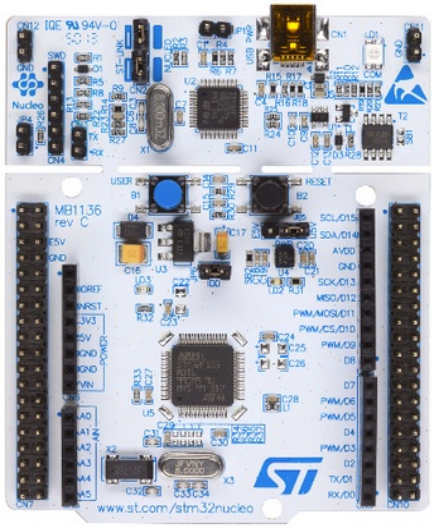
How to use NUCLEO-F401RE and Mbed



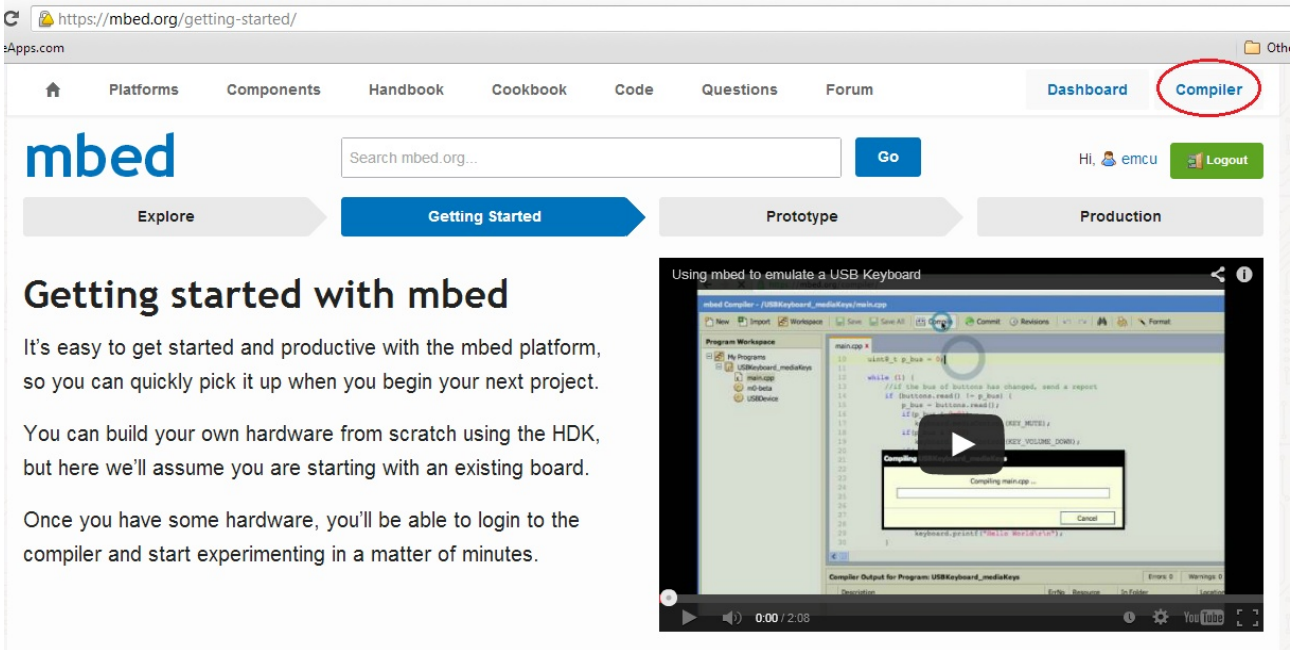
What is Mbed

The **mbed** development platform is the fastest way to create products based on ARM microcontrollers.
The project is being developed by ARM, its Partners and the contributions of the global mbed Developer Community.

In practice Mbed is online compiler tool.
This means that for use it is necessary have a Internet connection.

More info are **here**.

First you must **register on Mbed**.
Next follow the getting started example.
The **online compiler** is in the first page after you are login on Mbed, see below.



