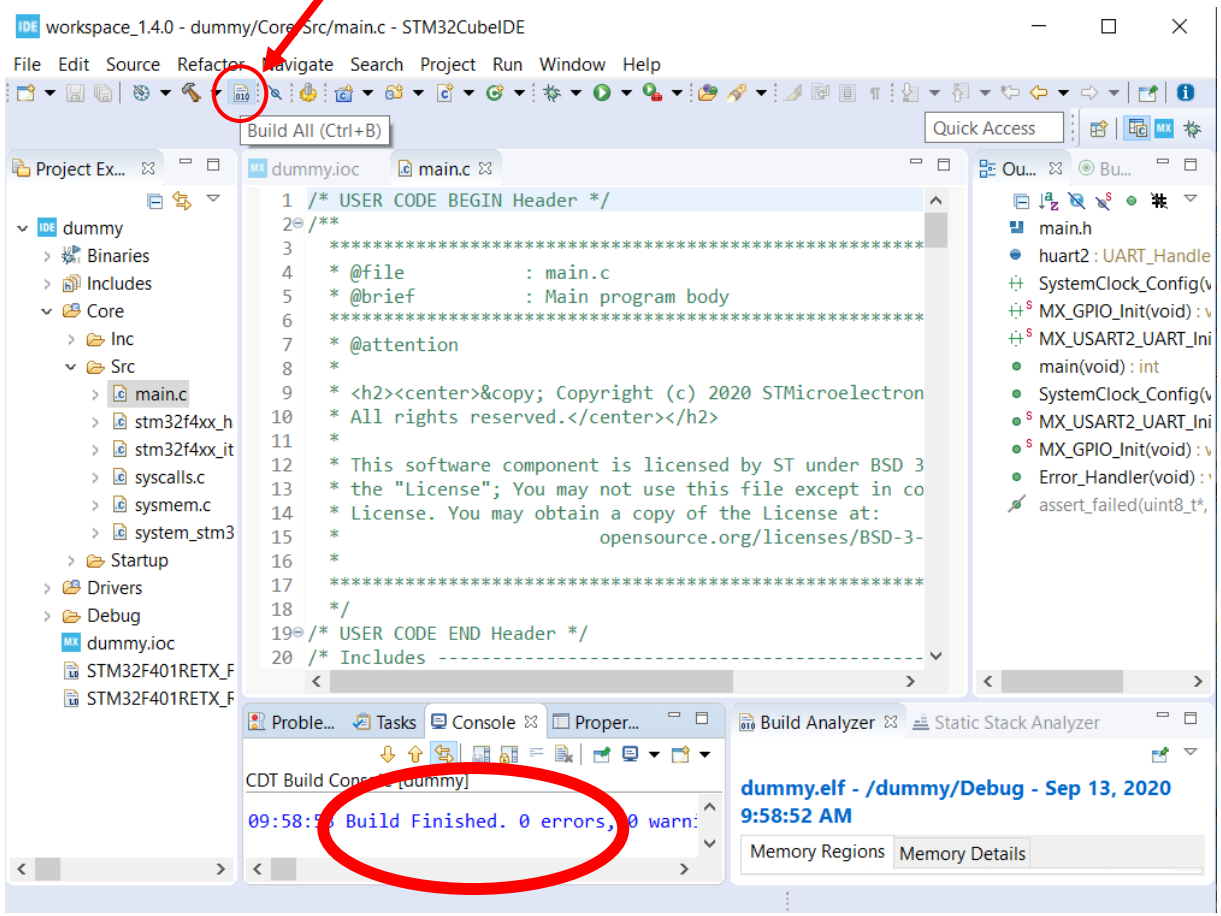
STM32CUbeIDE interface



Workspace

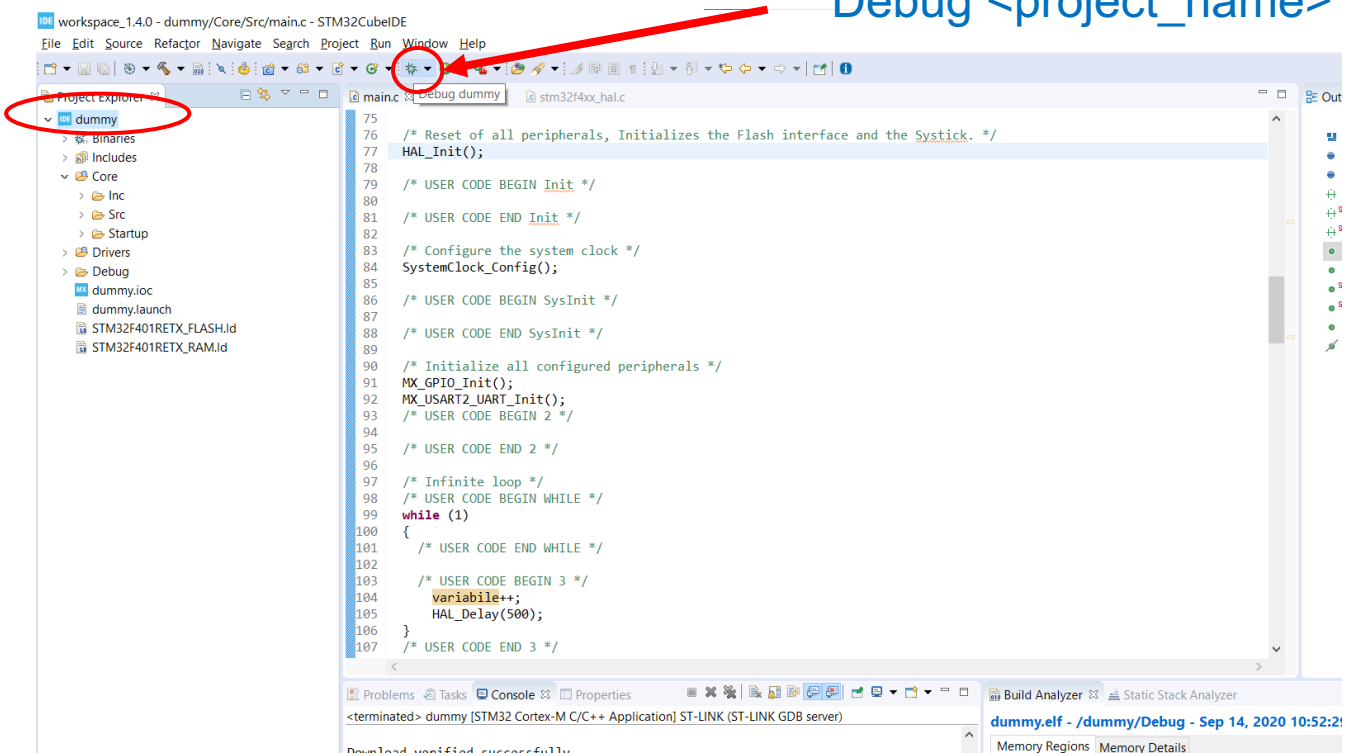
The IDE layout dynamically changes depending on the action being performed (coding, debugging, etc…)
Answer "Yes" when prompted to change perspective

