INSTALATION MANUAL

SonoUno: Sonification Software for astronomical data in two column files.

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1. Software description

SonoUno is a sonification software for two column tables of astronomical data. The software is being developed based on the study of other software (Sonification Sandbox, MathTrax and xSonify) and standards of accessibility like the ISO 9241-171:2008 (Guidance on software accessibility). In order to develop the first approach of graphical user interface, we perform a theoretical framework based on bibliography of user cases, focused on blind and visual impairment people.

The develop language is Python and we use modular design, in order to do collaborative work. The sonoUno now is multiplatform, tested on windows 10, Ubuntu 16.04 and Mac High Sierra; the development team work continuously to maintain this benefit. The principal goal of the SonoUno is to allow the user to open data files (txt or csv extension), reproduce the plot and sonification of the data. At the moment, the sonification is perform by variation of pitch in different instruments.

Additionally, SonoUno allow to select a specific range of data on the 'x' axis, mark and save point of interest in the data, apply predefined mathematical functions (for example, logarithm and square) and manipulate the data arrays with an Octave interface. In the section settings, the user can configure the plot and change between several predefined instruments (acoustic piano, clavinet, celesta and tubular bells, between others). We expect to include more sound configurations shortly.

Finally, the software allows the user to save the sound, the plot, a text file with the points marked on the data and a csv file with the plotted data.

2. Software installation

2.1. Ubuntu

2.1.1. Python and needed libraries

If you installed previously the soft at your computer, do not take into account this section. If not, the next steps are the libraries installation.

1. Go to the Ubuntu terminal and execute the 'python' command:

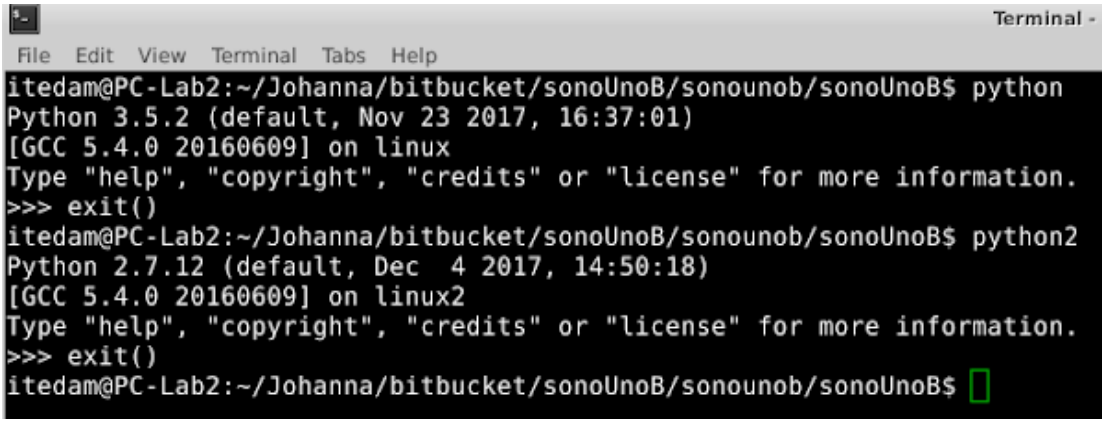

Image 1 - Checking the installed version of Python in your computer.

2. If the version is 3.x.x, type exit() and check with 'python2'. If the version here is 2.7.x (see Image 1) we can continue with the following steps, if not, you must install or update python 2.7 in the operating system using the command:
    a. sudo apt-get install --upgrade python

3. Once that we checked that we have python 2.7 installed (is called python2 in this instructive), check if you have 'pip' installed:
    a. pip -V

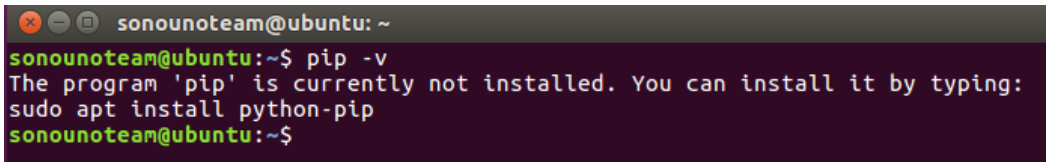

Image 2 – Shows that pip is not installed, the message begins with 'The program pip is currently not installed'.

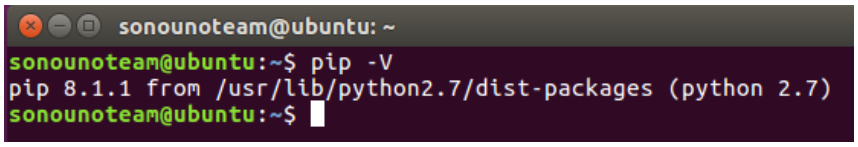

Image 3 - Shows the version of pip, indicating that pip is installed.

4. If you don't have 'pip' installed (Image 2), execute the next commands (Image 4, Image 5 and Image 6):
    a. sudo apt update

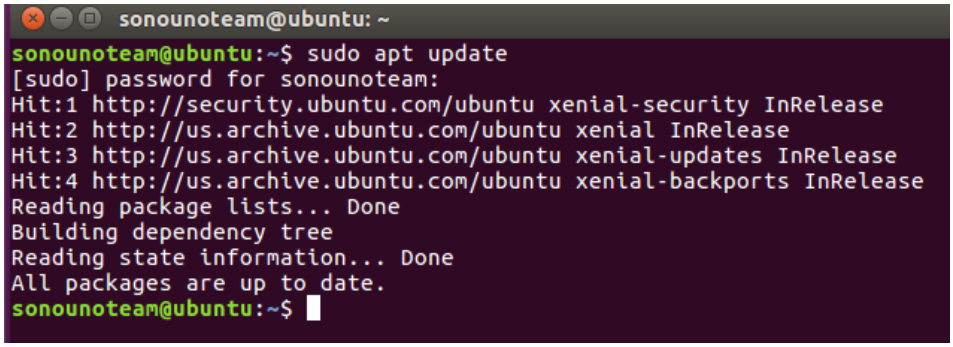

Image 4 - Implementation of the update command.

    b. sudo apt install python-pip

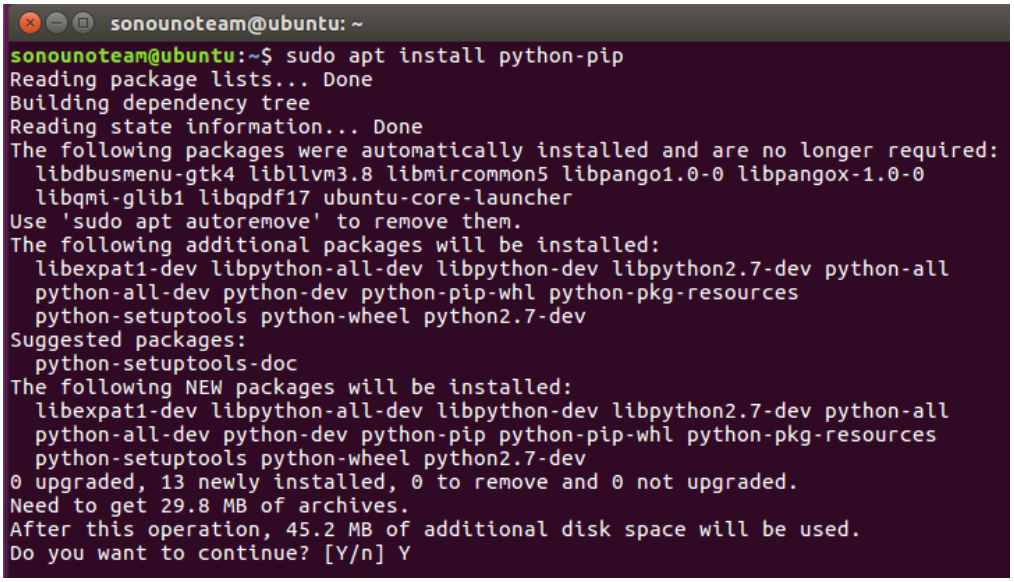

Image 5 - Shows the pip installation, on the question 'Do you want to continue? you have to type 'Y' and press Enter.

Image 6 - Shows the final lines of pip installation.

5. Once we have pip installed (Image 3), we can proceed with the library's installation.
6. First you have to type (Image 4):
    a. sudo apt update
7. Install wxPython with the next command:
    a. Para ubuntu 16.04:
        i. python2 -m pip install --user -U -f https://extras.wxpython.org/wxPython4/extras/linux/gtk3/ubuntu-16.04 wxPython
    b. Para ubuntu 18.04:
        i. python2 -m pip install --user -U -f https://extras.wxpython.org/wxPython4/extras/linux/gtk3/ubuntu-18.04 wxPython

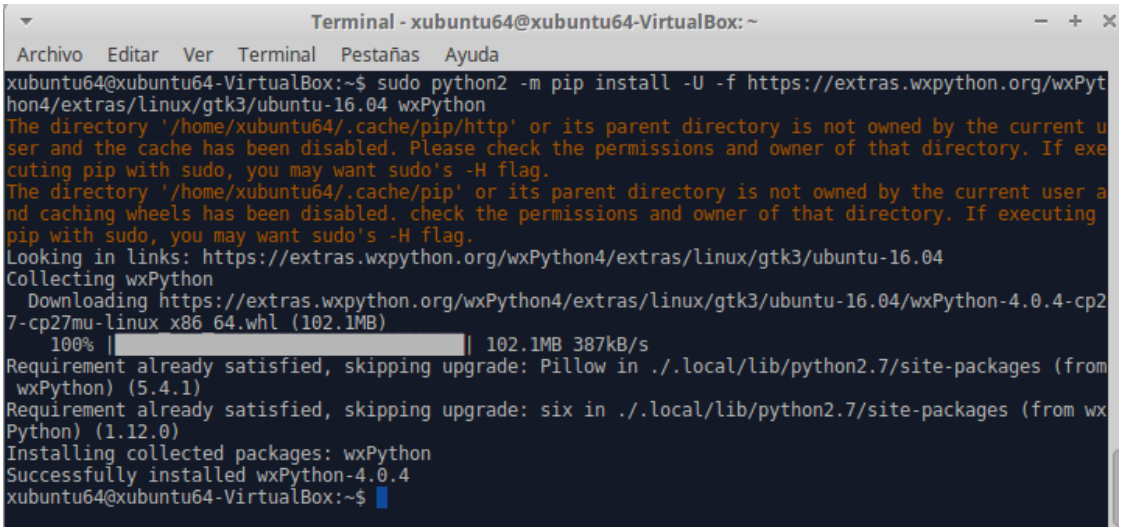

Image 7 - Installation of wxPython with the previous command.

NOTE: The installation can take several minutes, be patient. If the installation takes more than 30 minutes cancel the process (Ctrl+C) and execute the command once again. The aspect of the installation, can be seeing in Image 7.

8. Install matplotlib 2.2.3 or upper (**Error! Reference source not found.**):
    a. python2 -m pip install --user -U matplotlib

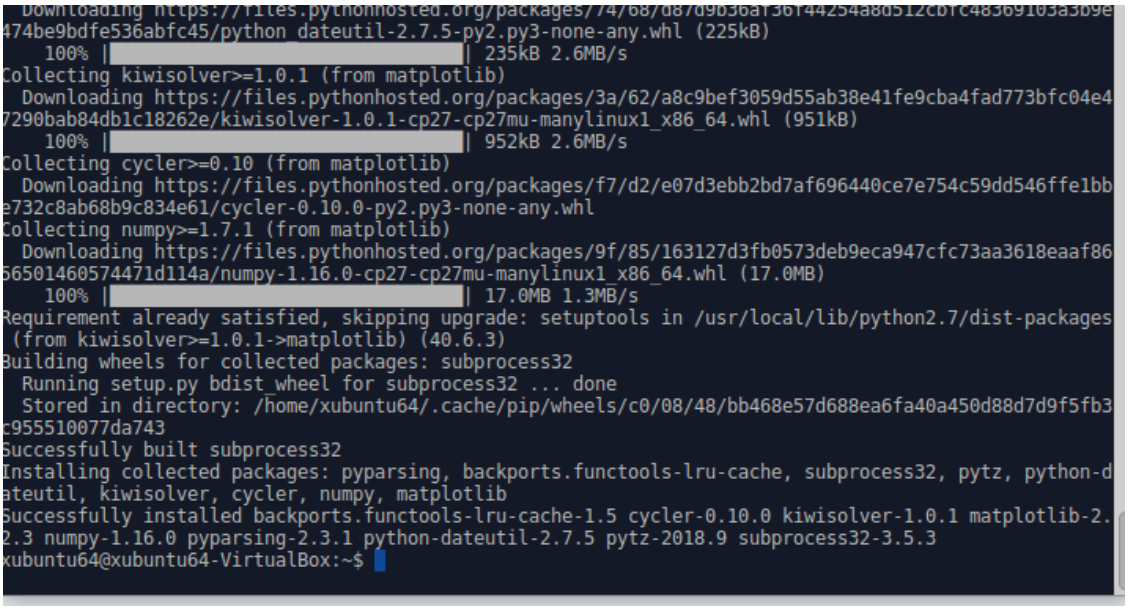

Image 8 - Last part of the installation of matplotlib with the previous command.

9. Install pandas (Image 9):
    a. python2 -m pip install --user -U pandas

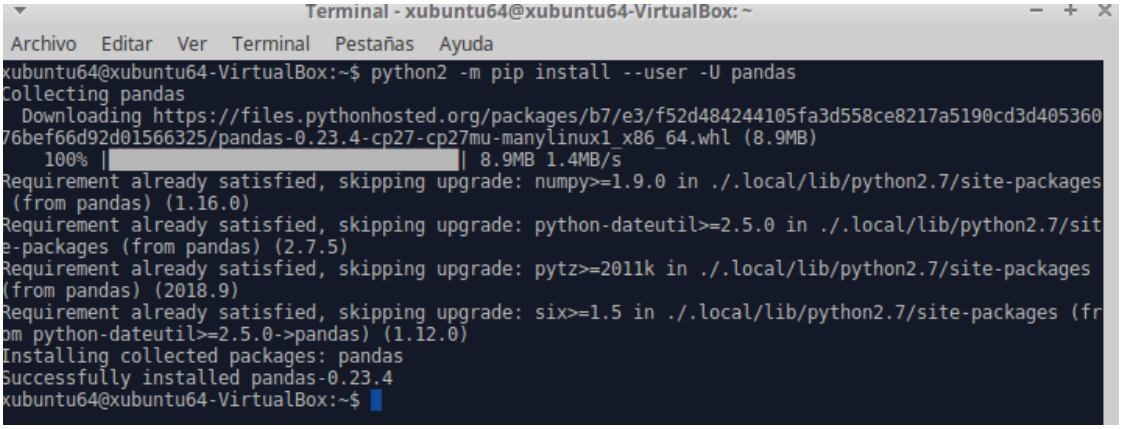

Image 9 - Installation of pandas with the previous command.

10. Install numpy (Image 10):
    a. python2 -m pip install --user -U numpy

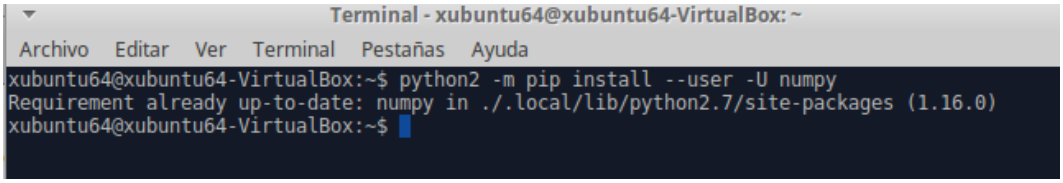

Image 10 - Installation of numpy with the previous command.

11. Install fluidsynth (Image 11):
    a. sudo apt-get install fluidsynth

```
Selecting previously unselected package fluidsynth.
Preparing to unpack .../fluidsynth_1.1.6-3_amd64.deb ...
Unpacking fluidsynth (1.1.6-3) ...
Selecting previously unselected package libqt5x11extras5:amd64.
Preparing to unpack .../libqt5x11extras5_5.5.1-3build1_amd64.deb ...
Unpacking libqt5x11extras5:amd64 (5.5.1-3build1) ...
Selecting previously unselected package qsynth.
Preparing to unpack .../qsynth_0.4.0-1_amd64.deb ...
Unpacking qsynth (0.4.0-1) ...
Processing triggers for libc-bin (2.23-0ubuntu11) ...
Processing triggers for man-db (2.7.5-1) ...
Processing triggers for hicolor-icon-theme (0.15-0ubuntu1.1) ...
Processing triggers for gnome-menus (3.13.3-6ubuntu3.1) ...
Processing triggers for desktop-file-utils (0.22-1ubuntu5.2) ...
Processing triggers for bamfdaemon (0.5.3~bzr0+16.04.20180209-0ubuntu1) ...
Rebuilding /usr/share/applications/bamf-2.index...
Processing triggers for mime-support (3.59ubuntu1) ...
Setting up fluid-soundfont-gm (3.1-5) ...
Setting up libfluidsynth1:amd64 (1.1.6-3) ...
Setting up fluidsynth (1.1.6-3) ...
Setting up libqt5x11extras5:amd64 (5.5.1-3build1) ...
Setting up qsynth (0.4.0-1) ...
Processing triggers for libc-bin (2.23-0ubuntu11) ...
sonounoteam@ubuntu:~$
```

Image 11 - Last part of the fluidsynth installation process, done with the previous command.