Update the USB driver for ST-LINK-v2

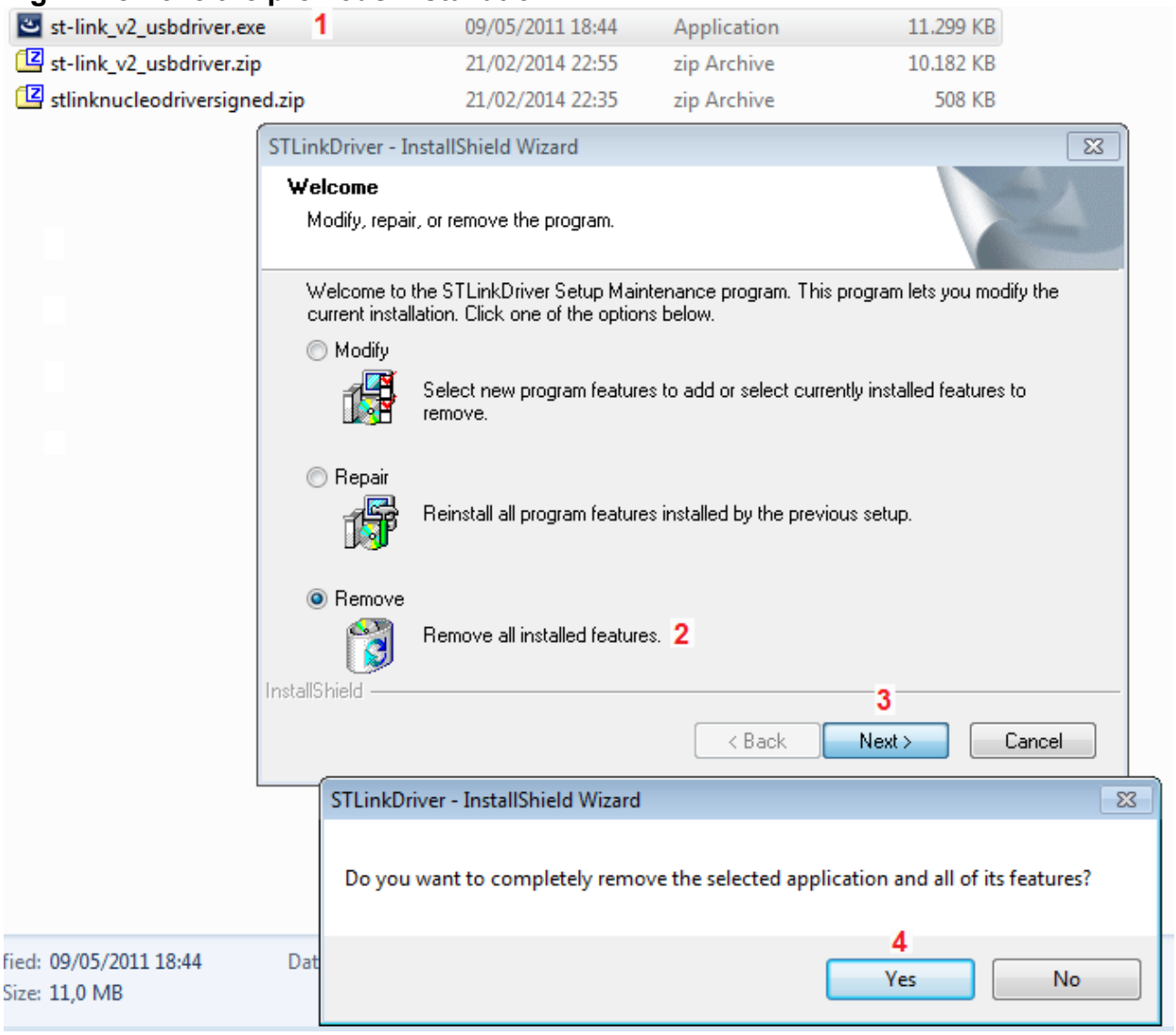
NOTE:
Do this update only if the: **Update the FW on NUCLEO-F401RE** fails.

Update the usb driver for ST-LINK-v2, chose it from the list below.
STSW-LINK003 ST-LINK/V2 USB driver for Windows 7, Vista and XP
STSW-LINK006 ST-LINK/V2 USB driver for Windows 8

Unzip the file and run it, with the privilege of ADMINISTRATOR, the file is:
st-link_v2_usbdriver.exe

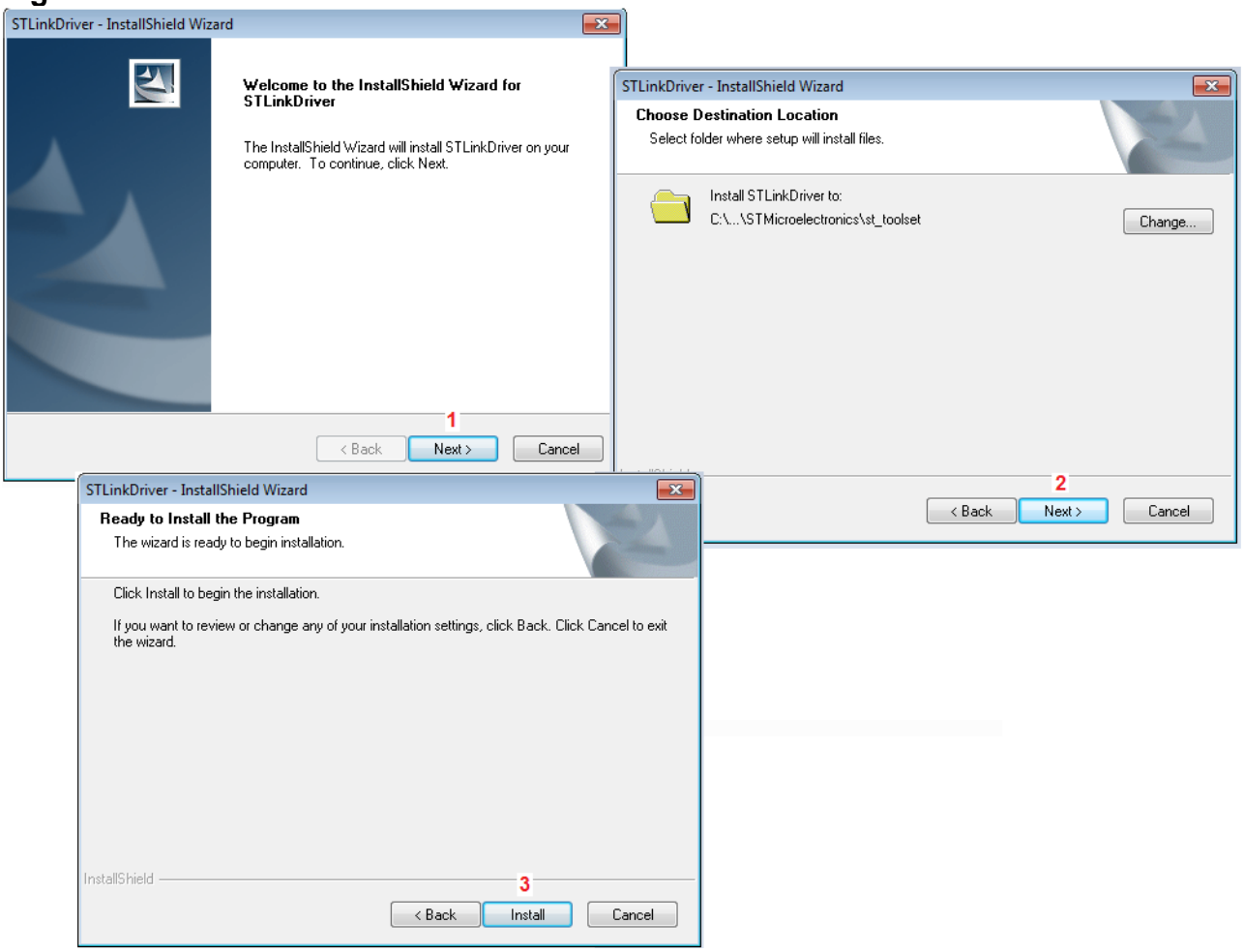
If the USB drive **is already installed** on your PC, first remove it (Fig.1) and next re-install it (Fig.2), see below.