Project code



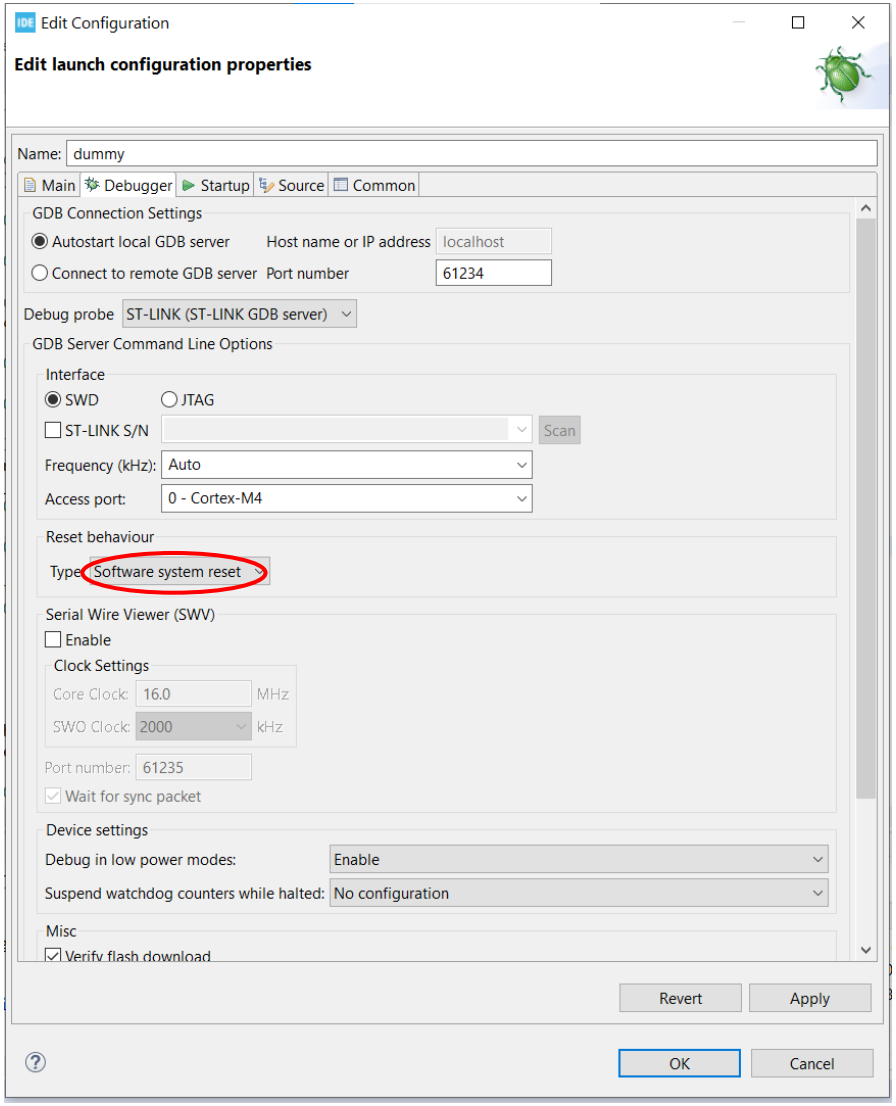
- Some parts of the code are already written (based on user settings selected with Cube)
- Between */*USER CODE BEGIN** and */*USER CODE END** it is possible to add code, which will be not modified even in case the settings in Cube are modified and code is generated again.
- Click **Build All**
- Check in the *Console* if the code has been built with "**0 Error(s)**"