12. Install mingus (Image 12):
    a. python2 -m pip install --user -U mingus

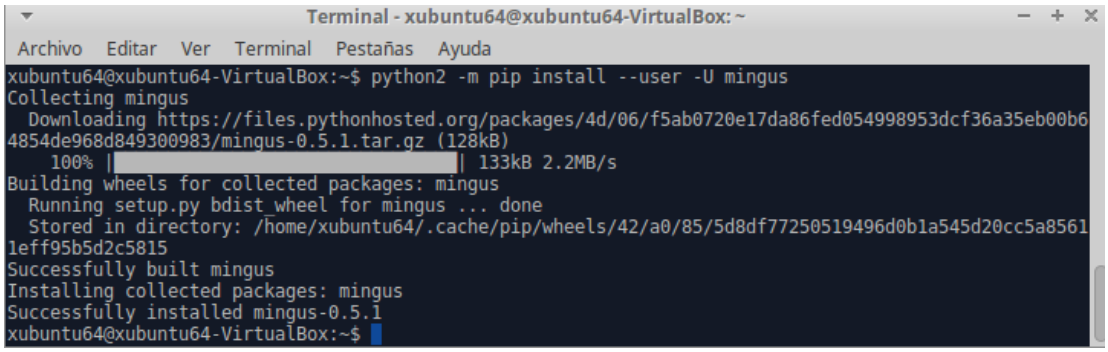

Image 12 - Installation of mingus with the previous command.

13. Install Octave (Image 13):
    a. sudo apt install octave

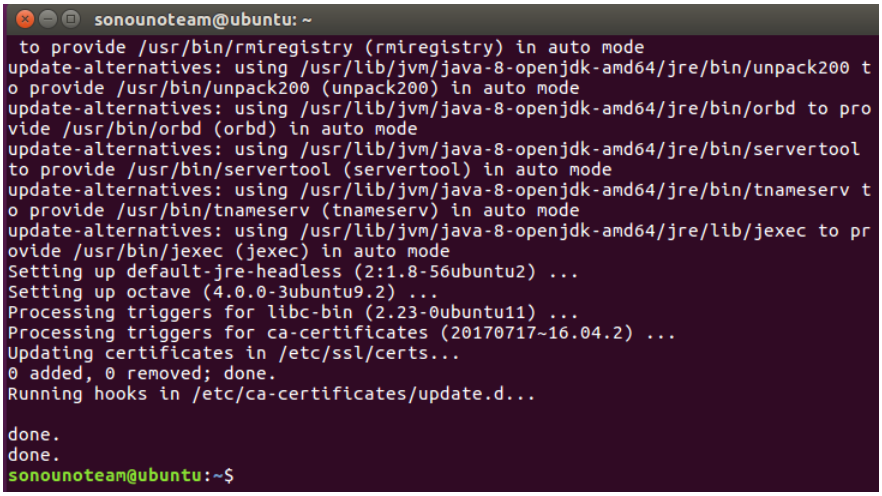

Image 13 - Last part of the octave installation process, done with the previous command.

14. Install oct2py (Image 14):
    a. python2 -m pip install --user -U oct2py

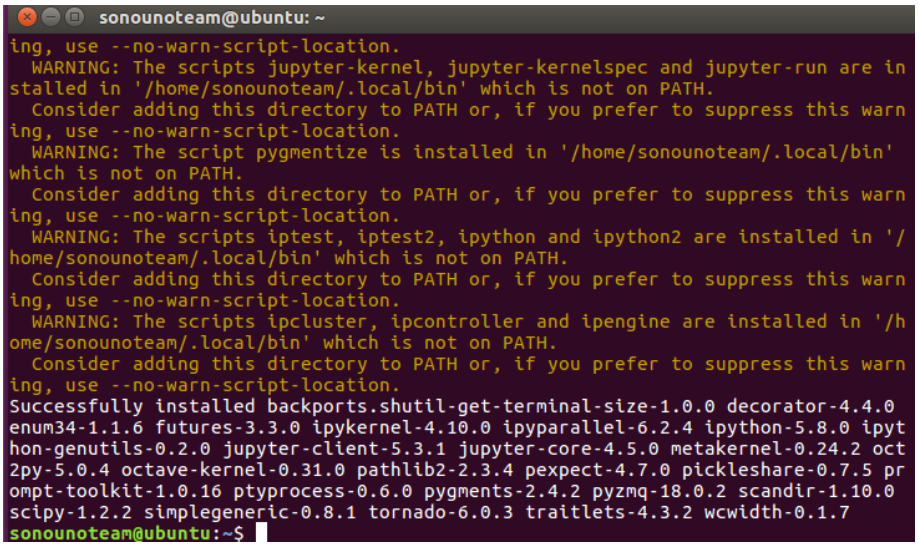

Image 14 - Last part of the oct2py installation process, done with the previous command.

<u>NOTE</u>: if any of the last libraries (from 7 to 14) is missing, the soft does not run. The installation can take several minutes.

15. Try that 'oct2py' was installed correctly with python on the terminal following the next steps (Image 15):
    a. Open python on the terminal with the command:
        i. python2
    b. Import 'octave' from 'oct2py' library with the command:
        i. from oct2py import octave
    c. If 'octave' is imported without problems (Image 16), type 'exit()' and jump to 'Run the software' section of this manual. On the other hand, if an error appear indicating a 'SyntaxError' (see Image 15) on the '../tornado/ioloop.py' file you must follow the next steps to fix it.

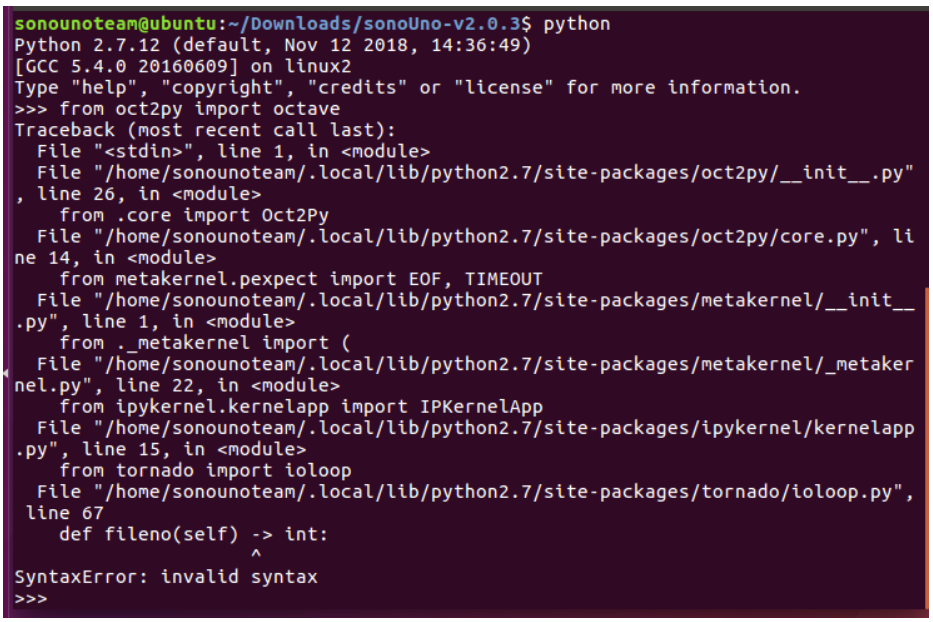

Image 15 - Shows the library import command and the 'SyntaxError'.

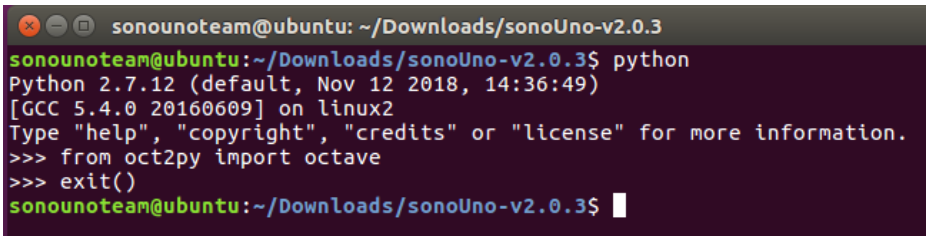

Image 16 - Shows the library importation command without errors.

16. To solve the problem with the oct2py library, you must uninstall tornado with the next command (Image 17):
    a. python2 -m pip uninstall tornado

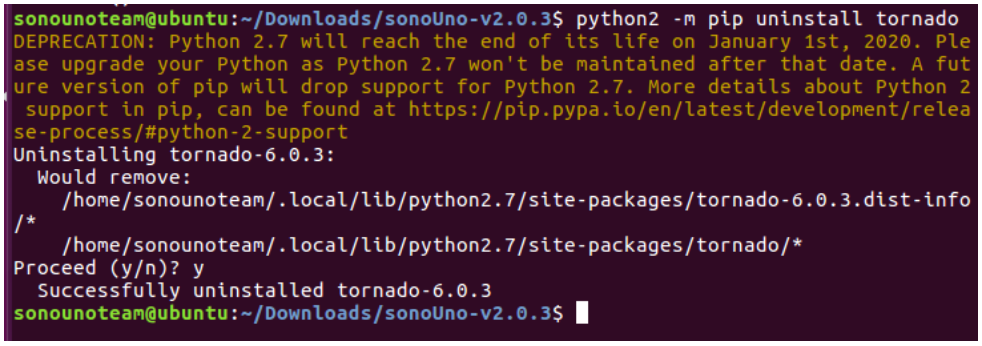

Image 17 - Uninstallation of tornado with the previous command.

17. Now you must install a previous version of tornado, in this case the version 5.1.1 works fine (Image 18).
    a. python2 -m pip install --user -U tornado==5.1.1

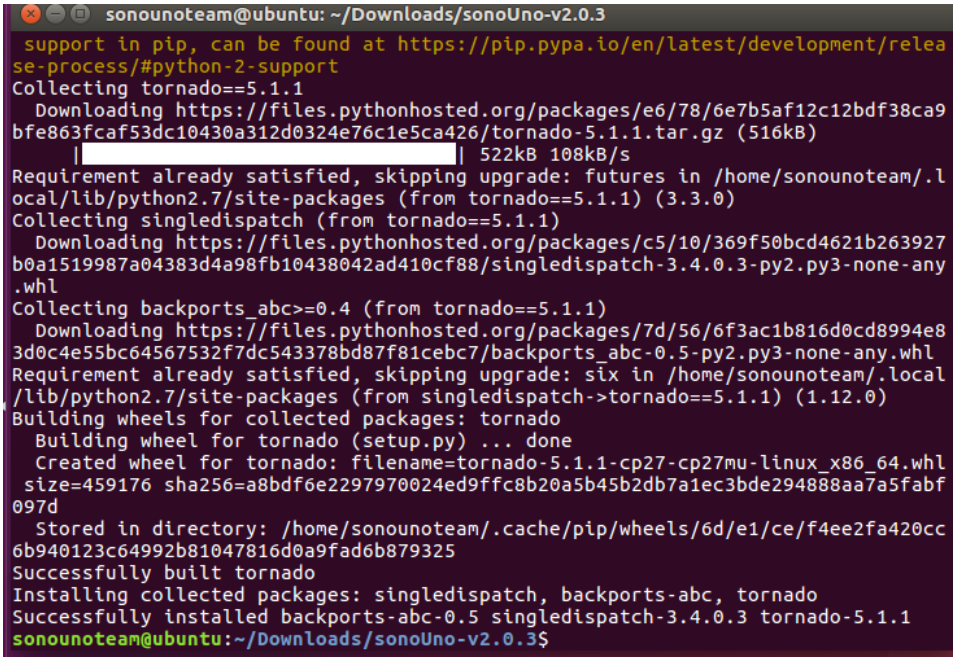

Image 18 - Last part of the tornado installation process, done with the previous command.

18. Finally, we test to import octave from the oct2py library:
    a. Open python on the terminal with the command:
        i. python2
    b. Import 'octave' from 'oct2py' library with the command:
        i. from oct2py import octave

NOTE: if a new error appears contact the development team, if not (see Image 16) continue with the section 'Run the software':

2.1.2. Possible errors

1. Problems the first time using pip, error 'Command "python setup.py egg_info" failed with error code 1 in /tmp/pip-build-EtyARr/numpy/' (see Image 19). Possible solution, update pip with the next command:
    a. python2 -m pip install --upgrade pip

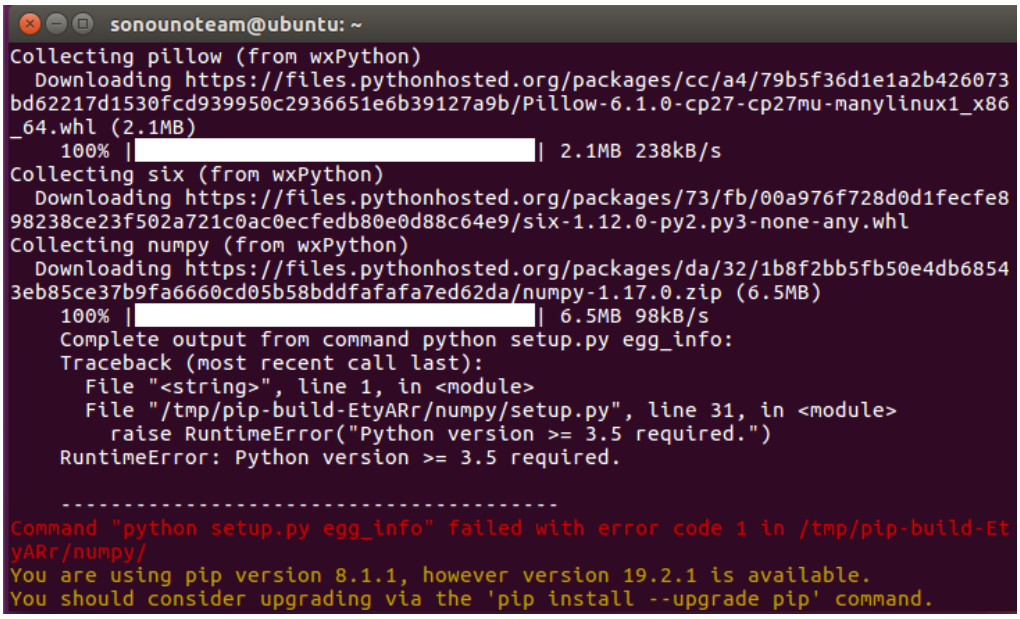

Image 19 - Possible error the first time using pip on Ubuntu.

2.1.3. Run the software

1. Unzip the file.
2. Open a terminal and go to the software folder. Probably you have more than one folder before you can run SonoUno.
3. To check in which folder is sonoUno.py, use the command "ls" (Image 20). The sonoUno.py must be among the files in the folder.

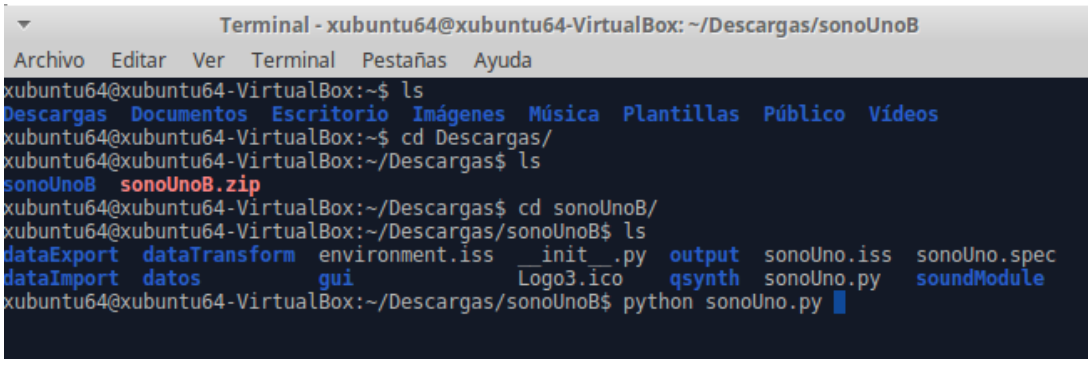

Image 20 - Aspect of the sonoUno folder on the command window.