Fig.1 – remove the previous installation

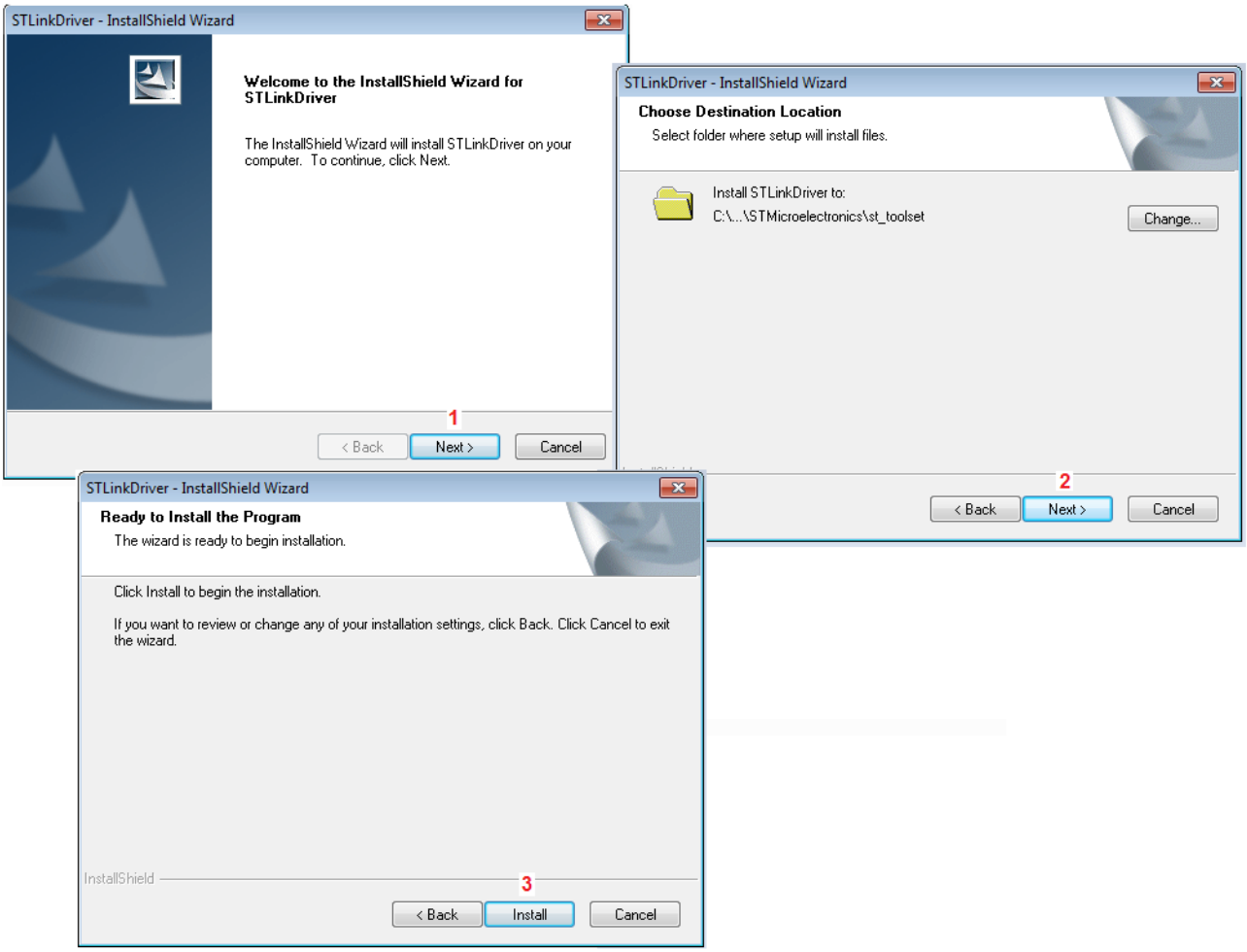


Now re-run the **st-link_v2_usbdriver.exe** and follow the steps below (1...3).

Fig.2



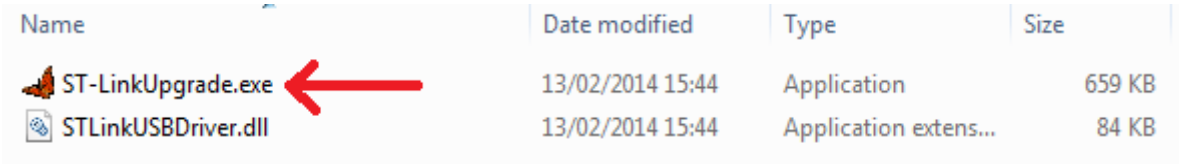
If the USB drive **is not already installed** on your PC, follow the steps below (1...3).