Start debug session



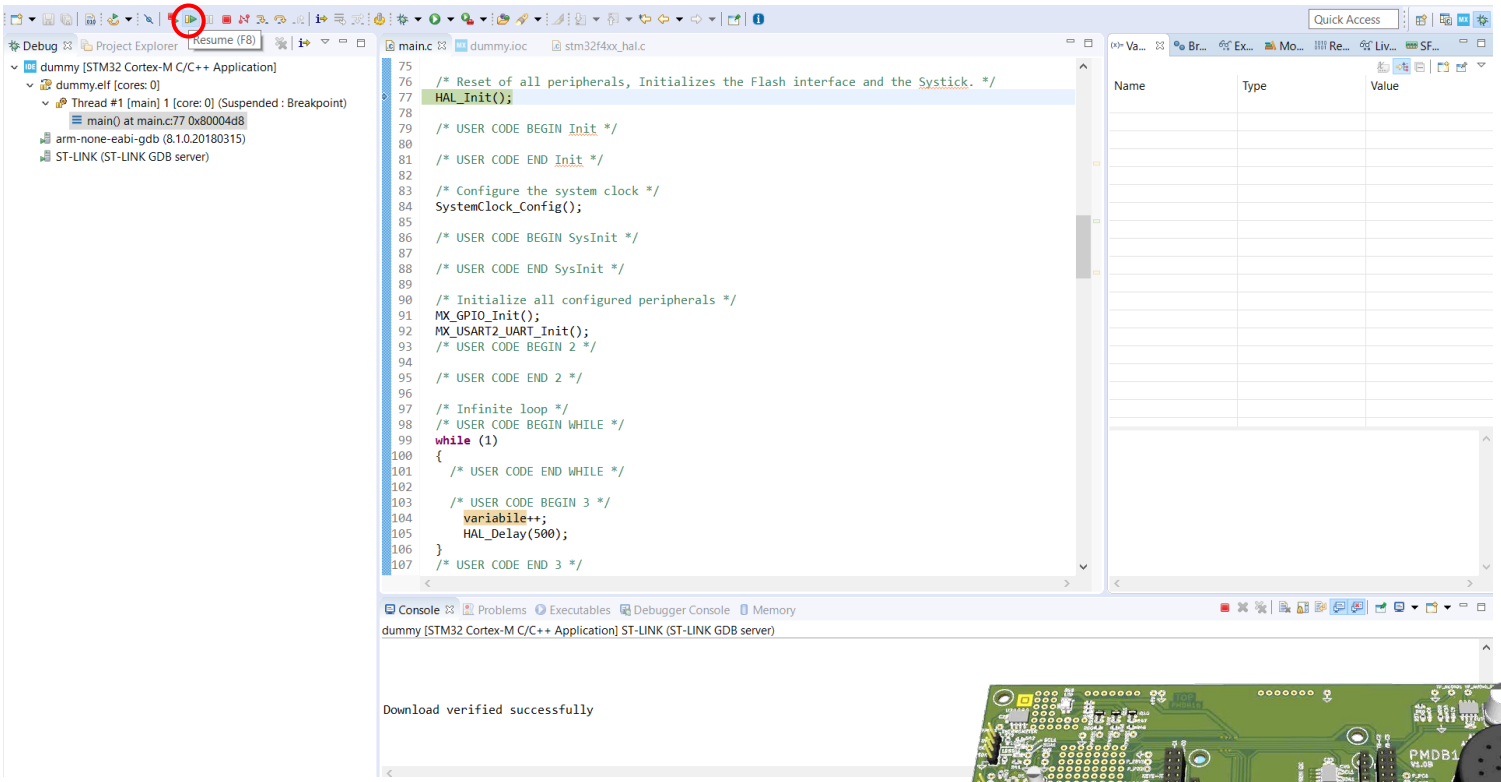
- Connect the Nucleo board to the PC through the USB link
- Select the project name on the left panel
- Click on “Debug <*project_name*>”
- If prompted, update the ST-Link firmware, wait for completion, reconnect the USB port and re-launch the debug session

Debug session

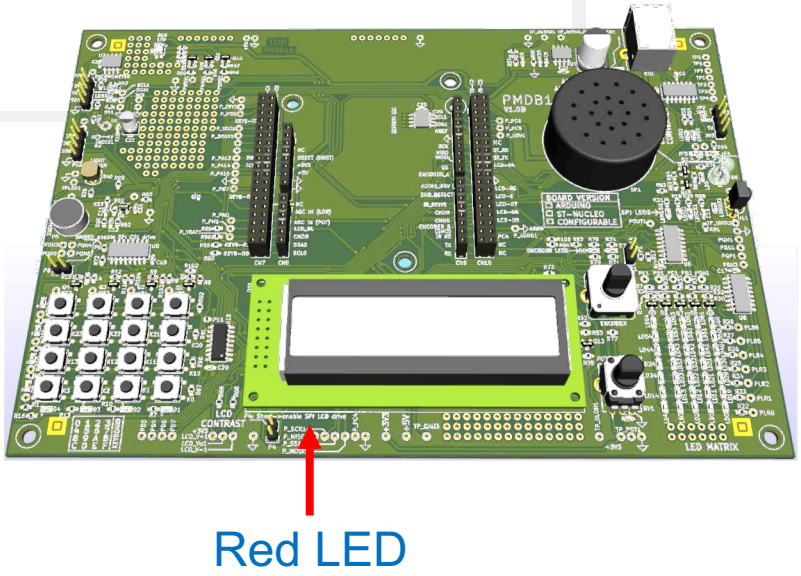


- Configure the debugger as shown on the left
- Most configuration are at their default value, except “Reset behaviour”

Debug software execution



- Start code execution by pressing “Resume” [F8]
- Global variables can be monitored in real time by adding them to the “Live expression” pane on the right



End

Congratulations!

Your tools have been correctly installed!