4. Once you are sure that you are at the right folder, make:
    a. python2 sonoUno.py

NOTE: if you have the error "ImportError: libSDL-1.2.so.0: cannot open shared object file: No such file or directory" (Image 21); run "sudo apt-get install libsdl-ttf2.0-0". If don't solve the problem, contact the development team.

```
xubuntu64@xubuntu64-VirtualBox:~/Descargas/sonoUnoB$ python sonoUno.py
Traceback (most recent call last):
  File "sonoUno.py", line 16, in <module>
    import gui.design_origin as gui
  File "/home/xubuntu64/Descargas/sonoUnoB/gui/design_origin.py", line 9, in <module>
    import wx.xrc
  File "/home/xubuntu64/.local/lib/python2.7/site-packages/wx/xrc.py", line 10, in <module>
    from ._xrc import *
ImportError: libSDL-1.2.so.0: cannot open shared object file: No such file or directory
xubuntu64@xubuntu64-VirtualBox:~/Descargas/sonoUnoB$
```

Image 21 - libSDL possible error when you try to run the software the first time on Ubuntu.

5. A window must be open (Image 22), if that is the case, the soft is ready to be used.

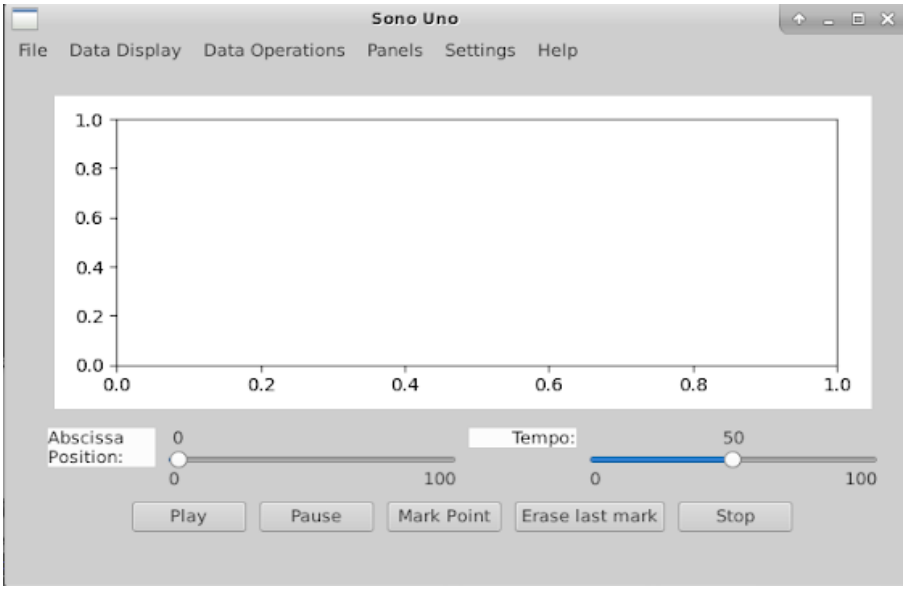

Image 22 - SonoUno main window on Ubuntu.

2.2. MacOS

2.1.1. Python and needed libraries

If you installed previously the soft at your computer, do not take into account this section. If not, the next steps are python and the libraries installation.

1. Go to the Ubuntu terminal and execute the 'python' command (Image 23):

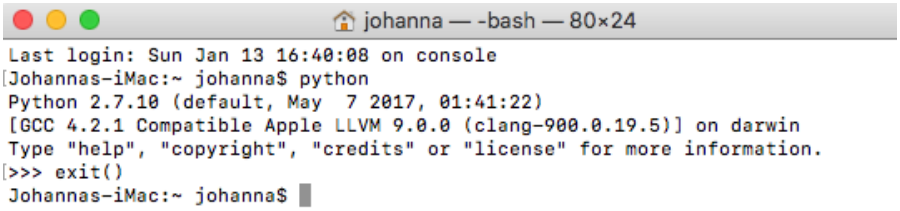

Image 23 - MacOS terminal with the command python executed.

2. If the version is 3.x.x, type exit() and check with 'python2'. If the version is 2.7.x, you can continue with the following steps. If not, you must update or install python 2.7.15 in the operating system, using the installer on https://www.python.org/ftp/python/2.7.15/python-2.7.15-macosx10.6.pkg
3. After install python, check if you have pip installed on your system with the next command (Image 24):
    a. python2 -m pip -V

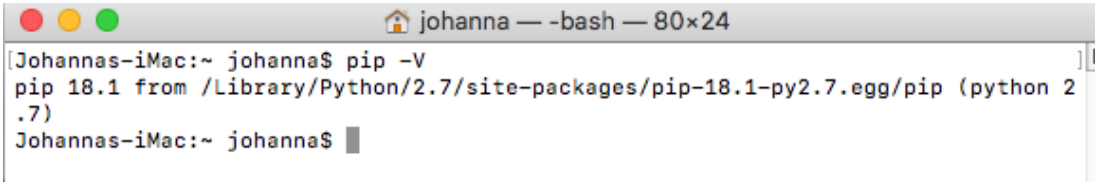

Image 24 - Show the execution of "pip -V" command and the answer that pip is installed on the system.

NOTE: To install pip you can try “easy_install pip” or “sudo easy_install pip” if admin privilege is needed. Or download python package from the website and install it.

4. Once that we checked that we have python 2.7.x and pip installed (is called python2 in this instructive), we can proceed with the libraries installation.
5. Install wxPython 4.0 with the next command:
    a. python2 -m pip install --user wxPython

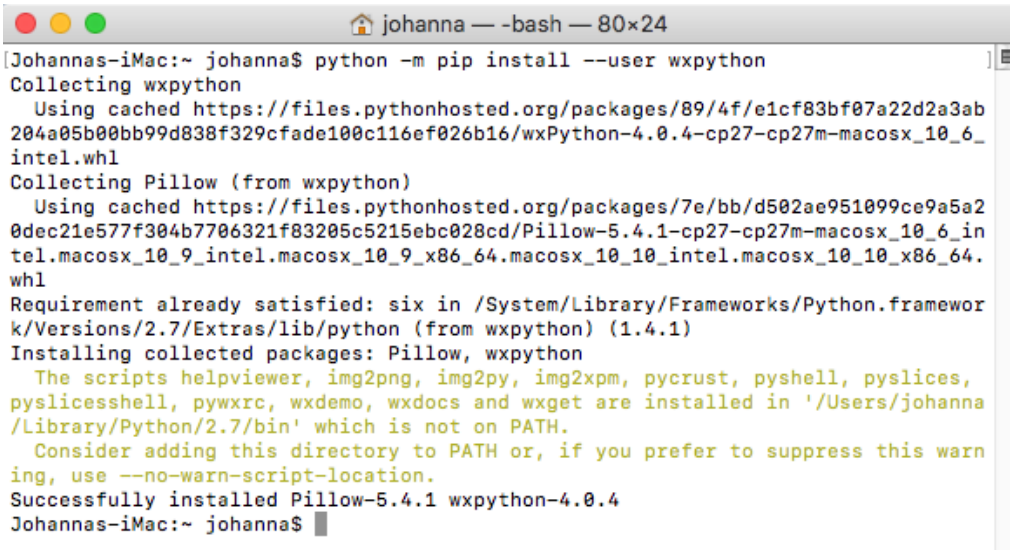

Image 25 - Installation of wxPython with the previous command.

NOTE: The installation can take several minutes, be patient. If the installation takes more than 30 minutes cancel the process (Ctrl+C) and execute the command once again. The aspect of the installation, can be seeing in Image 25.

6. Install matplotlib 2.2.3 or upper (Image 26):
    a. python -m pip install --user matplotlib

Image 26 - Last part of the installation of matplotlib with the previous command.

7. Install pandas (Image 27):
    a. python -m pip install --user pandas

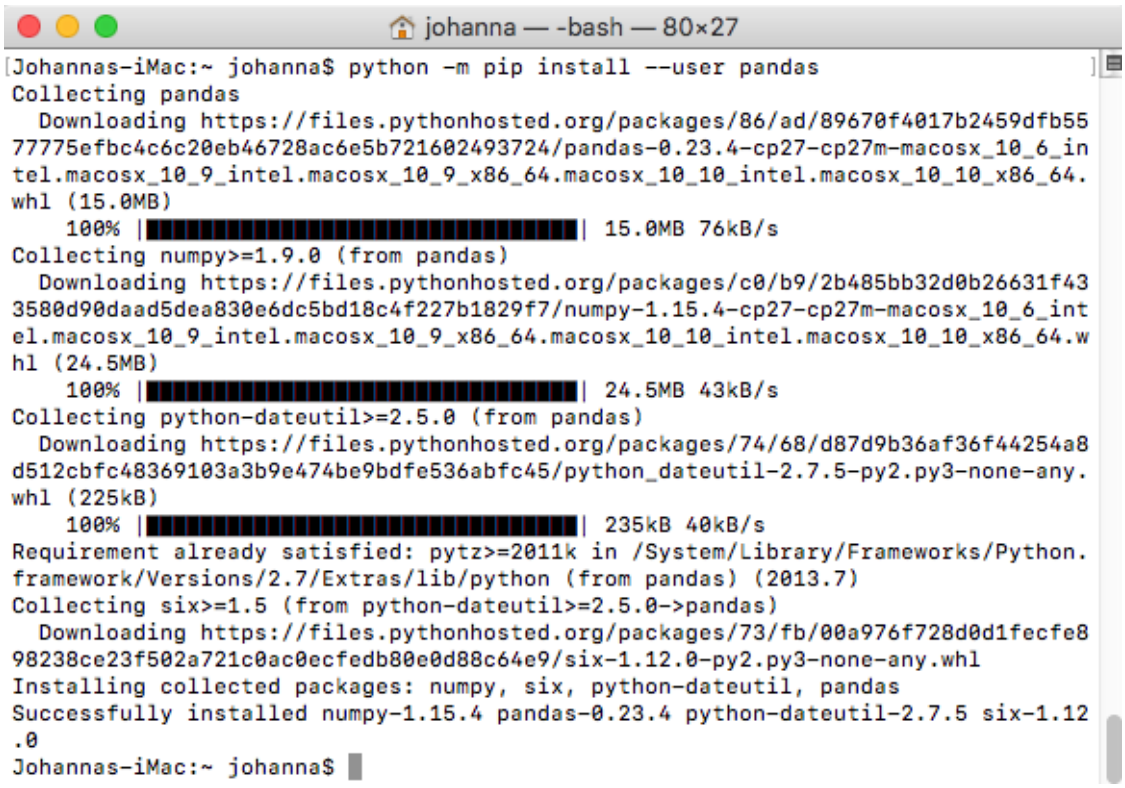

Image 27 - Installation of pandas with the previous command.

8. Install numpy (Image 28):
    a. python -m pip install --user numpy

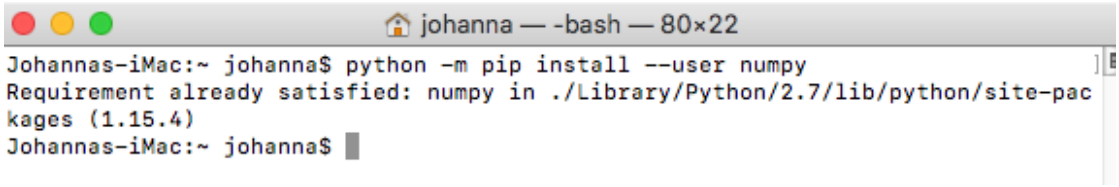

Image 28 - Installation of numpy with the previous command.

9. Install fluidsynth (Image 29):
    a. brew install fluid-synth

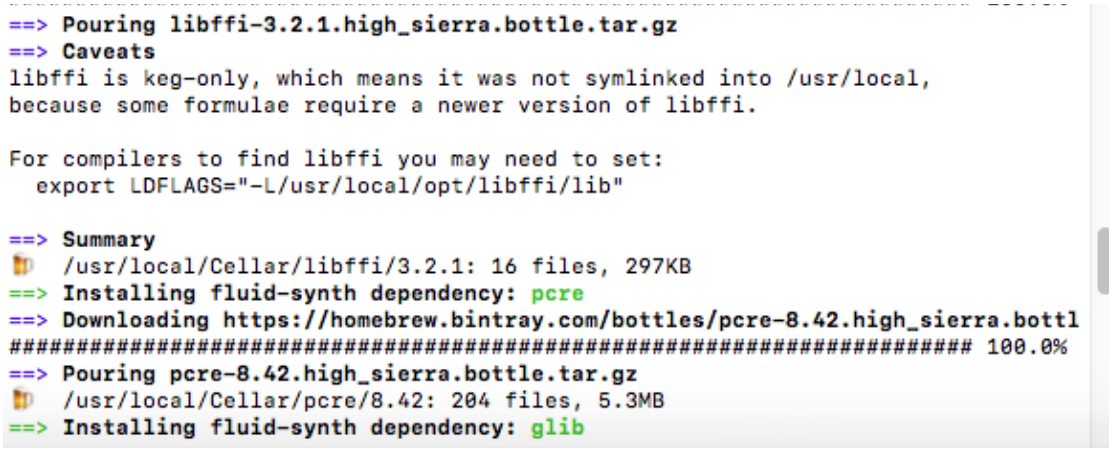

Image 29 - Part of the installation of fluidsynth with the previous command.

NOTE: if you don't have brew installed, you can install it from the official web site (https://brew.sh).

10. Install mingus (Image 30):
    a. python -m pip install --user mingus

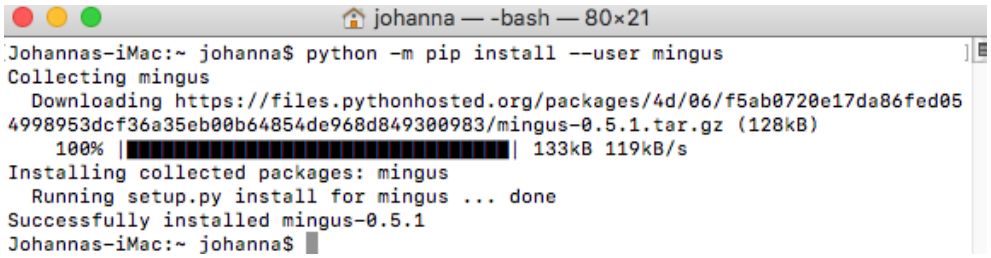

Image 30 - Installation of mingus with the previous command.

11. Install octave (Image 31):
    a. brew update
    b. brew install octave

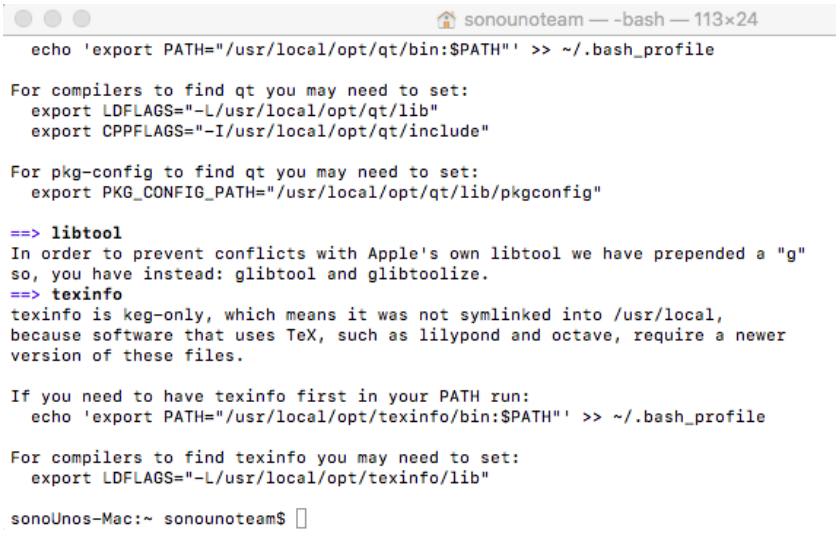

Image 31 - Last part of the installation of octave with the previous command.