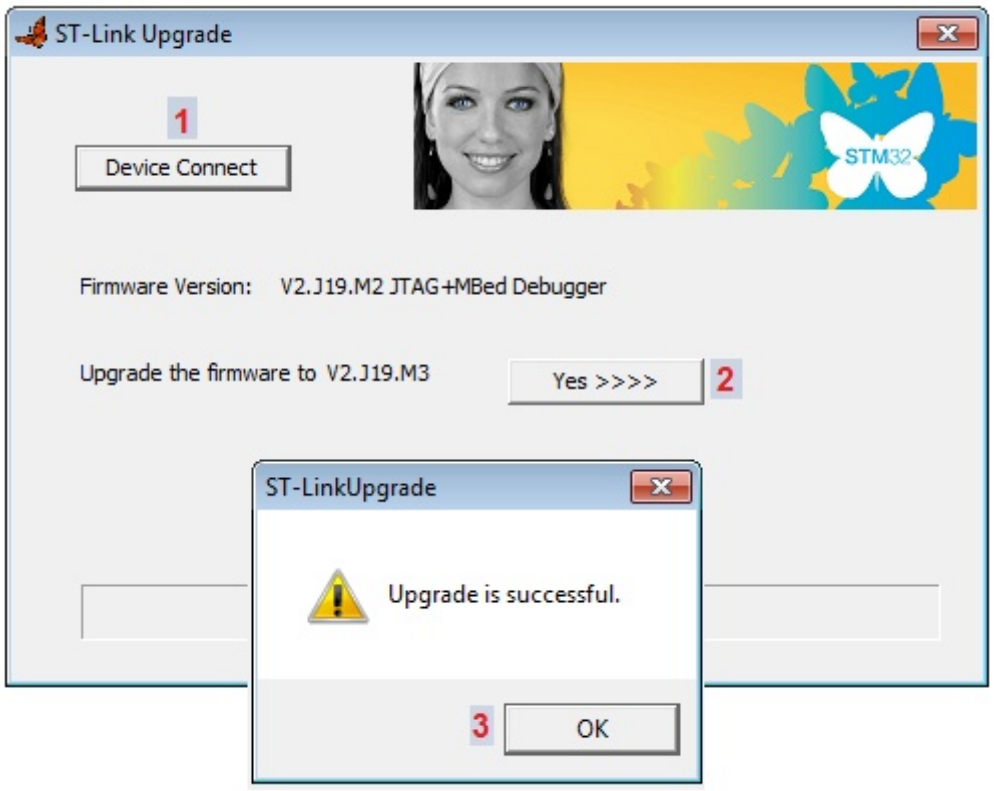


Update the FW on NUCLEO-F401RE

Go here and download the FW update.
http://mbed.org/teams//ST/wiki/Nucleo-Firmware

Extract and run **either dpinst_amd64.exe** or **dpinst_x86.exe** depending on whether you are on a 64bit or 32bit machine.
Follow the prompts.
To verify the operation, you may check using the Nucleo firmware installer.
In practice download the fw update for ST-LINK-v2 and run it (also with ADMINISTRATOR privilege), see below.



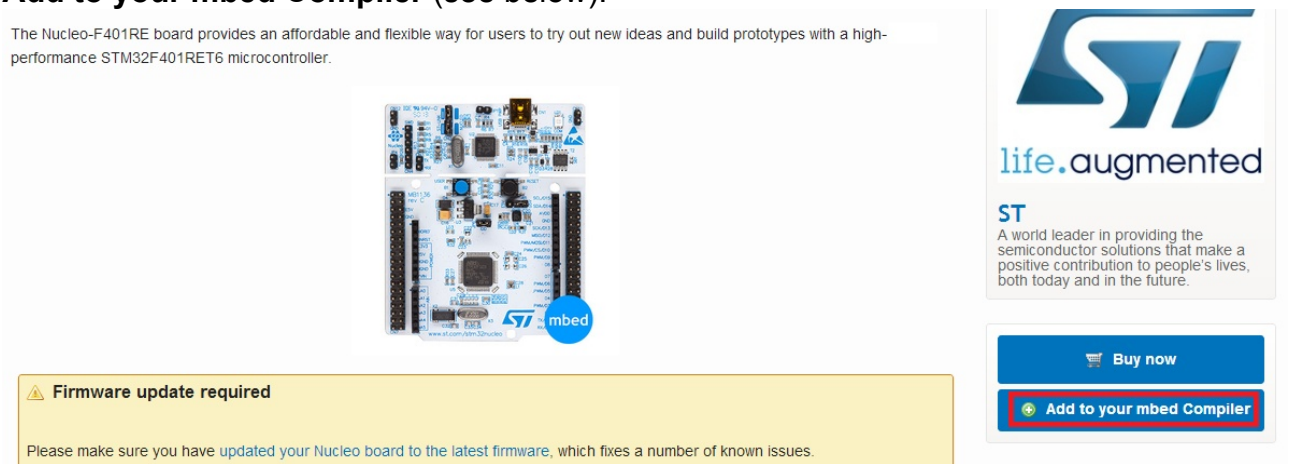


In case of problems do this:
Execute the: **Update the USB driver for ST-LINK-v2**
Execute again: **Update the FW on NUCLEO-F401RE**

