Setting up your programming environment

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1 Programming Environment

In this class, we will use a GCC-based programming environment. Specifically, all our labs will be coded using the open source **SW4STM32** IDE and toolchain, also known as **System Workbench for STM32**, available for all three major operating systems (Microsoft Windows, Apple macOS and GNU/Linux).
We will also be using the STM32CubeProgrammer. This application allows us to read, erase, and update the FLASH memory in our microcontroller. This software is also available for use in all three major operating systems.

This document will show how to install all the required software on Microsoft Windows 10, and Ubuntu 18.04 (Linux). If you need help creating your first STM32 project from scratch, there is another tutorial explaining how to use the SW4STM32.

2 Windows - Programming Environment

2.1 Setting up the System Workbench for STM32

In order to install our programming environment in a Windows machine, you will need to access the following link to download the Windows installer:
`http://www.openstm32.org/Downloading%2Bthe%2BSystem%2BWorkbench%2Bfor%2BSTM32%2Binstaller`.
You will need to create an account in order to be able to access the download links.

Once you gained access to the download links, go to the linux section and download the installer **.exe** file. When the download has finished, just double click the file name and follow the installer instructions.

2.2 Setting up the STM32CubeProgrammer

First, we need to install the Java Runtime Environment in our Windows machine. You should install the Java update 8, other versions may not work. You can grab the installer file in the following link:
`https://www.oracle.com/technetwork/java/javase/downloads/jdk8-downloads-2133151.html`.

Second, let's download the necessary zip-file from the ST website:
`https://www.st.com/en/development-tools/stm32cubeprog.html`
In the ST website, just scroll to the bottom of the page and click in the blue "Get Software" button. You will need to enter a valid email. The final download link will be send to your email.

Third, unzip the file you just downloaded and run the **.exe** installer.

3 Linux - Programming Environment

3.1 Setting up the System Workbench for STM32

In order to install our programming environment in a Linux machine, you will need to access the following link to download the Linux installer: `http://www.openstm32.org/Downloading%2Bthe%2BSystem%2BWorkbench%2Bfor%2BSTM32%2Binstaller`. You will need to create an account in order to be able to access the download links.

Once you gained access to the download links, go to the linux section and download the installer **.run** file, as indicated in Figure 1. Please, note that the latest version of the System Workbench for STM32 is only available for 64bit linux systems.

The GUI installation is only available if your linux system has the **gksudo** package installed. Unfortunetely, Ubuntu 18.04 does not contain this package anymore, and, therefore, we will have to install the IDE using the console.

First, let's install some package dependencies using the following command in a terminal window:

```
$ sudo apt install build-essential libc6:i386 lib32ncurses5
```

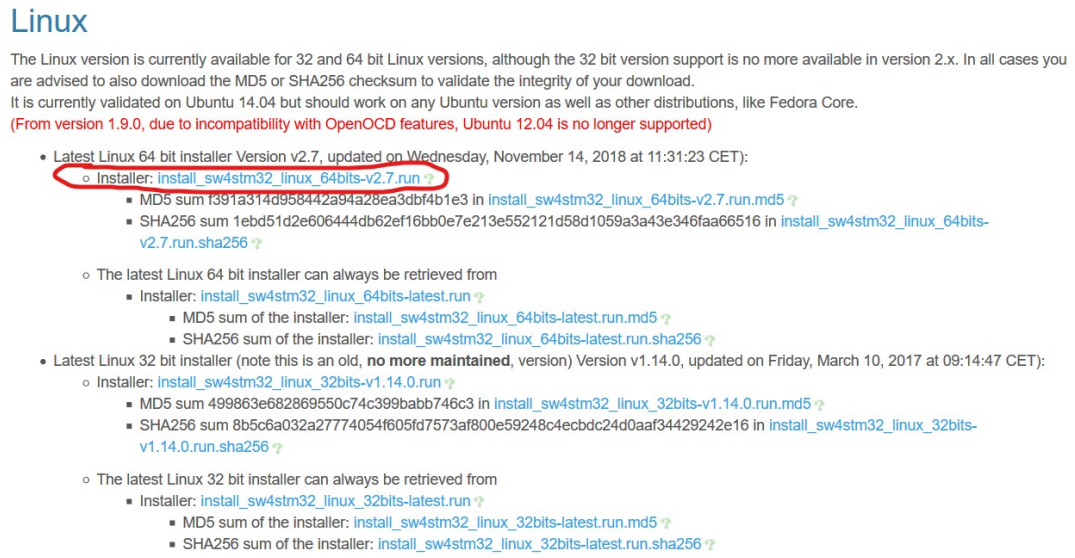

Figure 1: Location of the linux installer.

To start the installation process, open a terminal window and navigate to the directory where you downloaded the installer file, and run the following commands:

```
$ chmod a+x install_sw4stm32_linux_64bits-v2.7.run
$ ./install_sw4stm32_linux_64bits-v2.7.run
```

Answer the installer questions as follows:

- Do you want to run installation in console mode? [N/y]
  - **y**
- Press 1 to continue, 2 to quit, 3 to redisplay
  - **1**
- –More–
  - Press the letter '**q**' in your keyboard.
- Press 1 to continue, 2 to quit, 3 to redisplay
  - **1**
- Press 1 to continue, 2 to quit, 3 to redisplay
  - **1**
- Press 1 to continue, 2 to quit, 3 to redisplay
  - **1**
- Select the installation path: [/home/user/Ac6/SystemWorkbench]

  - Press the **enter** button in your keyboard.