12. Install oct2py (Image 32):
    a. python -m pip install --user oct2py

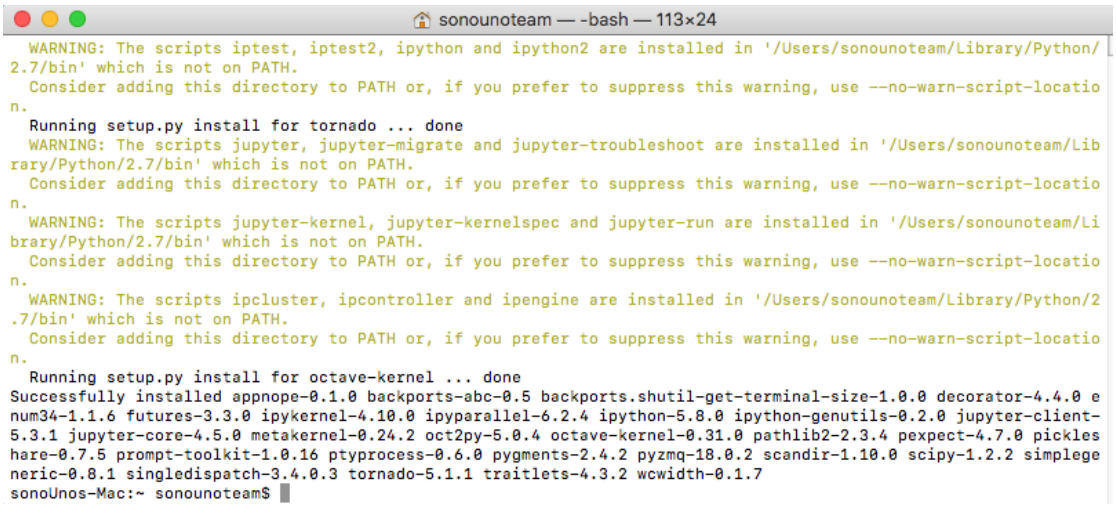

Image 32 - Last part of the installation of oct2py with the previous command.

13. Try that 'oct2py' was installed correctly with python on the terminal following the next steps:
    a. Open python on the terminal with the command:
        i. python2
    b. Import 'octave' from 'oct2py' library with the command:
        i. from oct2py import octave
14. If 'octave' is imported without problems (Image 33), type 'exit()' and jump to 'Run the software' section of this manual. On the other hand, if an error appears contact the development team.

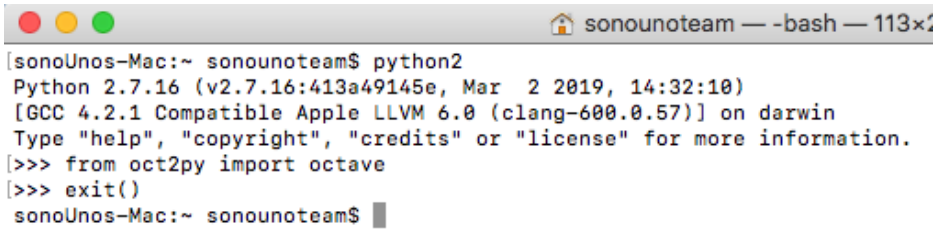

Image 33 - Shows the oct2py library importation command without errors.

<u>NOTE</u>: if any of the last libraries (from 5 to 12) is missing, the soft does not run. The installation can take several minutes.

2.1.2. Run the software

1. Unzip the file, if it is compressed.
2. Open a terminal and go to the software folder. Probably you have more than one folder before you can run SonoUno.

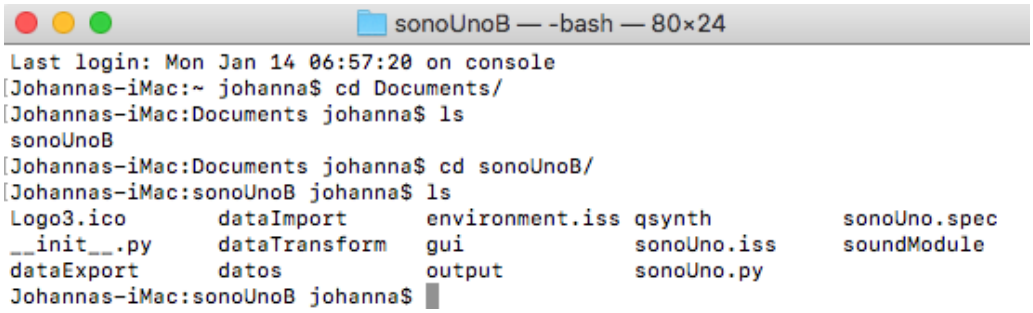

Image 34 - Aspect of the sonoUno folder on the command window.

3. To check in which folder is sonoUno.py, use the command "ls" (Image 34). The sonoUno.py must be among the files in the folder.
4. Once you are sure that you are at the right folder, make:
    a. python sonoUno.py
5. A window must be open (Image 35), if that is the case, the soft is ready to be used.

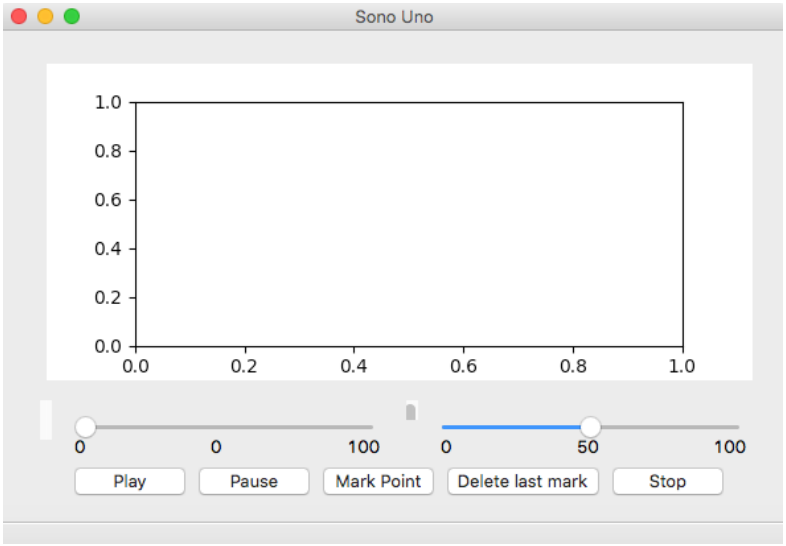

Image 35 - SonoUno main window on Mac.

2.3. Windows

2.3.1. Installation from the source

2.3.1.1. Prerequisites

Only for windows, the better installation of fluidsynth is through the QSynth software, located in https://sourceforge.net/projects/qsynth/files/. You can download an executable file and install this software.

When you have the installer, by default in Download folder of the file system (Image 36). To execute the installer, do double click on the file named “qsynth-x.x.x-setup”. If the installer asks for permission click Yes (Image 37).

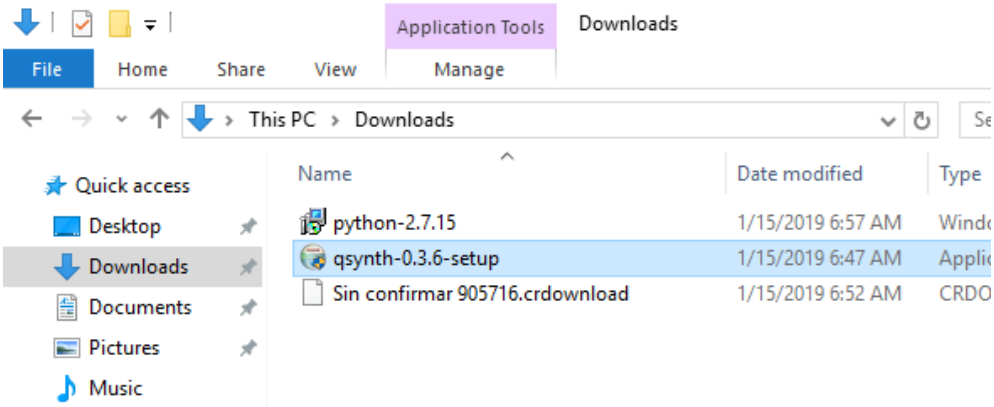

Image 36 - Download folder of the Windows 7 file system. Contain the qsynth installer.

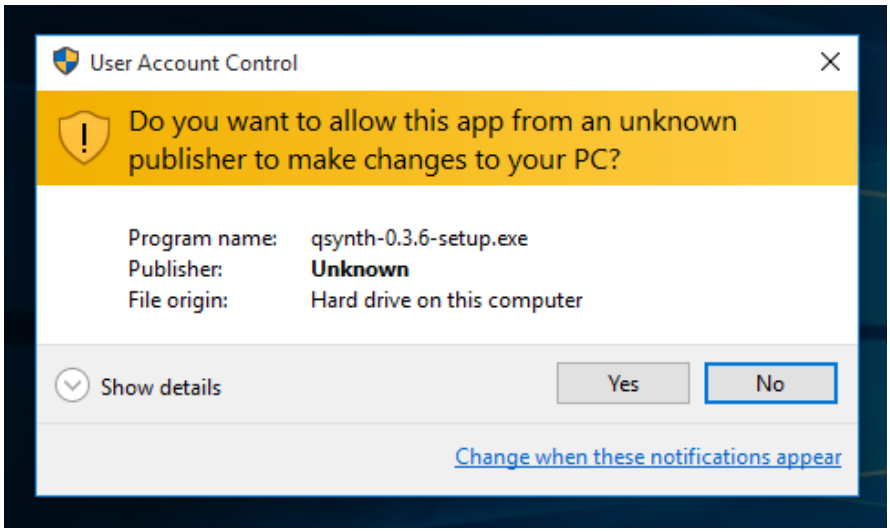

Image 37 - Qsynth installer asking for permission to install the software.

The first window is a welcome and recommendation, click Next to continue (Image 38). Next, the license agreement is shown, the user can read the text and then click “I Agree” to continue with the process (Image 39). The QSynth setup ask for the destination folder, by default is “C:\Program Files (x86)\QSynth” (Image 40). The next step is for select the destination folder of the start menu and then press “Install” (Image 41). The installation process takes a few minutes, with a status bar that is filling on the window. When the installation is finished the “Next” button is enable (Image 42), and the final window said that the program is installed on the computer (Image 43).

Finally, go to the QSynth folder and copy the complete folder on the sonoUno directory.

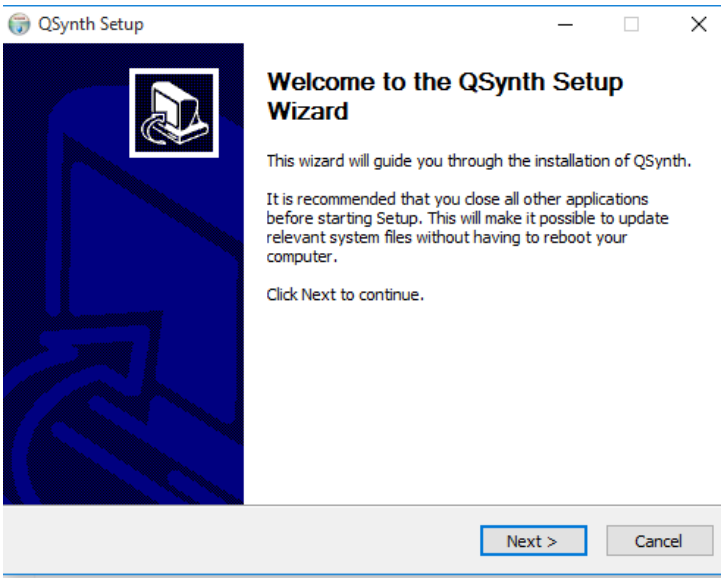

Image 38 - First window of the Qsynth installation wizard.

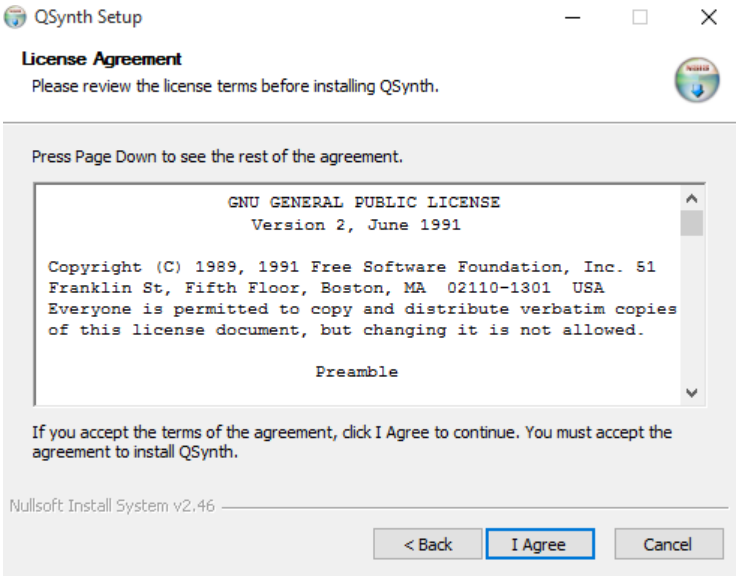

Image 39 - Text of the license agreement that must be accepted to continue with the installation.

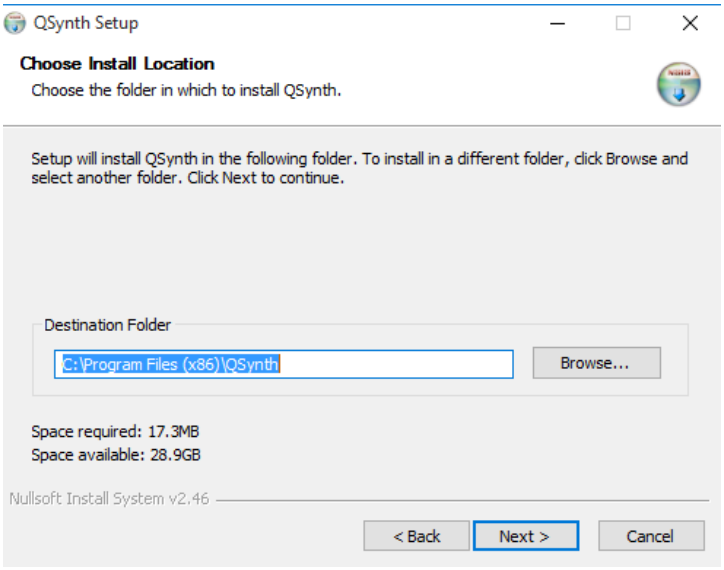

Image 40 - Window to select the destination folder of the installation, by default is C:\Program Files (x86)\QSynth.

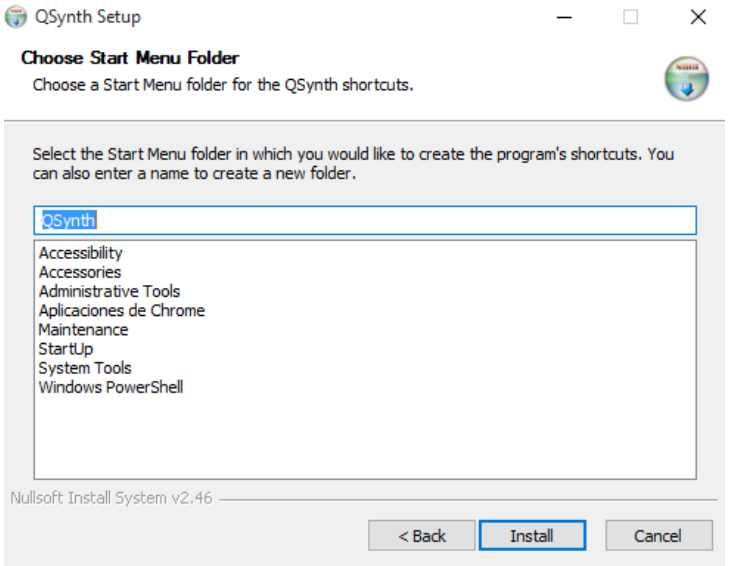

Image 41 - Window to choose the destination folder of the start menu.

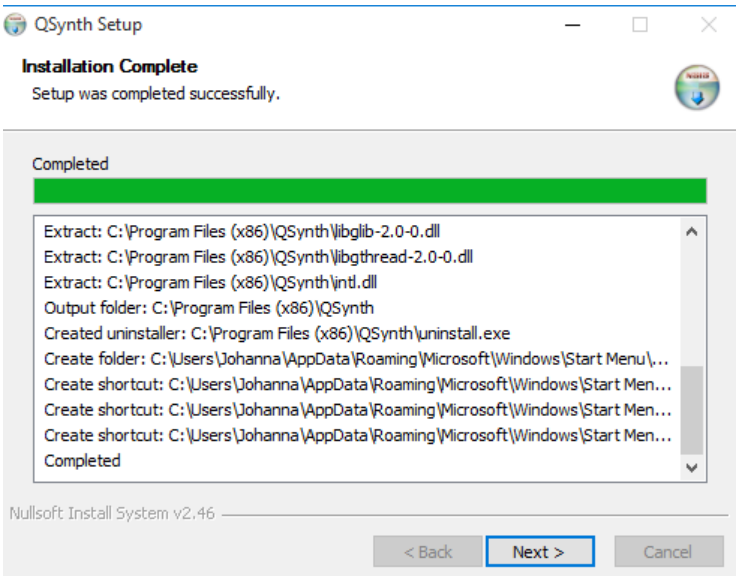

Image 42 - Installation process.