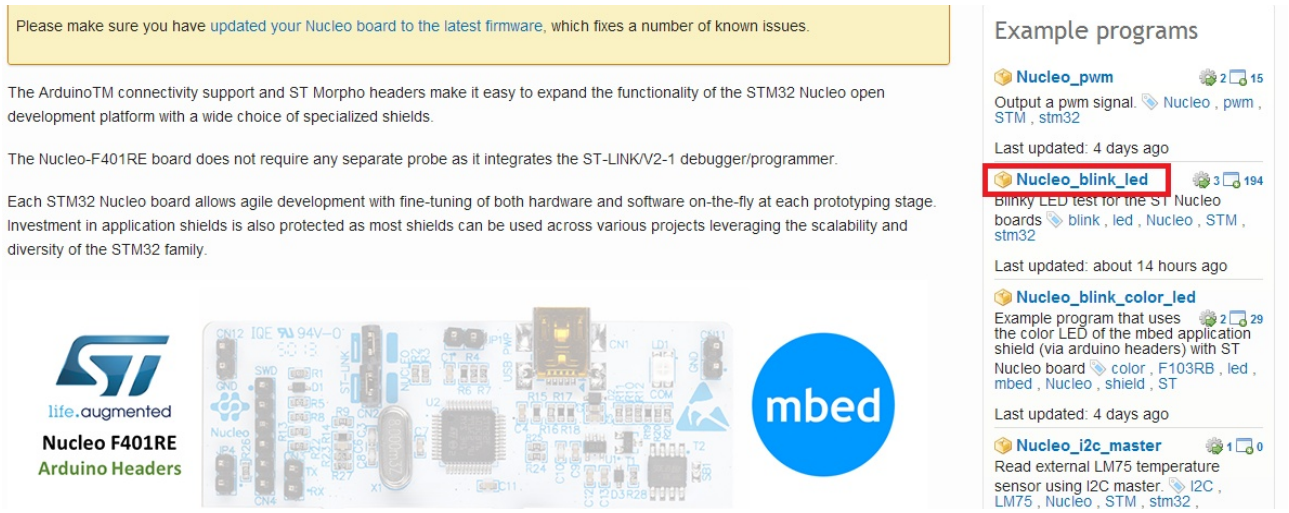
SW examples

From this **link** you find my doc, examples, etc, regarding **NUCLEO boards**.
From this **link** you find the **Mbed NUCLEO-F401RE** doc, example, etc.

For use the **NUCLEO-F401RE Mbed examples** you must before register on mbed and after **add the platform to your compiler**, to do do this click on the:
Add to your mbed Compiler (see below).

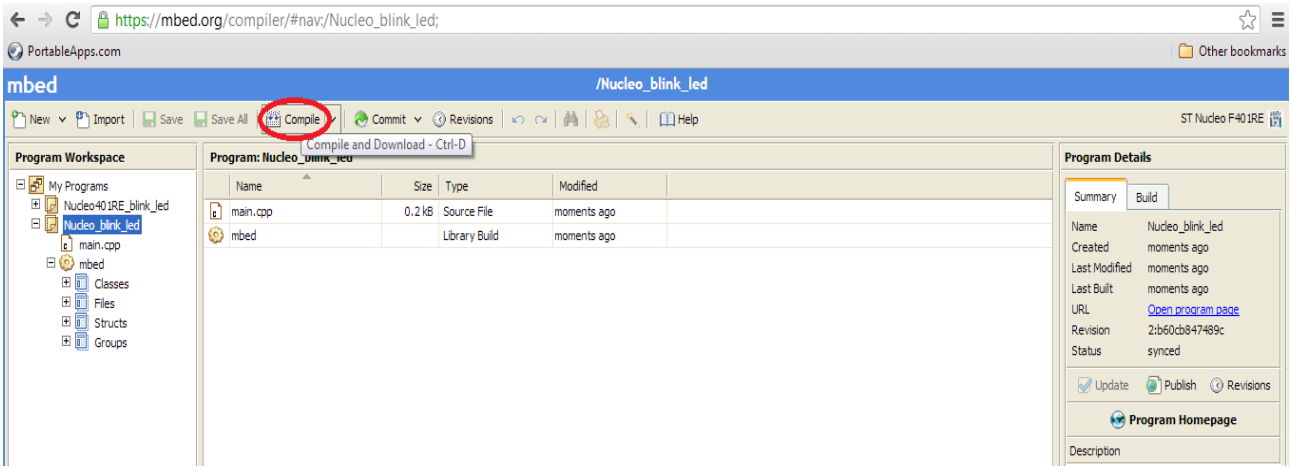


Now we need to use the example: **Nucleo_blink_color_led**
for do this, select it, see below



and from the new windows that appears select:
Import this program
see below.

After importing the project **click on the Compile** icon, see belos.