- Enter O for OK, C to Cancel:
  - **O**
- Press 1 to continue, 2 to quit, 3 to redisplay
  - **1**
- Enter Y for Yes, N for No:
  - **Y**
- Press 1 to continue, 2 to quit, 3 to redisplay
  - **1**
- Enter Y for Yes, N for No:
  - **N**

After these steps, the System Workbench for STM32 should be installed in your Linux machine. You can run the program using a terminal windows with the following commands:

```
$ cd ~/Ac6/SystemWorkBench/
$ ./eclipse
```

After these commands, the graphical IDE will show up.

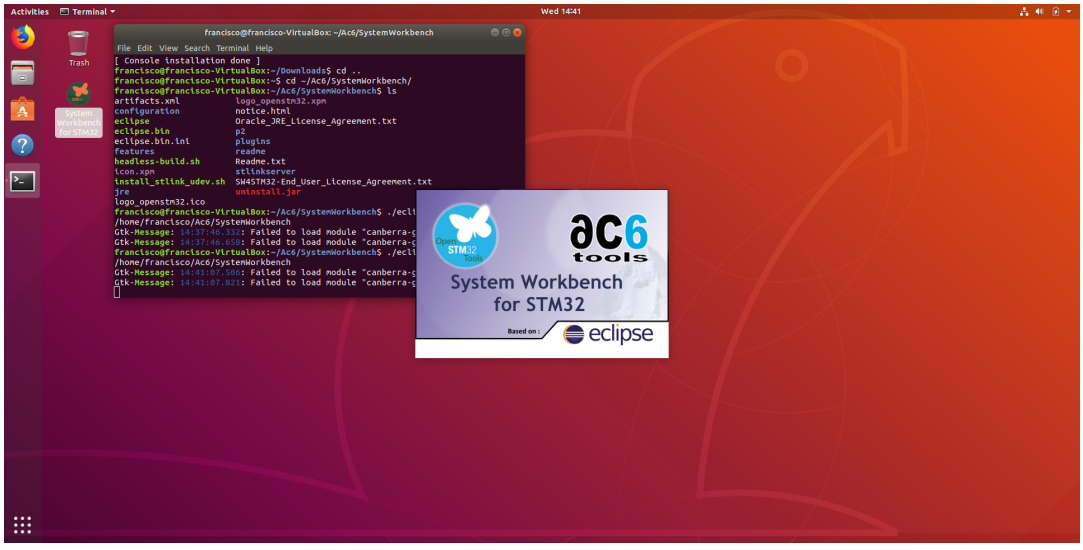

Figure 2: System Workbench for STM32 installed on Ubuntu 18.04.

3.2 Setting up the STM32CubeProgrammer

Now, we can download and install the STM32CubeProgrammer. This little application will help us erase and reprogram the microcontroller FLASH memory.

First, let's install the necessary Java dependencies with the following command:

```
$ sudo add-apt-repository ppa:webupd8team/java
$ sudo apt update
$ sudo apt install oracle-java8-set-default
```

Second, let's download the necessary zip-file from the ST website:
`https://www.st.com/en/development-tools/stm32cubeprog.html`
In the ST website, just scroll to the bottom of the page and click in the blue "Get Software" button. You will need to enter a valid email. The final download link will be send to your email.

Third, navigate to where you downloaded the zip-file, unzip, run the installer, and follow the instructions:

```
$ unzip en.stm32cubeprog.zip
$ ./SetupSTM32CubeProgrammer-1.3.0.linux
```

Now, we can run the application with the following commands:

```
$ cd ~/STMicroelectronics/STM32Cube/STM32CubeProgrammer/bin
$ ./STM32CubeProgrammer
```

4 Apple macOS - Programming Environment

Well, I don't have access to any Apple computer. So, I cannot explain step-by-step how to install our programming environment on macOS.

However, some general guidelines are provided in the following link: `http://www.openstm32.org/Installing%2BSystem%2BWorkbench%2Bfor%2BSTM32%2Bwith%2Binstaller`

The macOS installer can be downloaded from the following link (registration is required): `http://www.openstm32.org/Downloading%2Bthe%2BSystem%2BWorkbench%2Bfor%2BSTM32%2Binstaller`.

These instructions are replicated here for the sake of completeness. If you need further help, please contact your TA.

Warning: To run System Workbench for STM32 on MAC OSX systems, XCode is required. To download it, please refer to the Apple developper website (registration as Apple Developer is required).

The downloaded installer is an executable binary file. Your web browser might have removed the execution right of the file. Please, set the execution right to the installer file (chmod 755 install_sw4stm32.run then ./install_sw4stm32.run) **Or** Launch it with /bin/bash (/bin/bash install_sw4stm32.run).

Info: If an error message saying the installer "is damaged and can't be opened. You should move it to the Trash.", please modify the installation access right in the Gatekeeper:

- On latest version of MAC OSX, Go in the terminal:

```
#To disable
sudo spctl --master-disable
#To set the Gatekeeper access right back
sudo spctl --master-enable
```

- On older version of MAC OSX:
  - Go in the "System Preferences" >"Security & Privacy", then select "Allow downloaded app from:" "Anywhere". When the installation is done, restore the setting value back at "Mac App Store and identified developers".