STM32CubeMX + Keil workflow

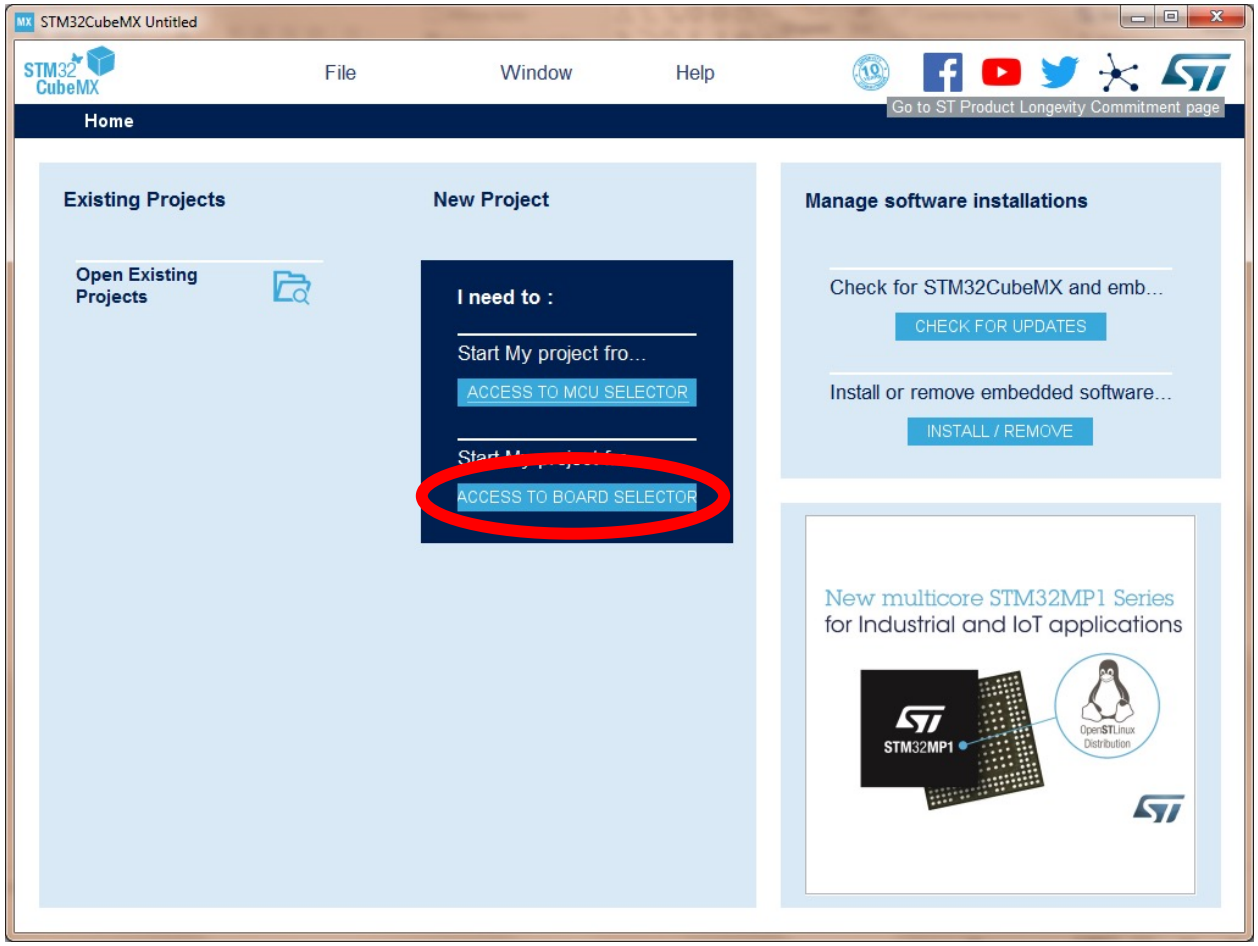
Introduction

Objective of this first trial is to learn:

- how to create a new project with Cube
- how to generate a code for Keil
- which is the structure of the Cube-generated Keil code
- how to compile and debug a code

Last but not least it is useful to check if all the software and drivers have been correctly installed