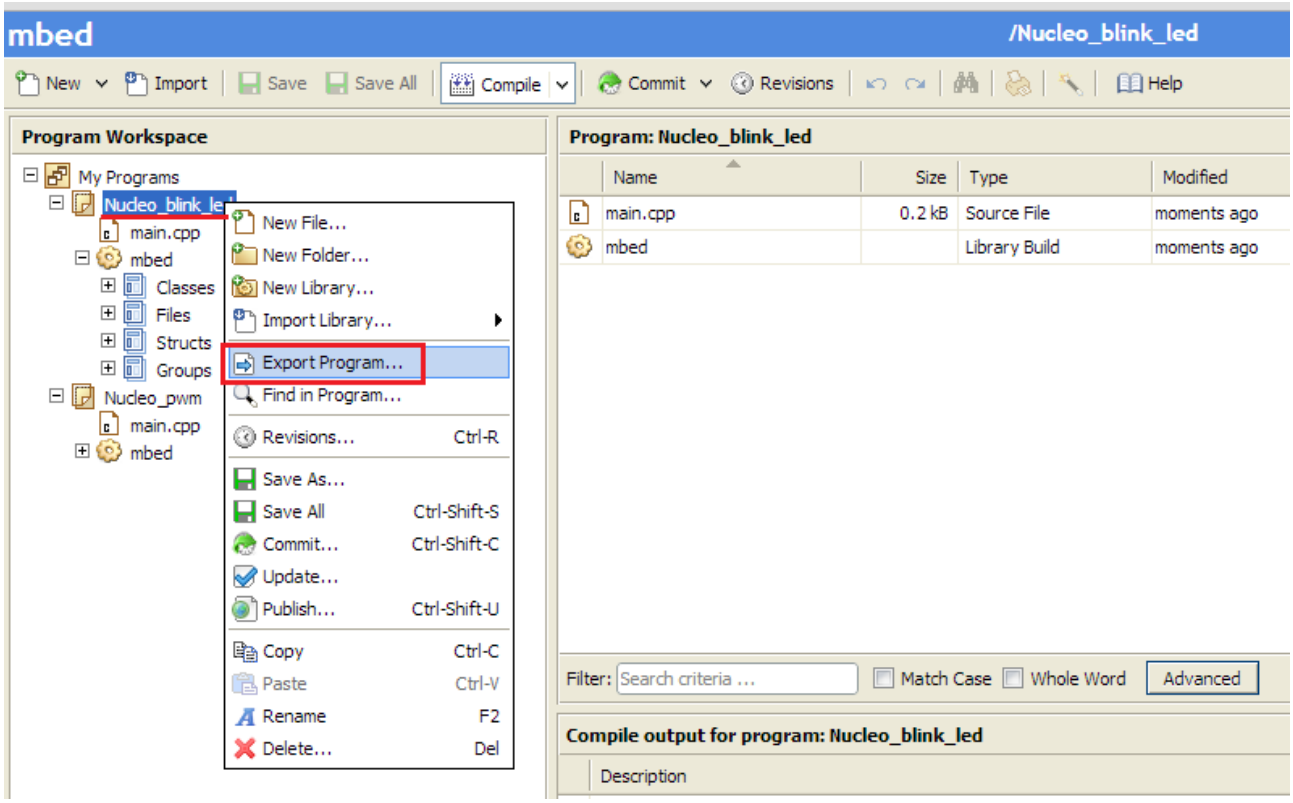


and save the **bin** file in a directory.

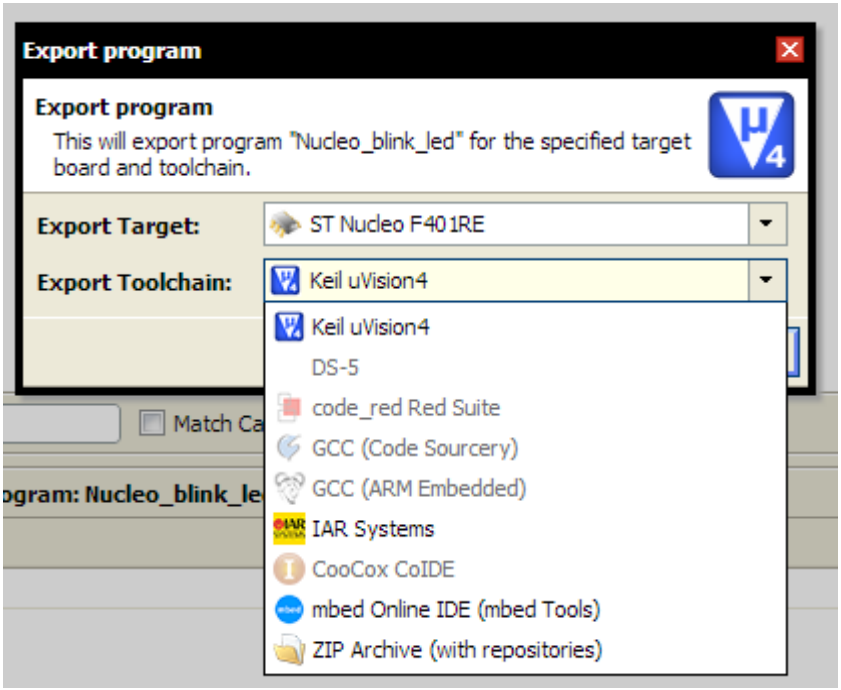
Now for programming NUCLEO-F401RE use **ST-LINK-Utility**.
At the end of the programming you must see the green LED that blinking.

Export your programs to KEIL, IAR, etc

First: select the program that you need export..
Second: click on it with the right mouse button and from the window that appear select Export Program, see below.