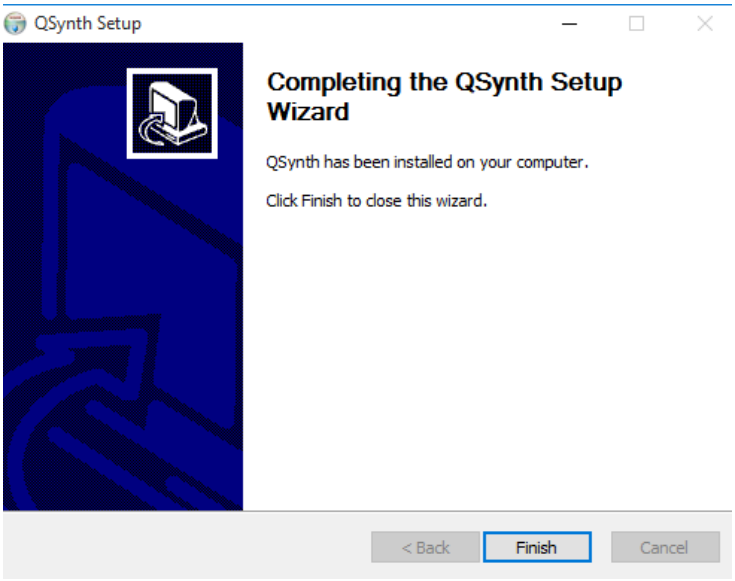

Image 43 - The last window of the Qsynth installation wizard.

2.3.1.2. Python and needed libraries

The next thing to install is python 2.7x86 (32 bits), an installer is provide on the official website (https://www.python.org/downloads/release/python-2715/). To download the installer used on this instructive use the next link: https://www.python.org/ftp/python/2.7.15/python-2.7.15.msi. Once you have the installer, double click on it. Maybe the installer asks for confirmation (Image 44), click Execute.

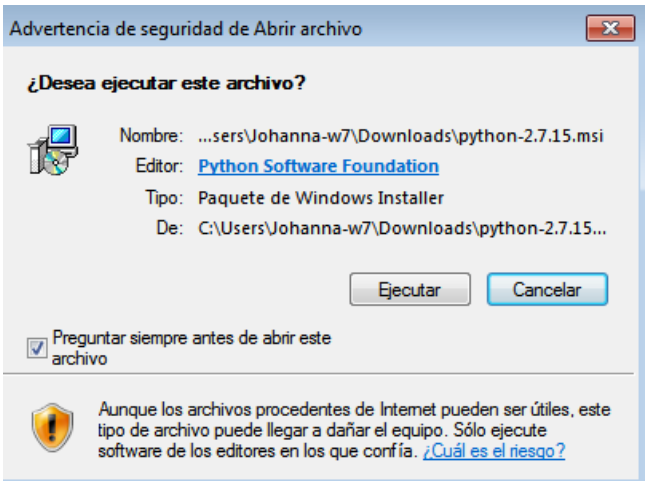

Image 44 - Pop-up window asking for permission to execute the installer of python on Windows.

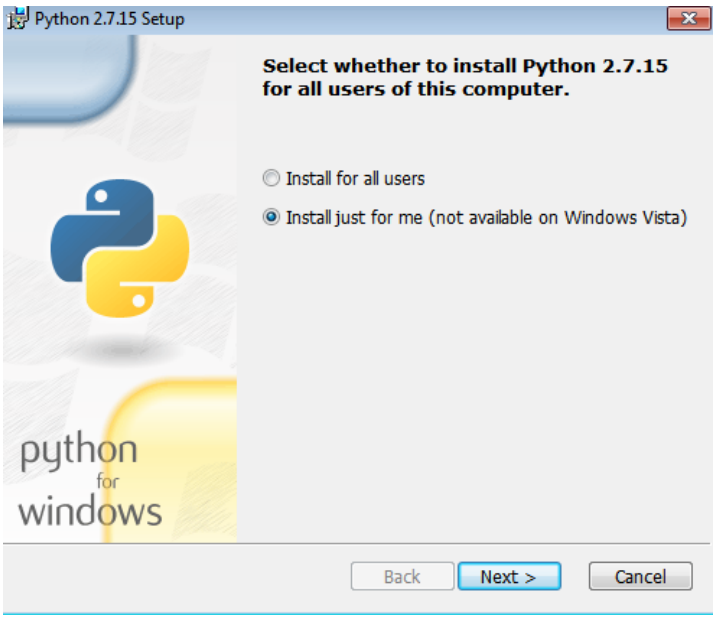

Image 45 - First window of the installer setup of python, the item "Install just for me" is checked.

The first step on the python installer is to select whether to install python: for all users or just for me; in this tutorial “Install just for me” was selected (Image 45). Next, the user can select the destination directory, by default is “C:\Python27\” (Image 46). Then, the installer allows the user to customize the installation, in this window the default settings are keep (Image 47). When the next button are press the installer ask for permission before installing the software (Image 48), click yes and the next window present a status bar that is filling (Image 49). Finally, the last windows inform that the process is complete (Image 50).

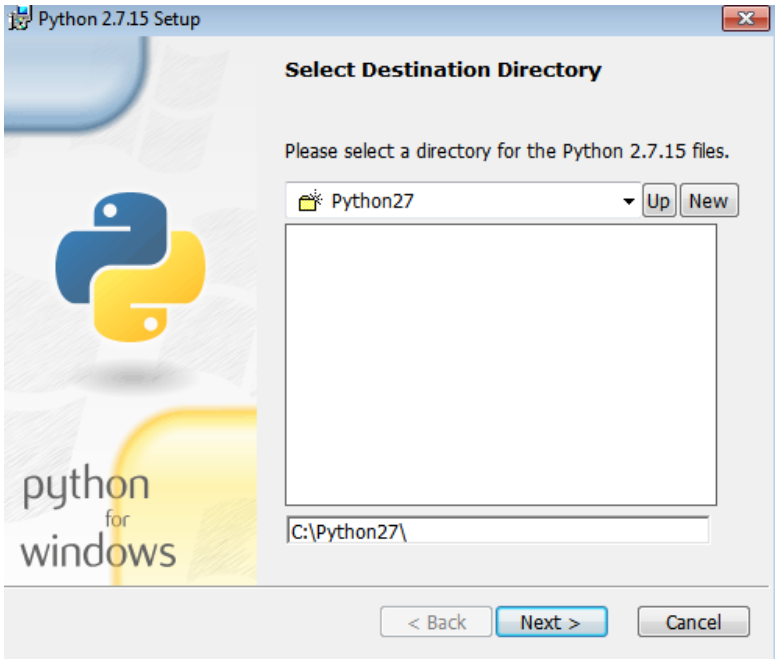

Image 46 - "Select destination directory" window, the "C:\Python27\" directory is set by default.

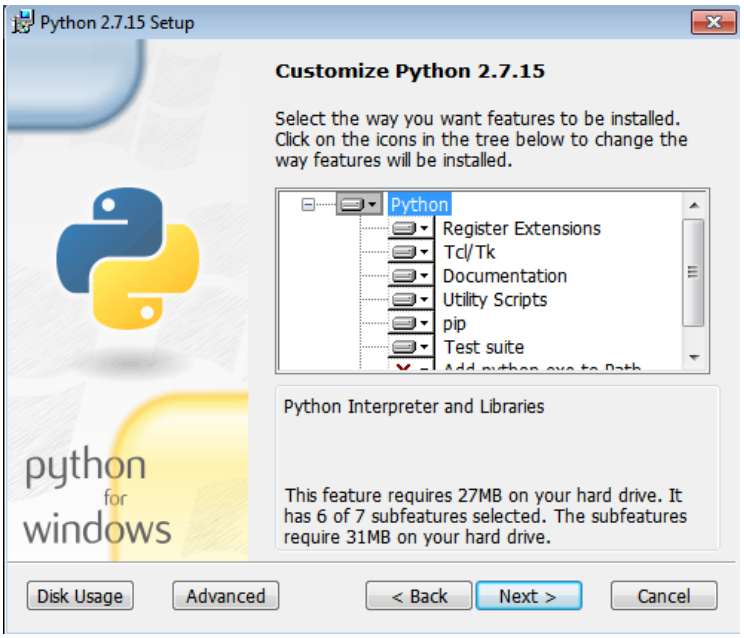

Image 47 - "Customize Python" window, the default setting are keep.

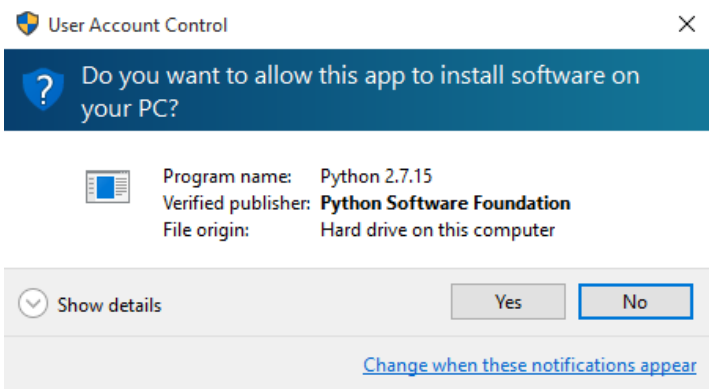

Image 48 - The installer ask for permission again.

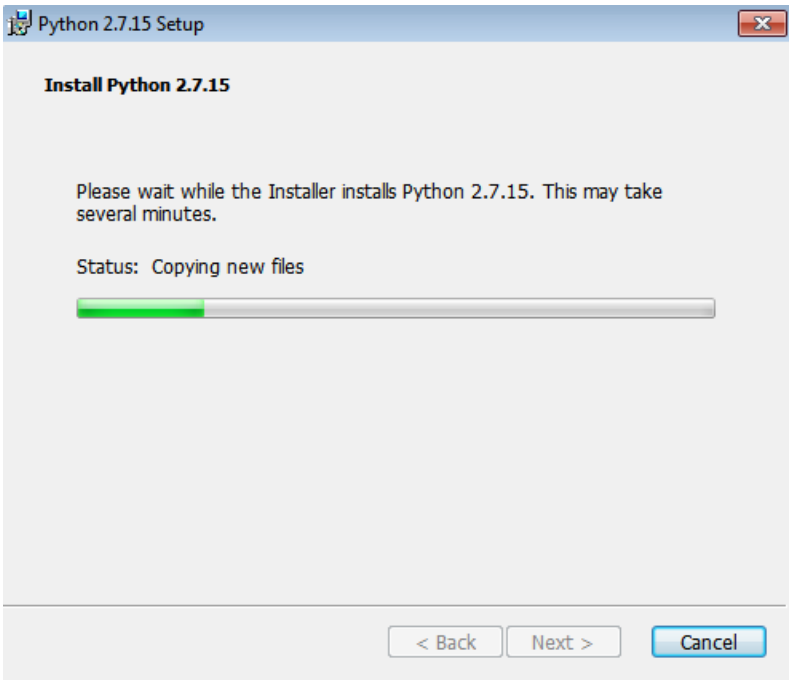

Image 49 - The next window is the installation process, with a status bar.

Image 50 - The last window notify that the software was installed.

The next important step is to set the environment variables, the only part that differs between Windows 7 and 10 is the location of control panel button on the start menu. On Windows 7, click the start menu and the control panel button is on the right (Image 51), but on Windows 10, the user have to select “All apps” and search for “Window system” folder, the control panel button is inside this folder (Image 52).

In the control panel window, select “System and security” (Image 53), then “System” (Image 54) and finally, “Advance system settings” (Image 55). In the new window bottom the user can find the “Environment variables” button (Image 56), witch one open the environment variables window (Image 57), where the user can set the PATH variable.

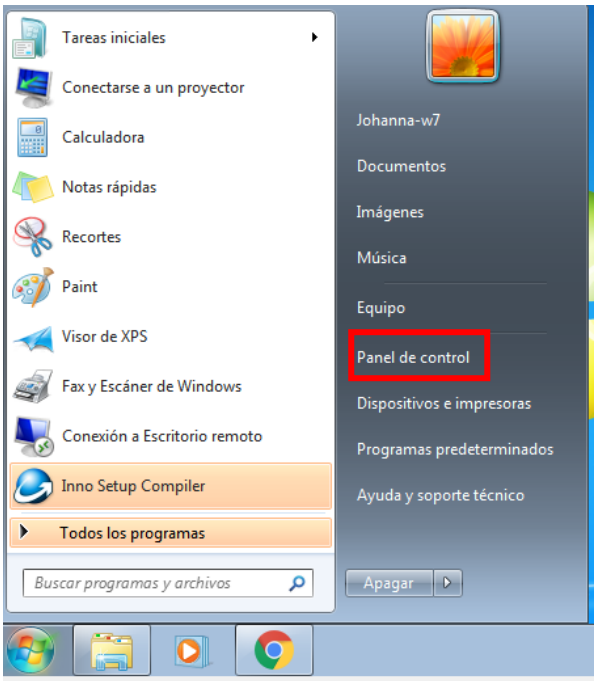

Image 51 - Selection of control panel on the start menu of Windows 7 system.

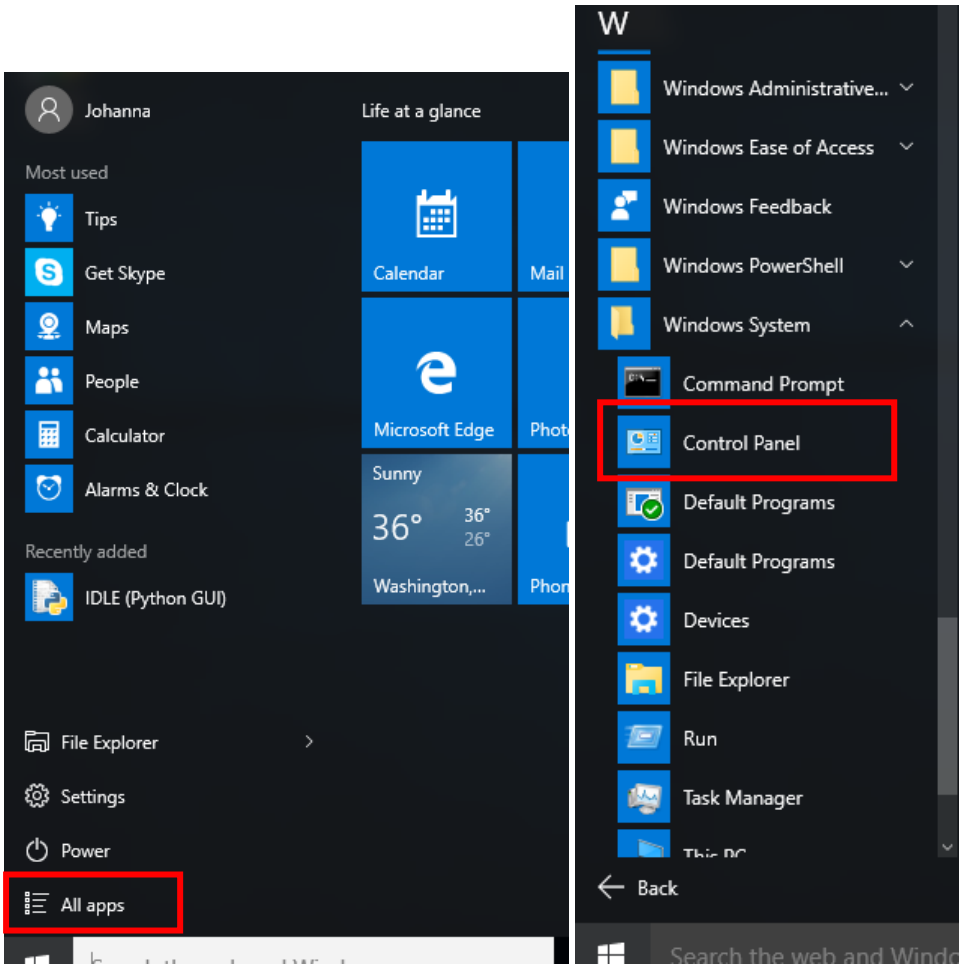

Image 52 - Selection of control panel on the start menu of Windows 10 system.