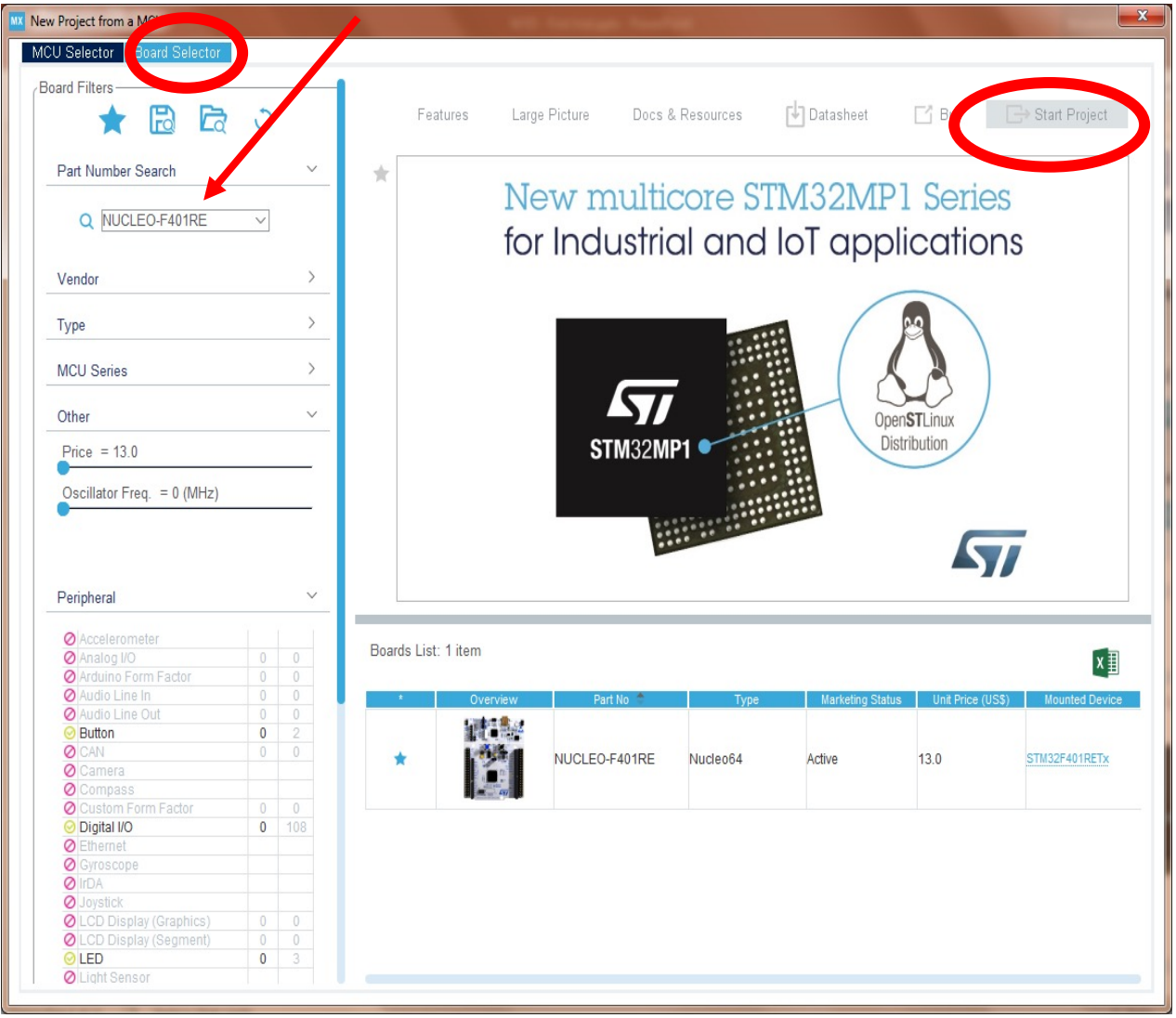
New project with Cube



- Open **STM32CubeMX**
- **New Project**, select **"ACCESS TO BOARD SELECTOR"**
- Accept to download any eventual new library / update
  (the first time you use Cube it will prompt you to download libraries and updates, always accept and wait, they can take some minutes)