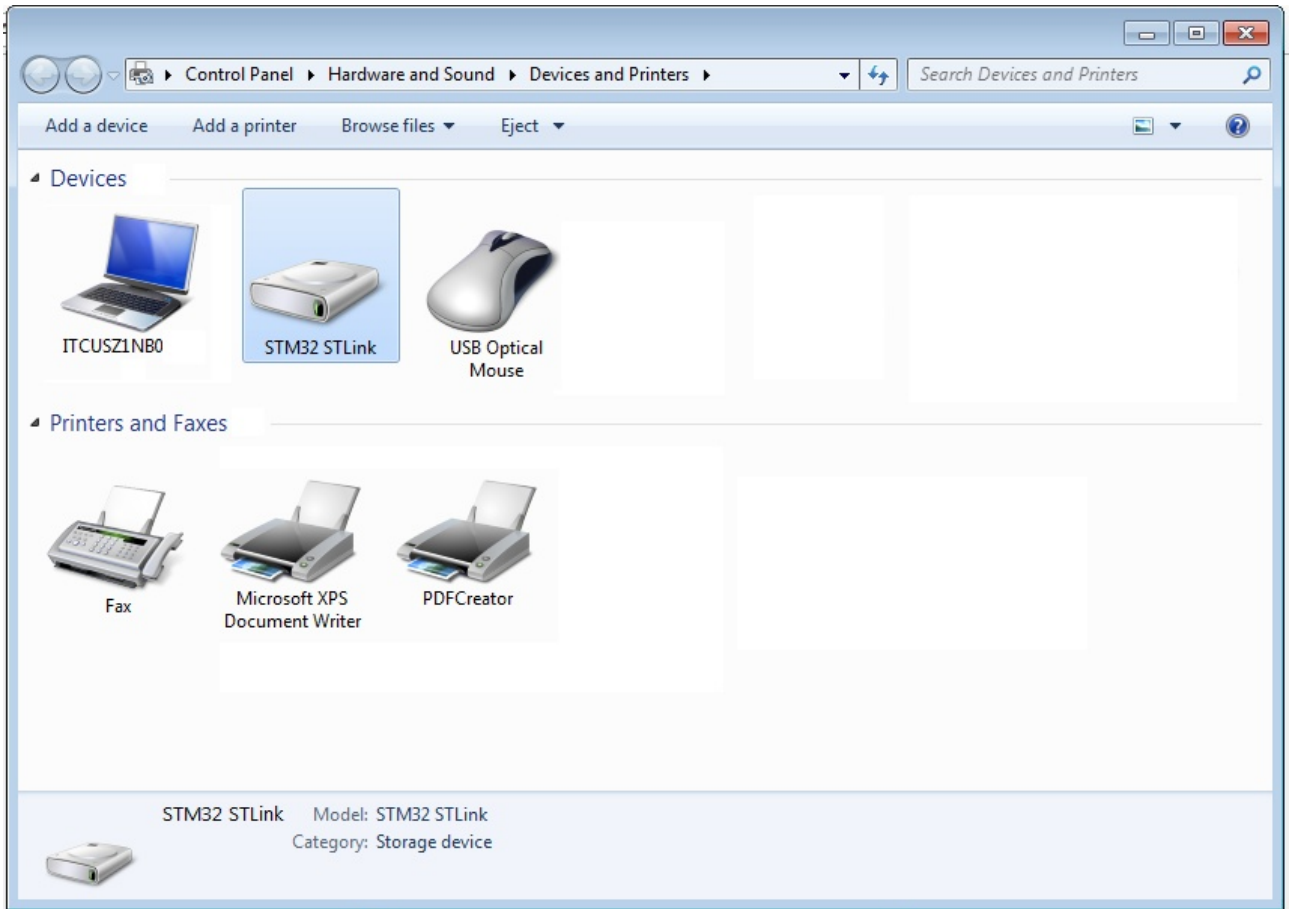
From the new window that appear select the name of the toolchain and click on EXPORT button.



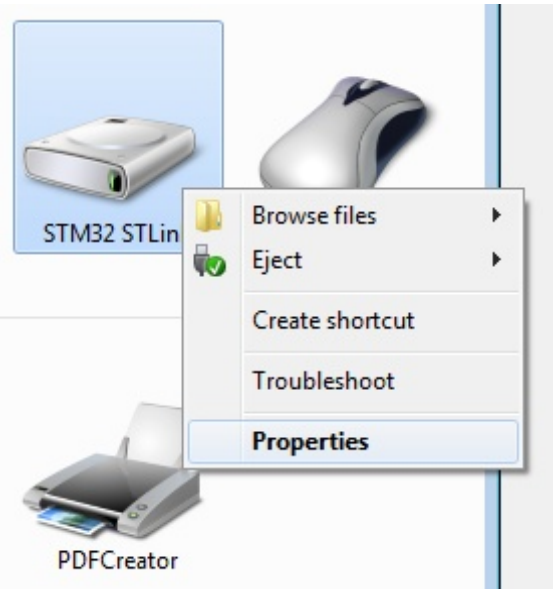
A minimum debug using pc.printf

Up to now is not present a serious debug tool in Mbed, the only possibility that you have is to use the **pc.printf** or **printf** that send a message (text, variable, etc) via USB port to the PC.
The PC see the NUCLEO-F401RE as a **Virtual COM Port**.

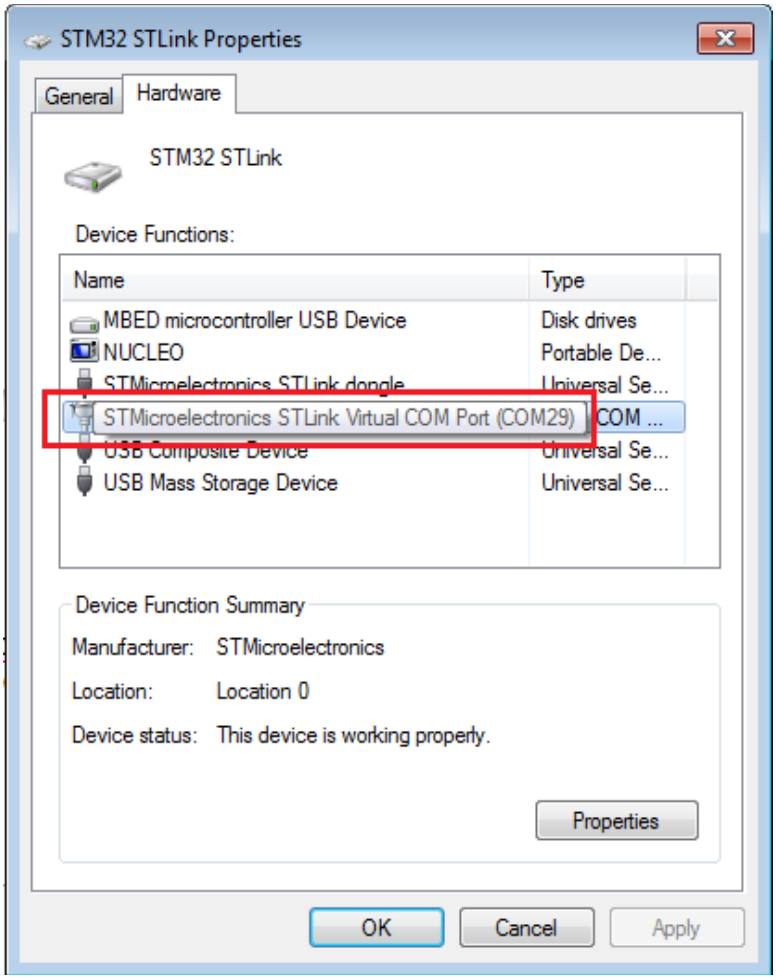
If you select: **START -> Device and Printer**
You must see something like below.