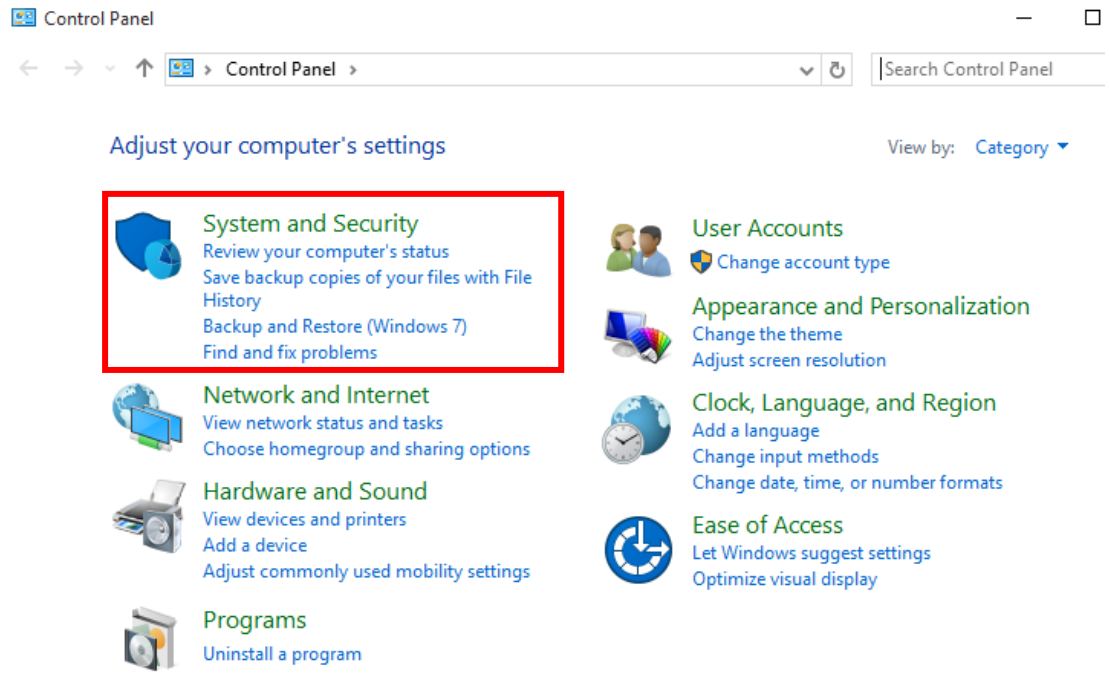

Image 53 – "System and security" section marked with a rectangle on the control panel.

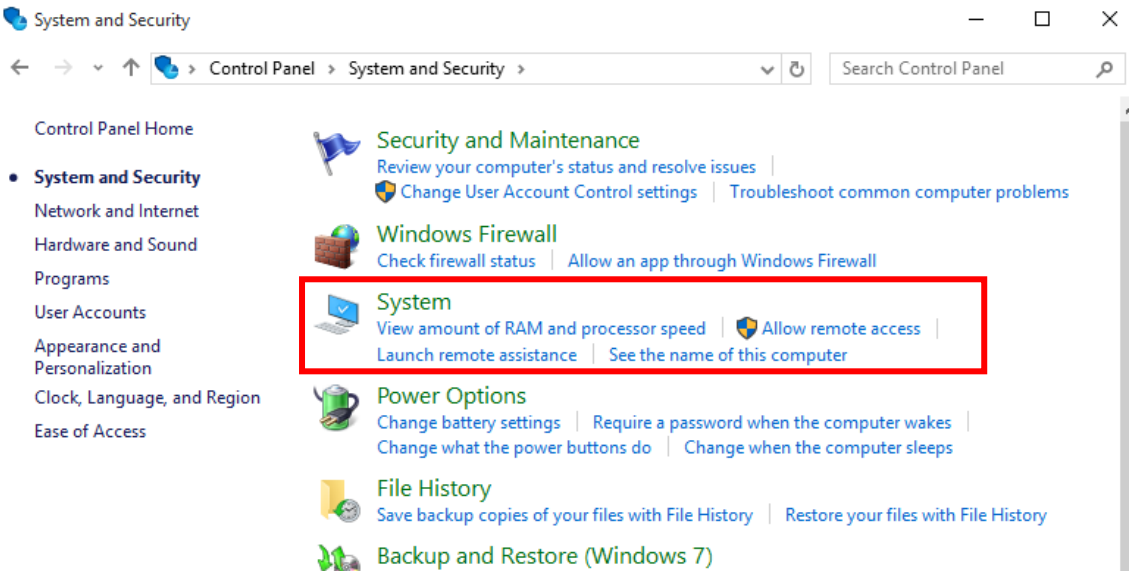

Image 54 - System section marked with a rectangle on "System and security".

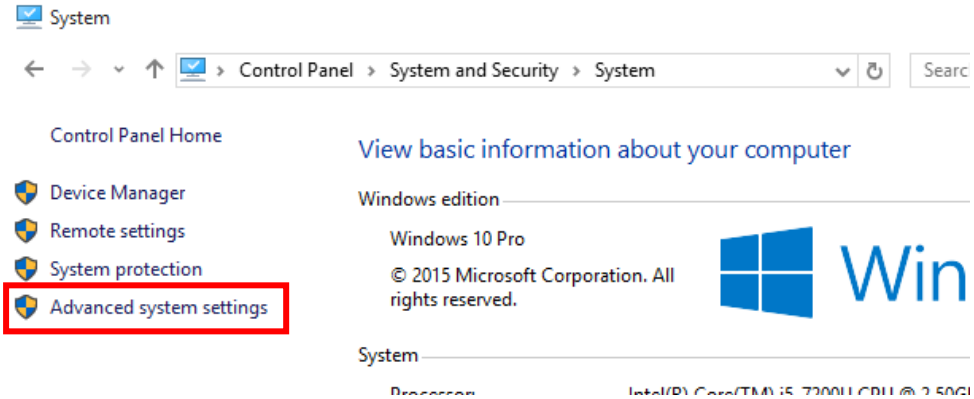

Image 55 - "Advanced system settings" section marked with a rectangle on "System".

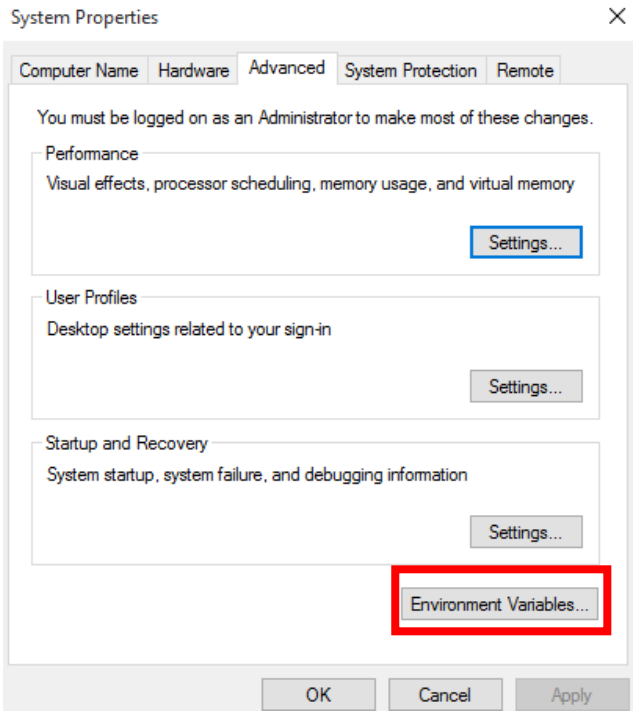

Image 56 - "Environment Variables" button marked with a rectangle on "System properties".

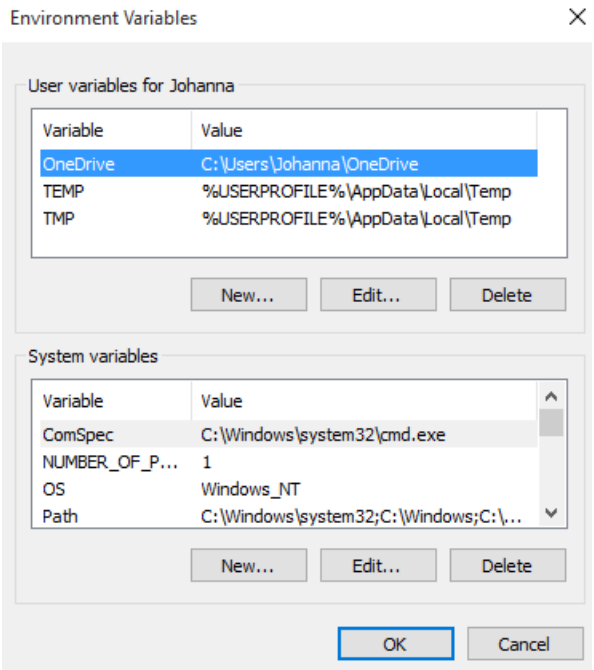

Image 57 - Environment variables window.

Another way to access to the environment variables windows is typing “environment variable” on the start menu (Image 58), the button “Edit the system environment variables” open the same window that the first way (Image 57).

Once the user is in the environment variables window, if the user variable PATH exist, the user has to click on “Edit” and add the new path to the variable. On the other hand, if the PATH user variable does not exist, the user must click on the “New” button, that action open a pop-up window where the user can set the variable name and value (Image 59). The name of the variable is “PATH” and the value is the new path, in this case the directory of the QSynth

installation folder (by default C:\Program Files (x86)\QSynth) and the two directories needed for python: C:\Python27 and C:\Python27\Scripts (Image 60). Finally, click Ok and Ok.

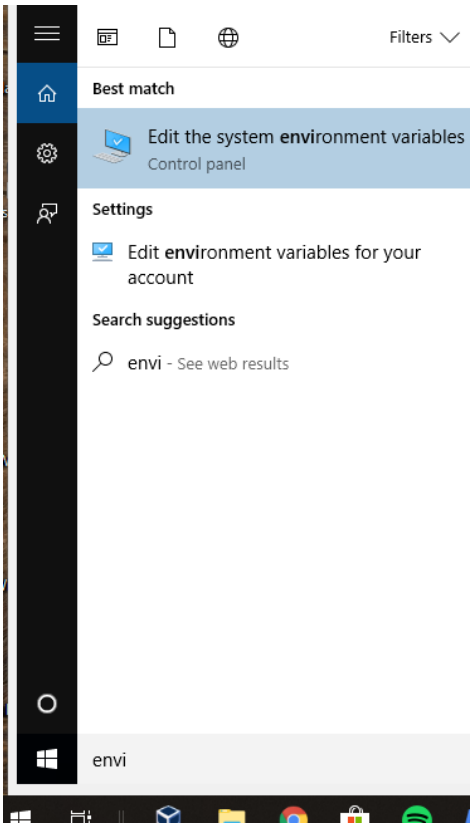

Image 58 - Search on start menu typing "Environment variable".

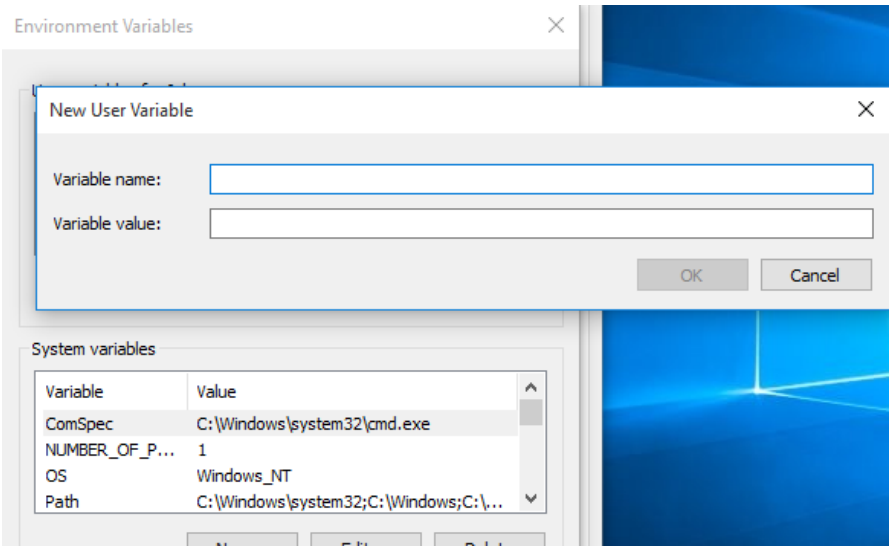

Image 59 - Press the new button on the user variables section of the environment variable window.

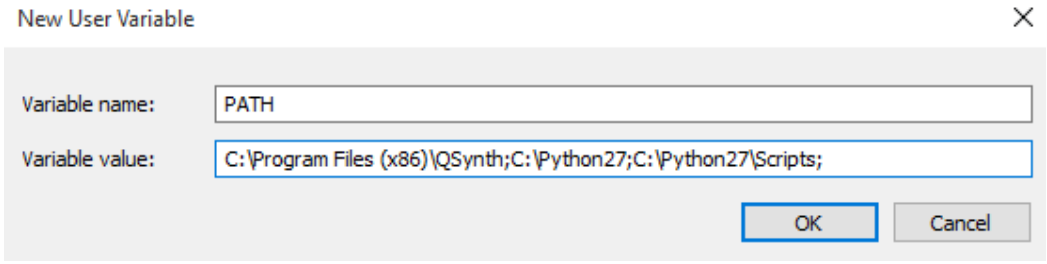

Image 60 - Select the name PATH and paste the directories on the value box.

The last part is to install the libraries, to do that the user have to open the command window (Image 61), typing “cmd” on the start menu. Follow the nexts steps:

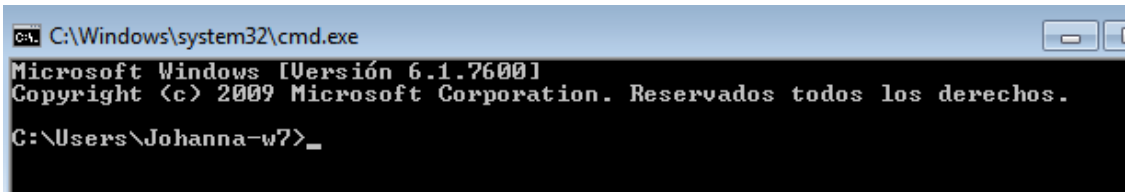

Image 61 - Command window on Windows operative system.

1. Install wxPython with the next command:
    a. python -m pip install -U wxPython

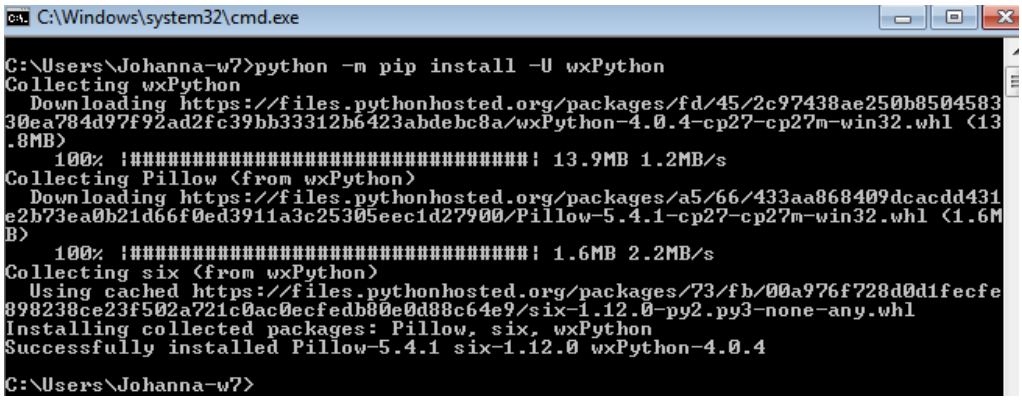

Image 62 - Installation of wxPython with the previous command.

NOTE: The installation can take several minutes, be patient. If the installation takes more than 30 minutes cancel the process (Ctrl+C) and execute the command once again. The aspect of the installation, can be seeing in Image 62.