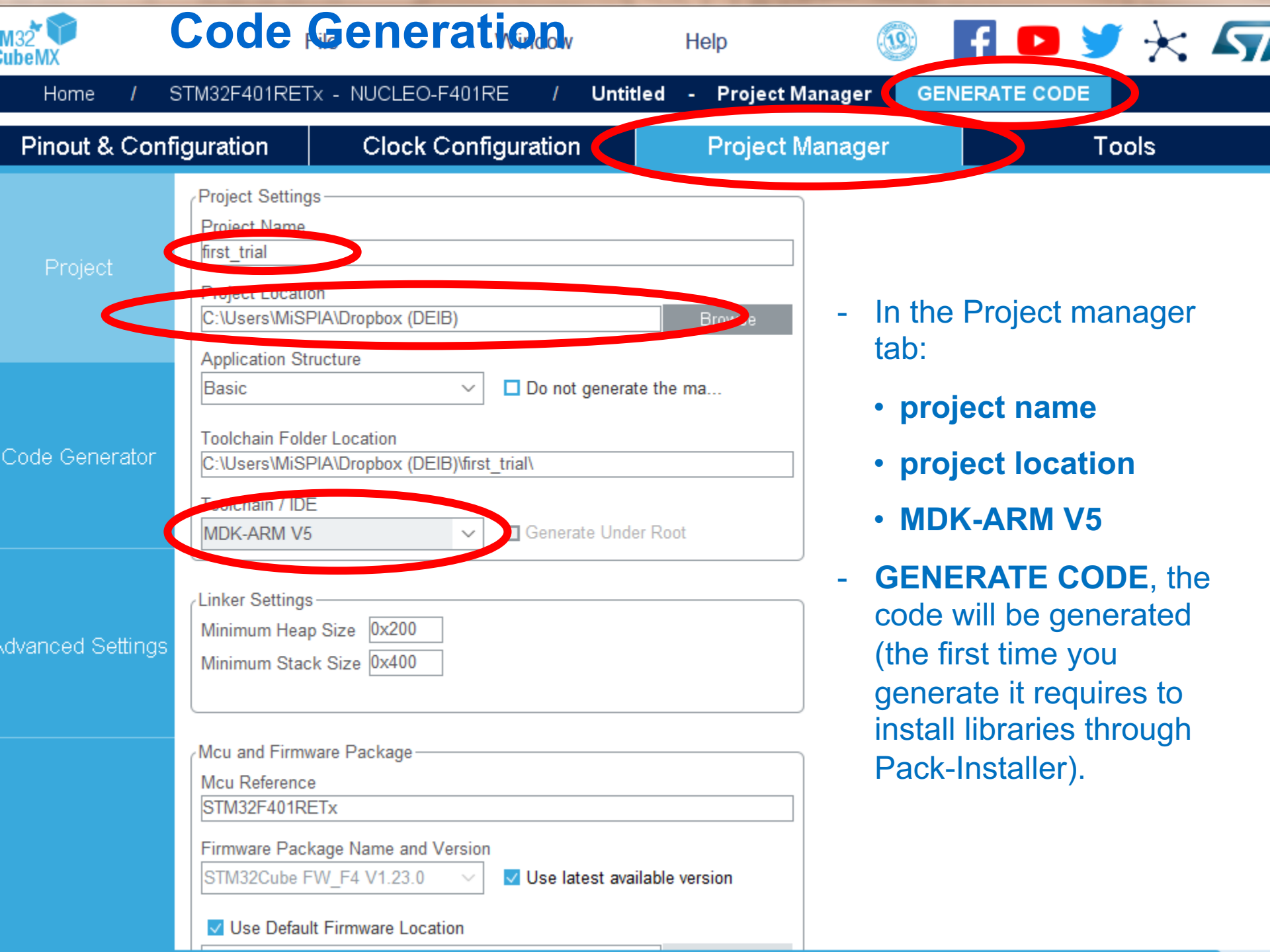
Board Selection

NUCLEO-F401RE



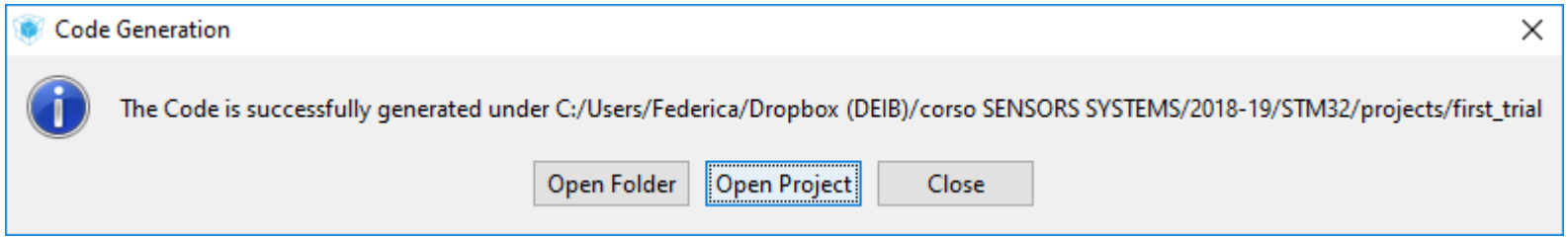
- Select **NUCLEO-F401RE**
- If you need, download datasheet and other documentation
- **Start Project**
- Initialize peripherals with their default Mode? **YES**

Code Generation



- In the Project manager tab:
  - **project name**
  - **project location**
  - **MDK-ARM V5**
- **GENERATE CODE**, the code will be generated (the first time you generate it requires to install libraries through Pack-Installer).