Now select the **STM32 STLink** and **click on it using the right button** of the mouse.
From the window that appear select **Properties**, see below.



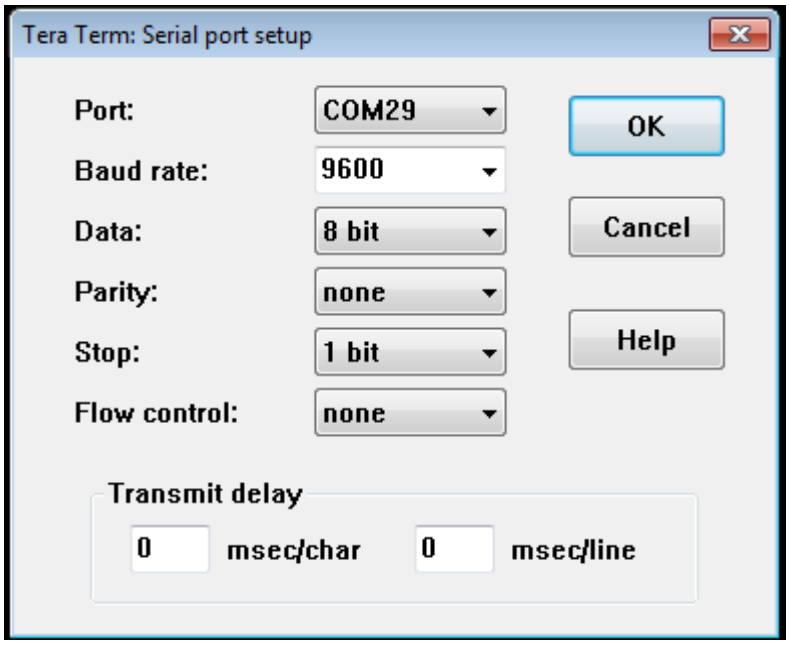
From the window that appear select **Hardware**.
You must see something like below.
My Virtual COM Port is **COM29**.



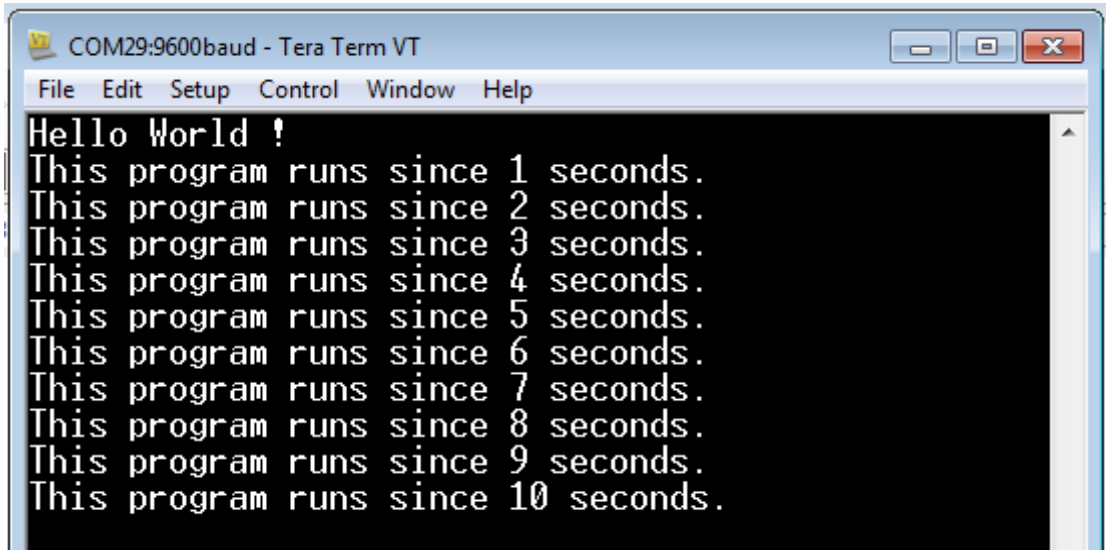
Now use the example **Nucleo_printf** and **programing** your **Nucleo-F401RE.**
Below there is the content of **main.cpp**

```
#include "mbed.h"

Serial pc(SERIAL_TX, SERIAL_RX);

DigitalOut myled(LED1);

int main() {
  int i = 1;
  pc.printf("Hello World !\n");
  while(1) {
      wait(1);
      pc.printf("This program runs since %d seconds.\n", i++);
      myled = !myled;
  }
}
```

Configure your **TeraTerm** (on Windows7) using the following parameters:



On your PC, you must see something like below.



And on the **NUCLEO-F401RE** you must see the **green led** that **flashing**.

LINKs

- NUCLEO eva board
- For who has Windows7 we suggest to install **TeraTerm**
  http://en.wikipedia.org/wiki/Tera_Term
  download it from this link:http://ttssh2.sourceforge.jp/index.html.en