2. Install matplotlib 2.2.3 or upper (Image 63):
    a. python -m pip install -U matplotlib

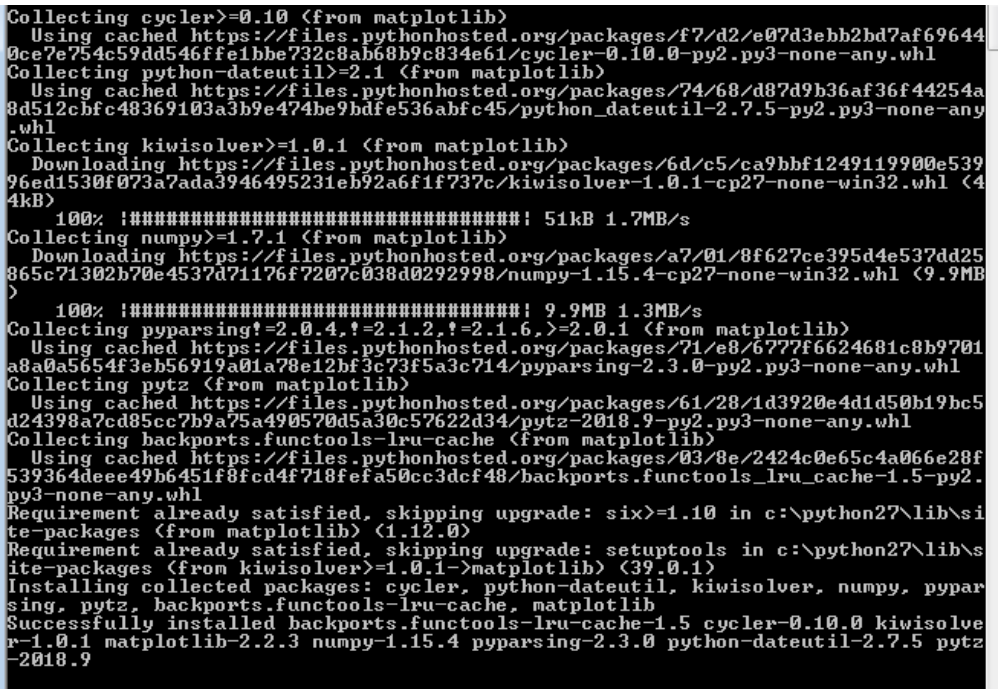

Image 63 – Part of the installation of matplotlib with the previous command.

3. Install pandas (Image 64):
    a. python -m pip install -U pandas

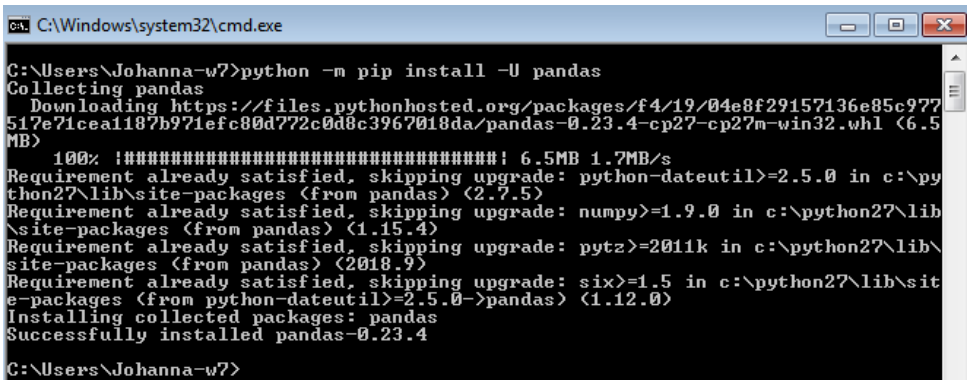

Image 64 - Installation of pandas with the previous command.

4. Install numpy (Image 65):
    a. python -m pip install -U numpy

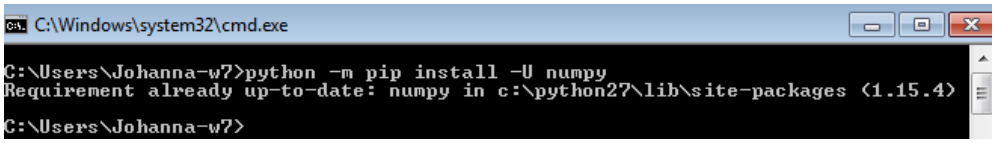

Image 65 - Installation of numpy with the previous command.

5. Install mingus (Image 66):
    a. python -m pip install -U mingus

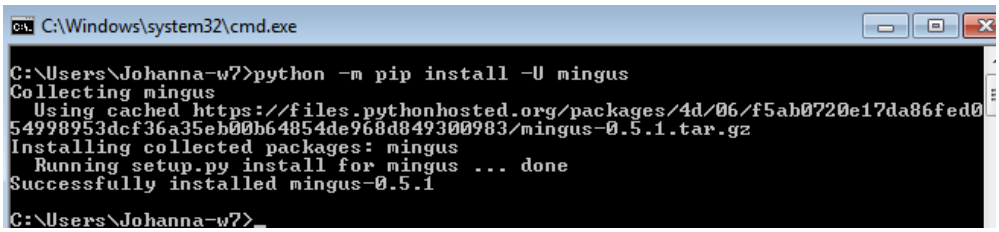

Image 66 - Installation of mingus with the previous command.

6. Install Octave:
    a. Prerequisites:
        i. First you have to install Java SE Runtime Environment 8u221, you can download the installer from https://www.oracle.com/technetwork/java/javase/downloads/jre8-downloads-2133155.html?ssSourceSiteId=otnes, select the item 'Accept license agreement' and click on 'jre-8u221-windows-x64.exe' (Image 67).

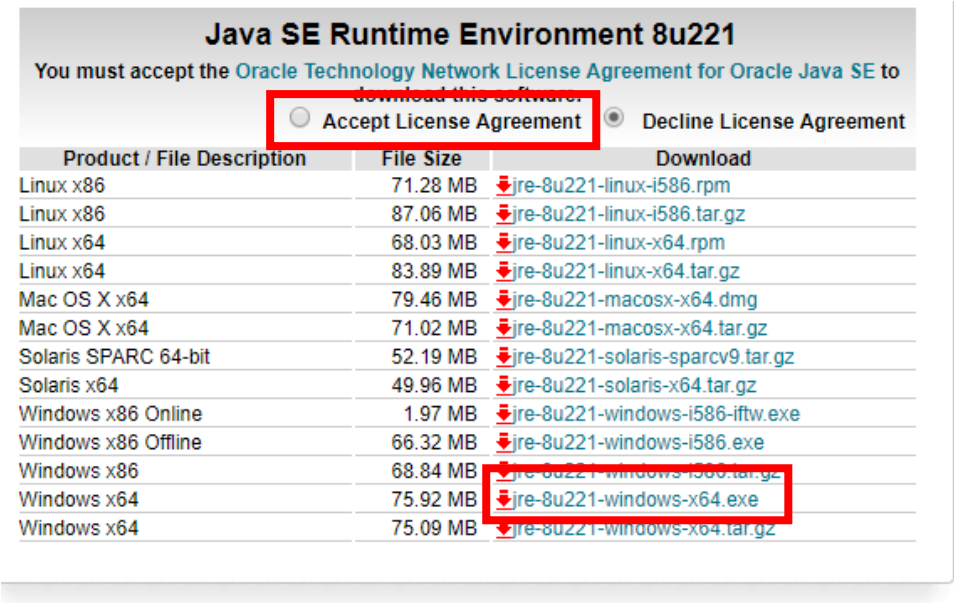

Image 67 - Part of the web page to download the Java SE Runtime Environment 8u221.

ii. Once you have the installer, run the executable and follow the instructions (Image 68, Image 69, Image 70 and Image 71).

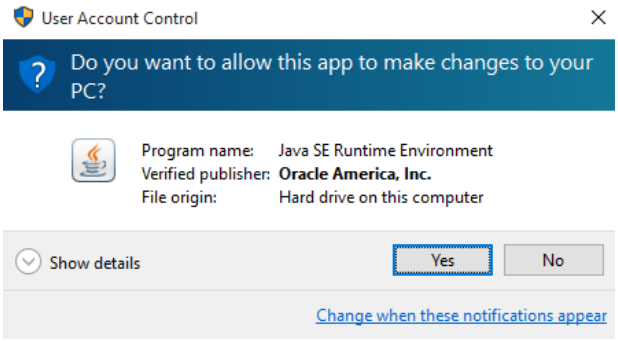

Image 68 - JRE installer asking for permission to install the software.

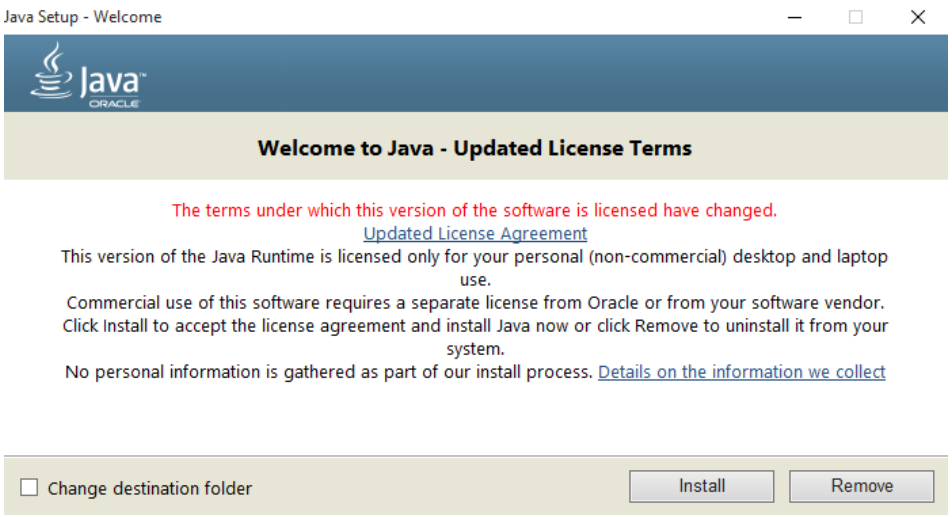

Image 69 - Shown the license terms of JRE, to continue with the installation press Install.

Image 70 - Shown the progress bar of the installation process.

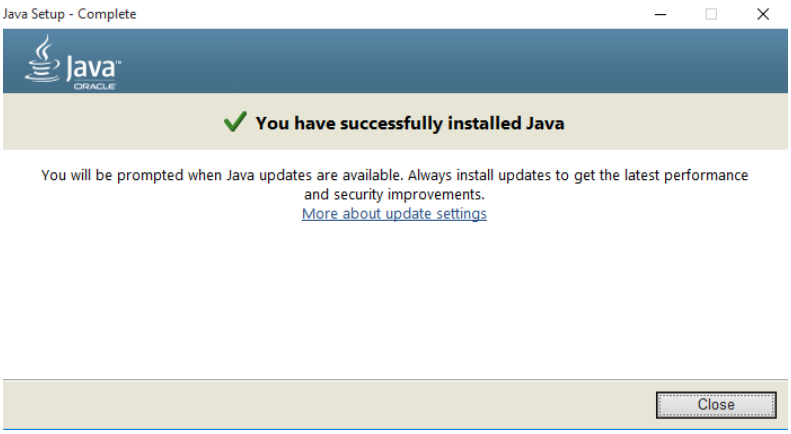

Image 71 - Shown the final windows of the installation process, to finish the installation press Close button.

iii. Then, you have to install Java Platform (JDK) 8u111 / 8u112, you can download the installer from https://www.oracle.com/technetwork/java/javase/downloads/jdk8-downloads-2133151.html?ssSourceSiteId=otnes, select the item 'Accept license agreement' and click on 'jdk-8u221-windows-x64.exe' (Image 72).

Java SE Development Kit 8u221

You must accept the Oracle Technology Network License Agreement for Oracle Java SE to download this software.

○ Accept License Agreement ◉ Decline License Agreement

Product / File Description	File Size	Download
Linux ARM 32 Hard Float ABI	72.9 MB	jdk-8u221-linux-arm32-vfp-hflt.tar.gz
Linux ARM 64 Hard Float ABI	69.81 MB	jdk-8u221-linux-arm64-vfp-hflt.tar.gz
Linux x86	174.18 MB	jdk-8u221-linux-i586.rpm
Linux x86	189.03 MB	jdk-8u221-linux-i586.tar.gz
Linux x64	171.19 MB	jdk-8u221-linux-x64.rpm
Linux x64	186.06 MB	jdk-8u221-linux-x64.tar.gz
Mac OS X x64	252.52 MB	jdk-8u221-macosx-x64.dmg
Solaris SPARC 64-bit (SVR4 package)	132.99 MB	jdk-8u221-solaris-sparcv9.tar.Z
Solaris SPARC 64-bit	94.23 MB	jdk-8u221-solaris-sparcv9.tar.gz
Solaris x64 (SVR4 package)	133.66 MB	jdk-8u221-solaris-x64.tar.Z
Solaris x64	91.95 MB	jdk-8u221-solaris-x64.tar.gz
Windows x86	202.73 MB	jdk-8u221-windows-i586.exe
Windows x64	215.35 MB	jdk-8u221-windows-x64.exe

Image 72 - Part of the web page to download the Java Platform (JDK) 8u221.

iv. Once you have the installer, run the executable and follow the instructions (Image 73, Image 74, Image 75, Image 76 and Image 77).

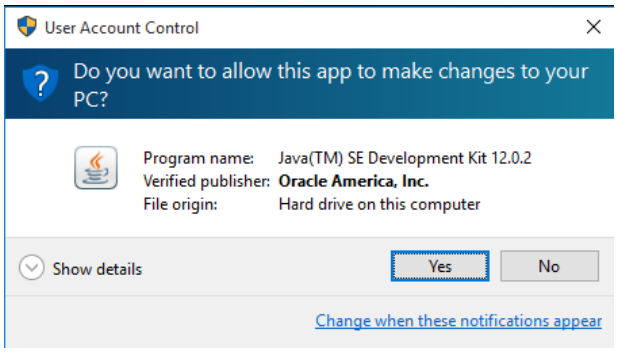

Image 73 - JDK installer asking for permission to install the software.

Image 74 - Shown the welcome windows, to continue press Next button.

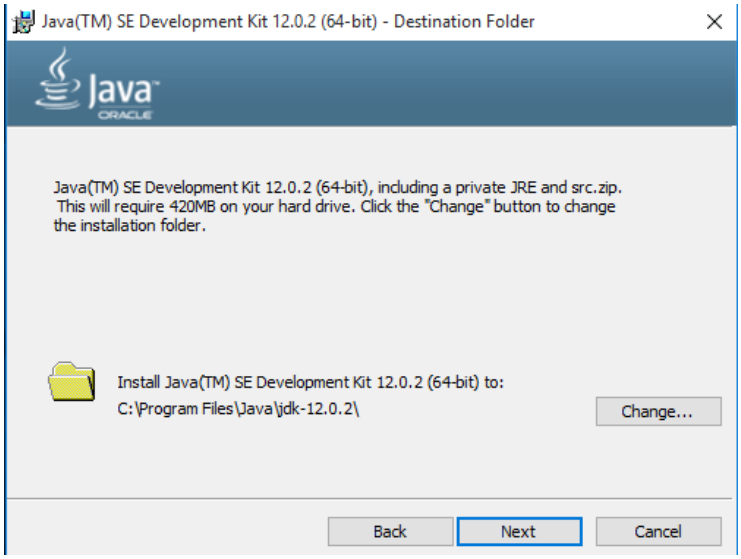

Image 75 - This window allows to change the destination folder of the JDK, to continue press Next button.

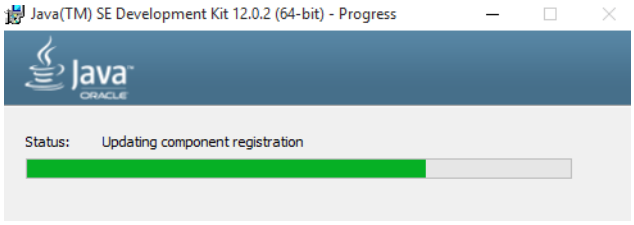

Image 76 - Shown a progress bar indicating the installation status.

Image 77 - The final window indicate that the software is installed, to finish press Close button.

b. Finally, you have to install octave. The installer can be download from the official website (https://www.gnu.org/software/octave/#install). Once you have the installer, double click to run it and follow the instructions (Image 78, Image 79, Image 80, Image 81, Image 82, Image 83 and Image 84).

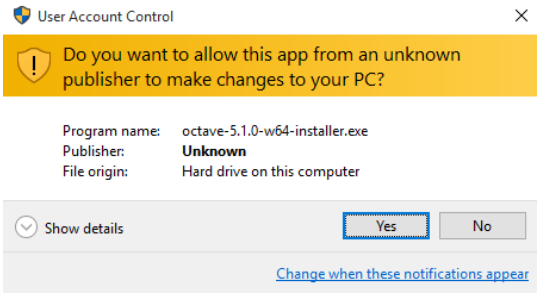

Image 78 - Octave installer asking for permission to install the software.