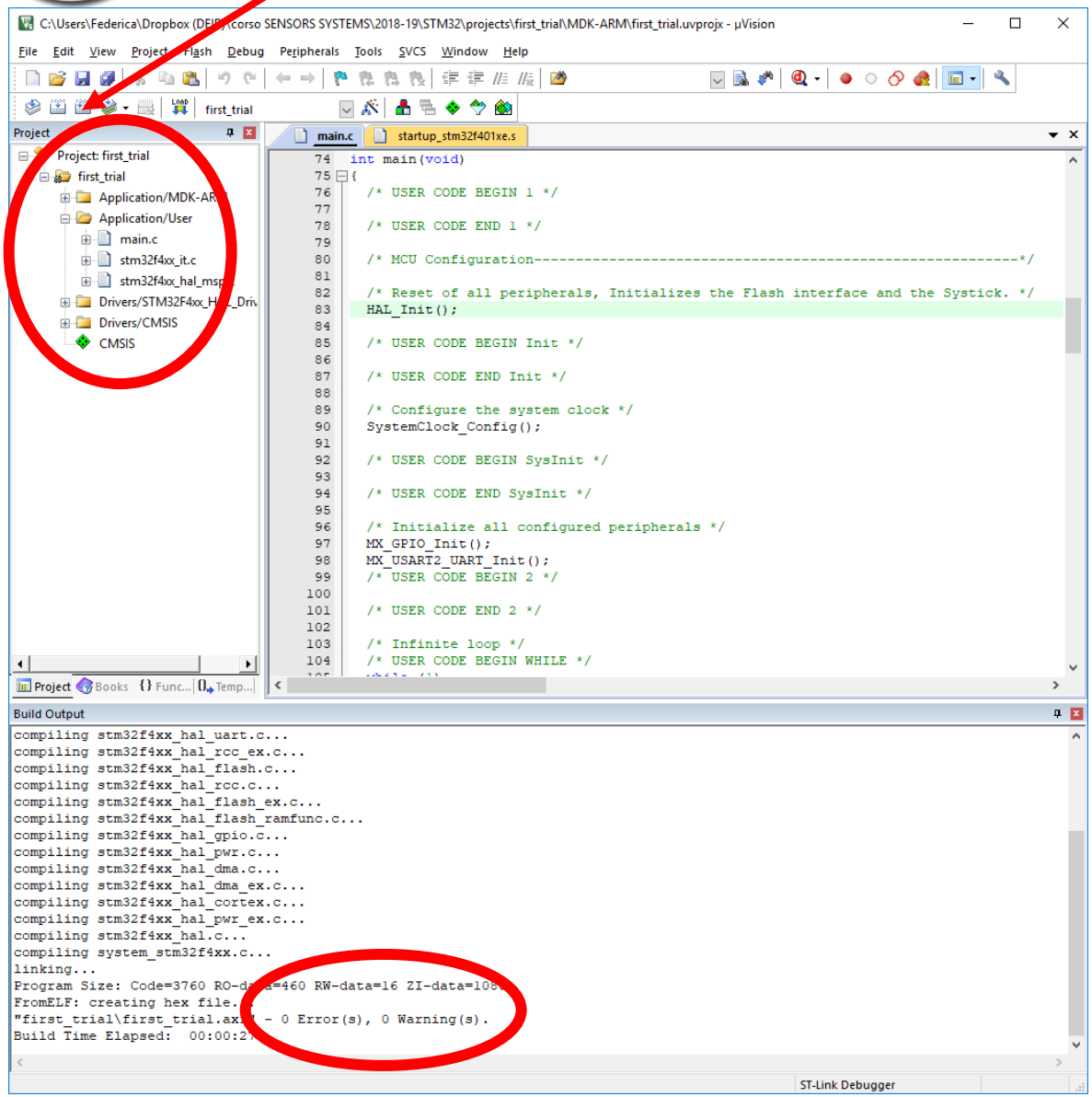
Open Keil project



- Select **Open Project**
- In the future if you need to generate the code again and you already have the project open in Keil, select **Close**, and in Keil accept to reload the project

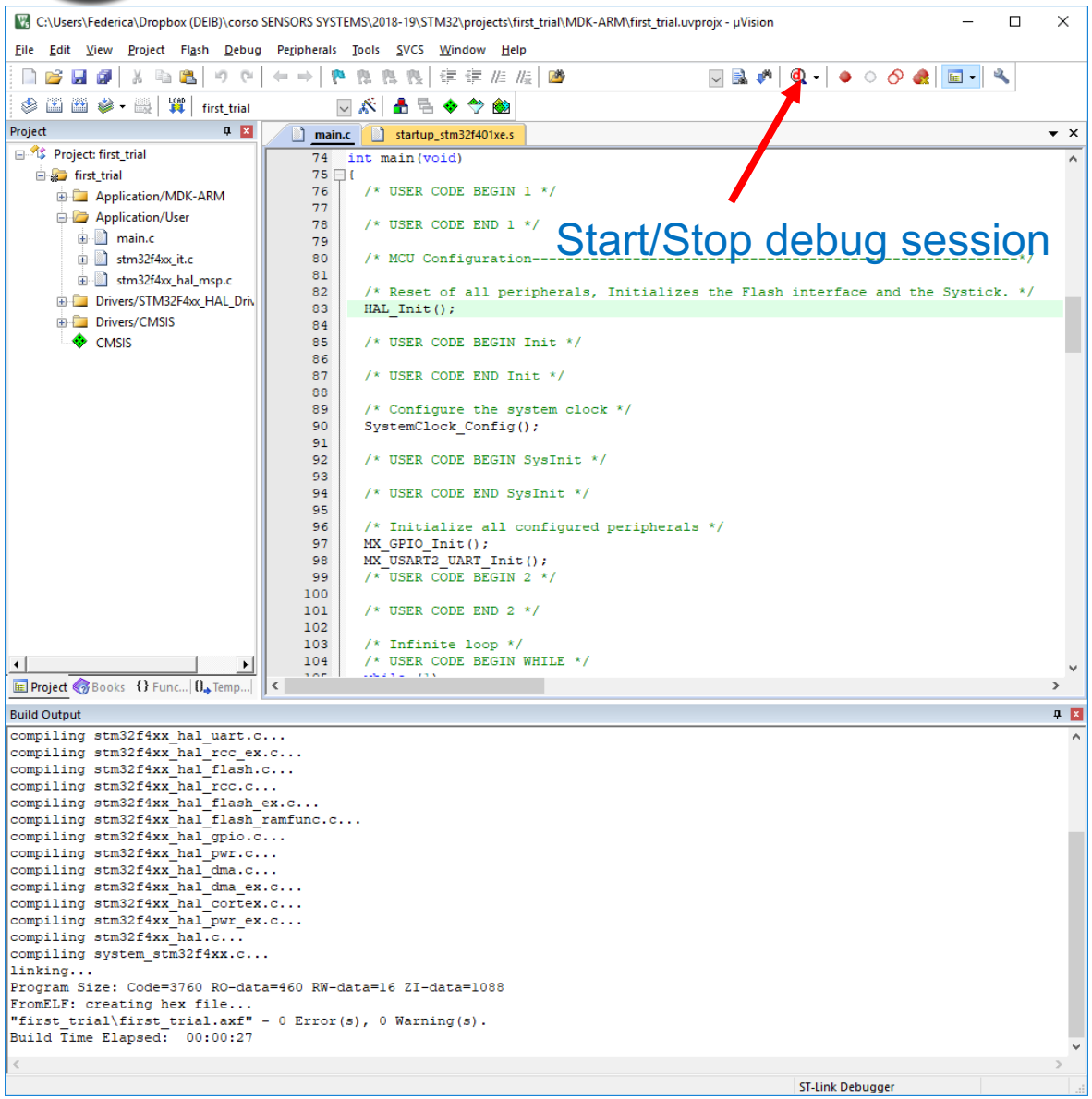
Project code

Rebuild



- Open **main.c** from the *Project window* (on the left)
- Some parts of the code are already written (based on user settings selected with Cube)
- Between */*USER CODE BEGIN* and */*USER CODE END* it is possible to add code, which will be not modified even in case the settings in Cube are modified and code is generated again.
- Click **Rebuild**
- Check in the *Build Output window* if the code has been build with **0 –Error(s)**

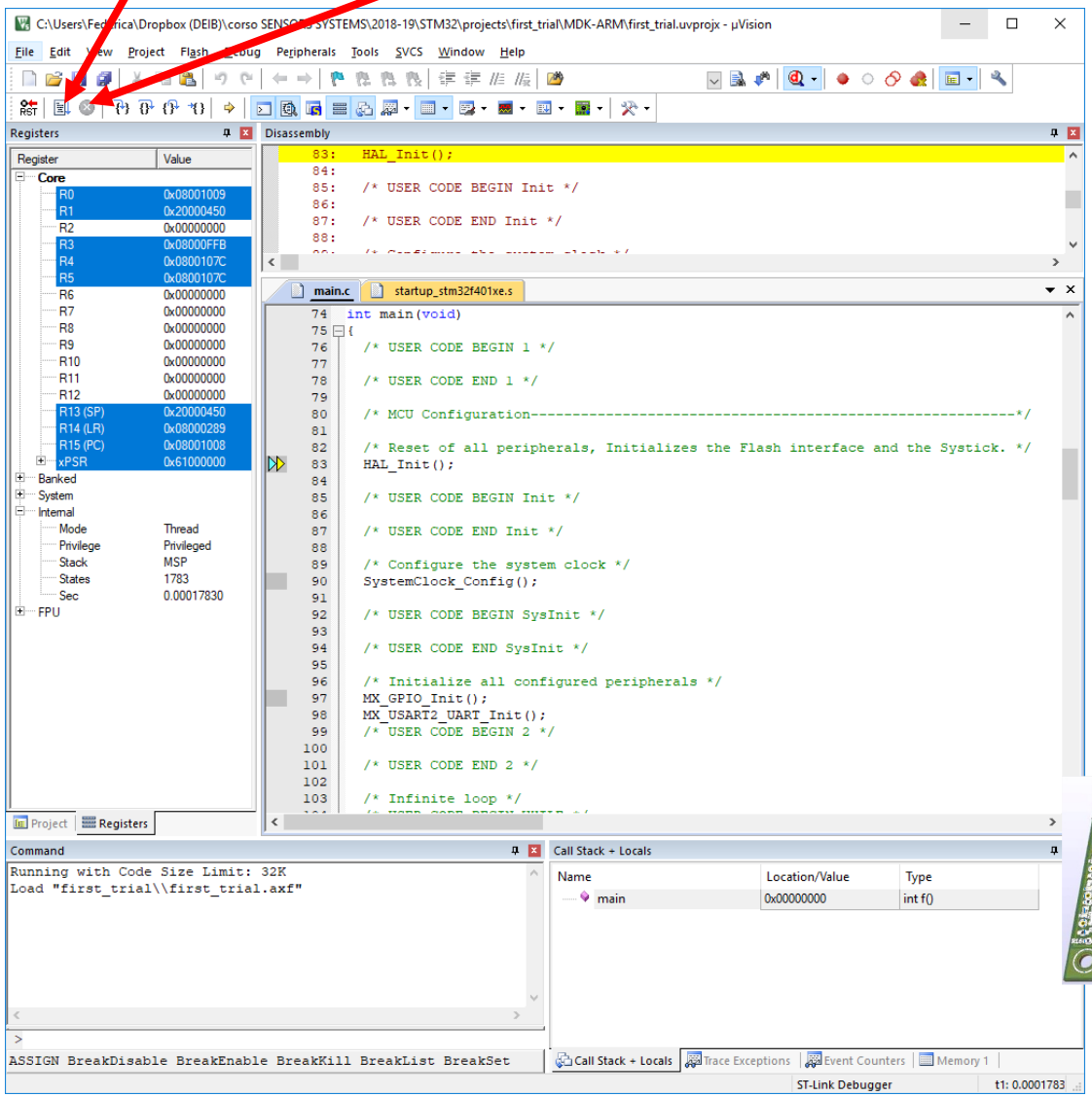
Start debug session



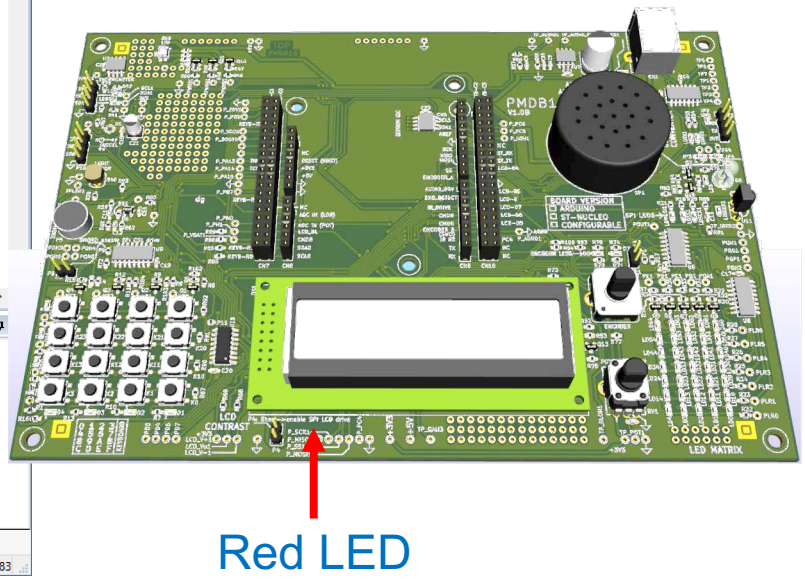
- Connect the Nucleo board to the PC through the USB link
- Click **Start/Stop debug session**
- If asked, update the ST-link drivers
- Evaluation Mode → OK

Debug session

Run (F5) Stop



- Click **Run (F5)** to run the code
- In this first trial a red LED on the Sensors Board should switch on
- **Stop** and click on **Start/Stop debug session** to come back to the code.



End

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