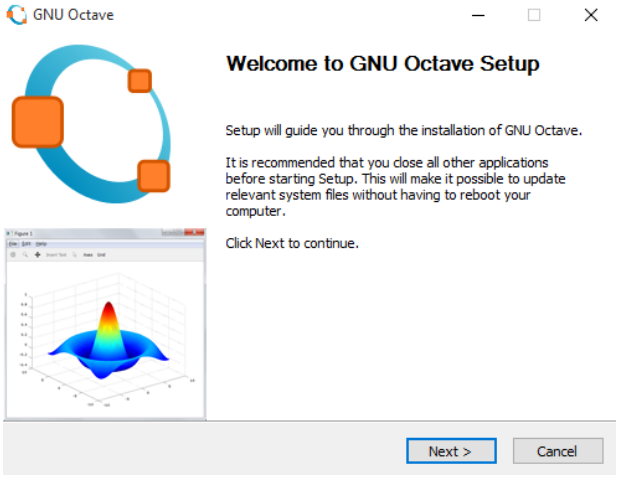

Image 79 - The first window shown a welcome message, to continue press Next button.

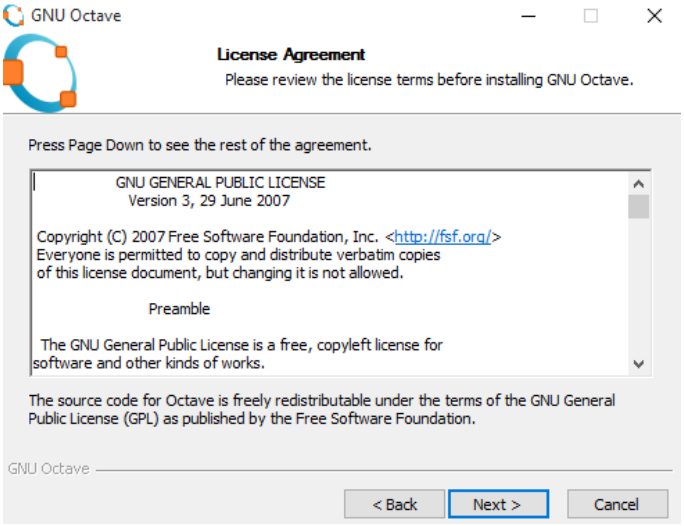

Image 80 - The second window shown the license agreement, to accept and continue press Next button.

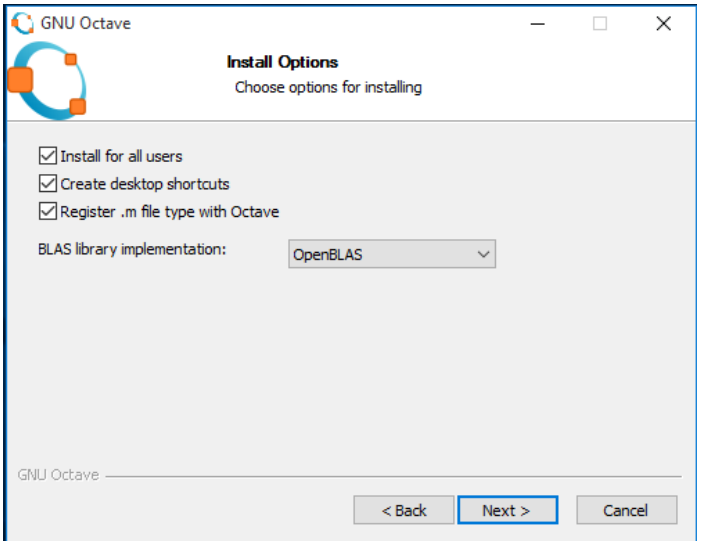

Image 81 - The third window shown some configurations checkbox, to continue press Next button.

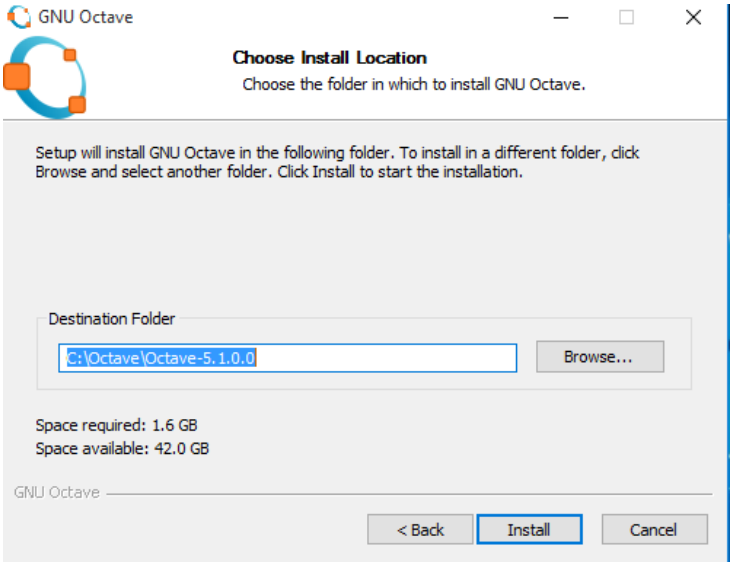

Image 82 - The fourth window allow to change the destination folder, to continue press Install button.

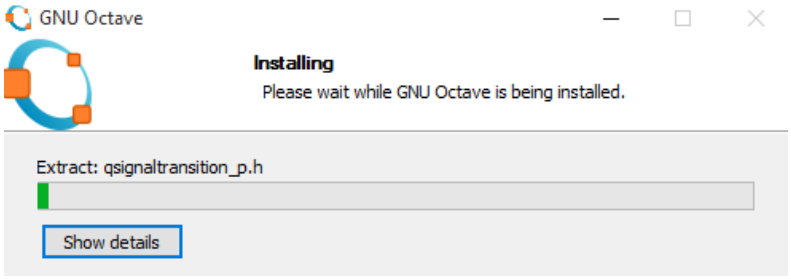

Image 83 - The next window shown a progress bar indicating the installation status.

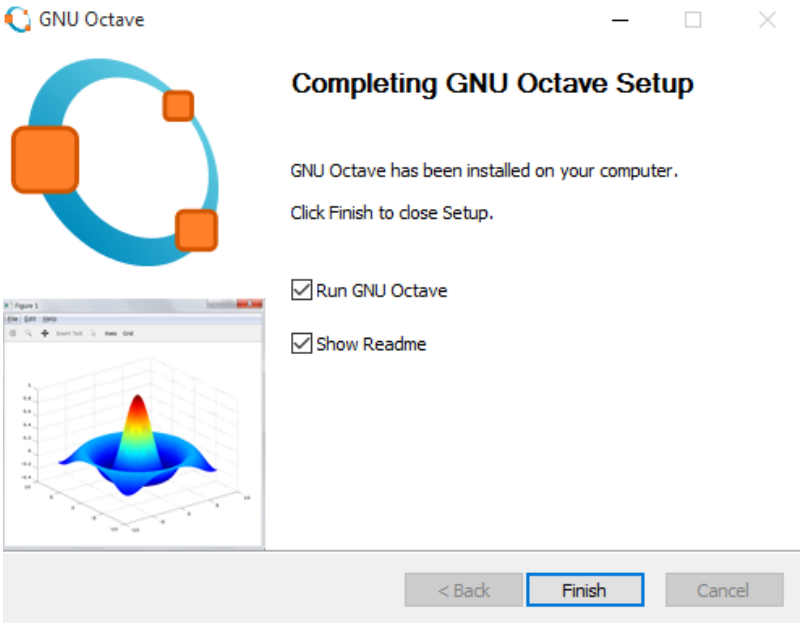

Image 84 - The final window indicate that the software is installed and shown two preselected checkboxes (run octave and show readme), to finish you can unselect the checkboxes item and press Finish button.

c. In order to use GNU Octave from the command windows, you have to set the PATH variables including the octave path (C:\Octave\Octave-5.1.0.0; C:\Octave\Octave-5.1.0.0\mingw64\bin;) ().

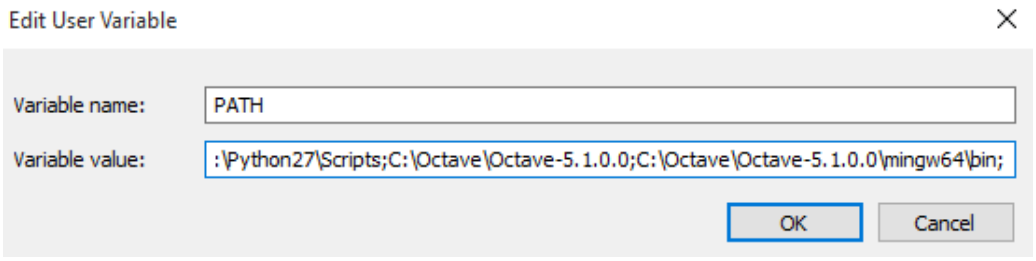

Image 85 - Shown the window to set the PATH variable. If you don't remember how access to this window see Image 51 to Image 59.

7. Install the oct2py library ():
   a. python -m pip install -U oct2py

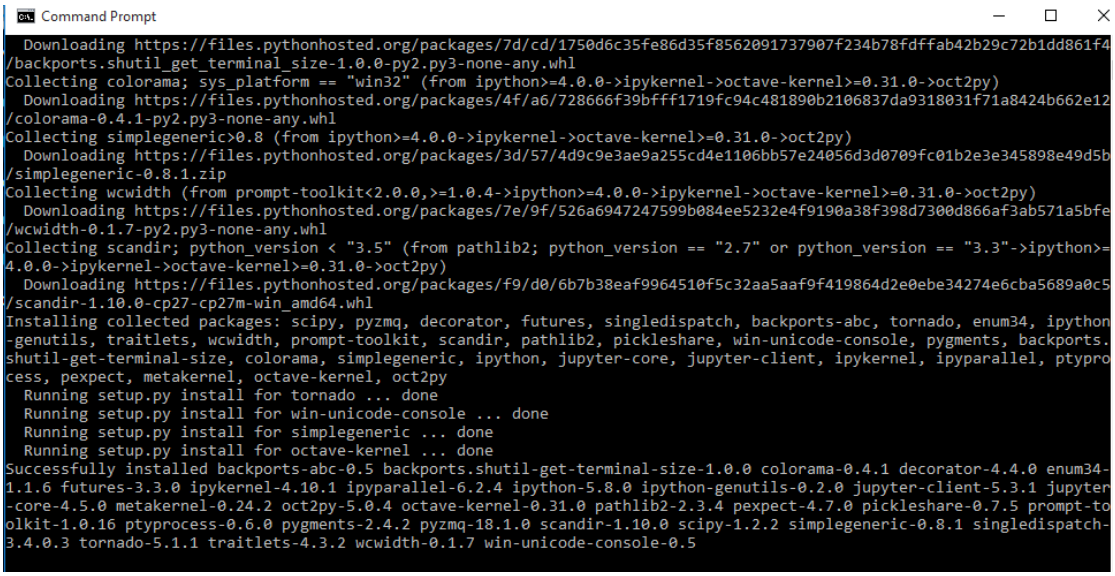

Image 86 - Part of the installation of oct2py with the previous command.

b. To test if the octave library can be used by the software, run the next commands (Image 87):
   i. python
   ii. from oct2py import octave

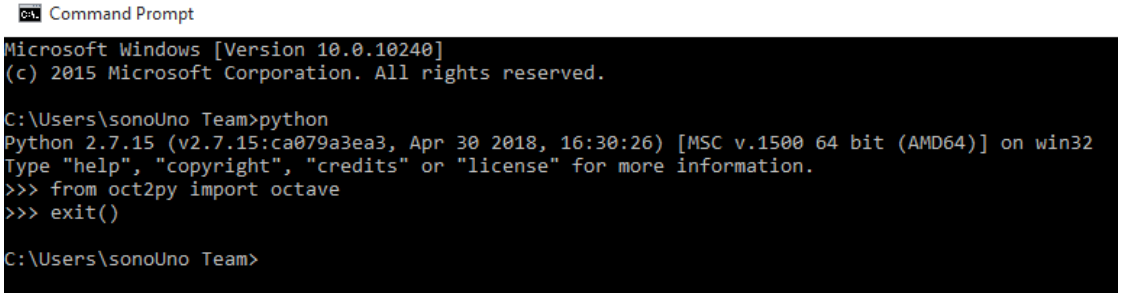

Image 87 - Testing the octave library.

NOTE: If the PATH to Octave is not set or is incorrect, an error can be shown by python like Image 88.

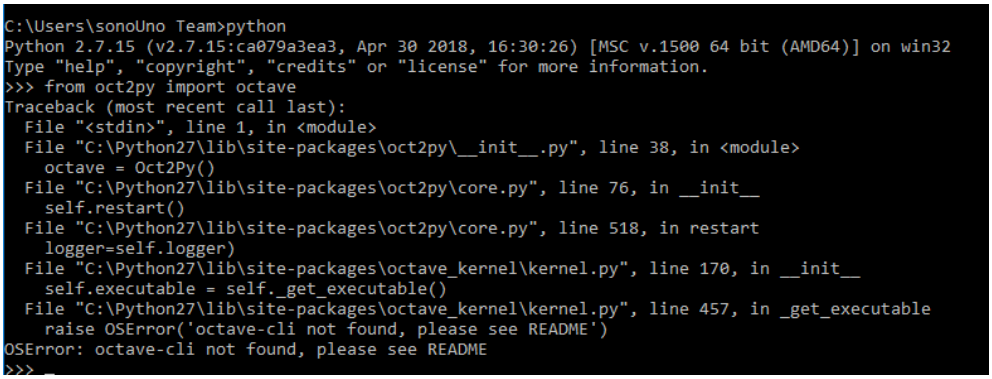

Image 88 - Possible error with octave if the PATH variables are not set.

<u>NOTE</u>: if any of the last libraries (from 1 to 7) is missing, the soft does not run. The installation can take several minutes.

To open the software, follow the next steps:

1. Unzip the file, if it is compressed.
2. Open a terminal and go to the software folder. Probably you have more than one folder before you can run SonoUno.

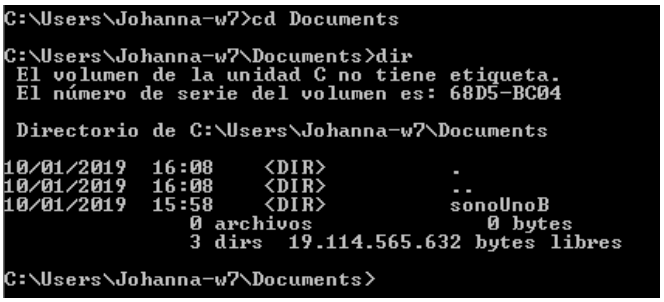

Image 89 - Location of the sonoUno on the command line.

3. To check in which folder is sonoUno.py, use the command “dir” (Image 89). The sonoUno.py must be among the files in the folder.

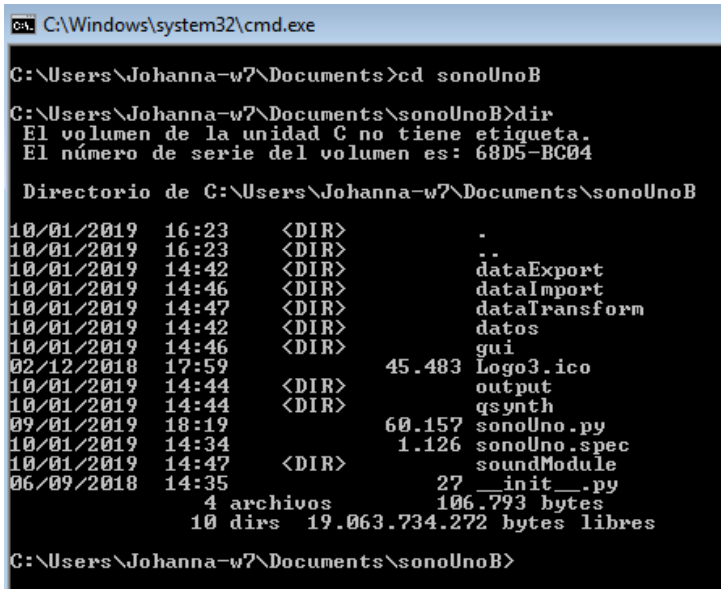

Image 90 - Aspect of the sonoUno folder on the command line on Windows.

4. Once you are sure that you are at the right folder, make:
    a. python sonoUno.py

A window must be open (Image 91), if that is the case, the soft is ready to be used.

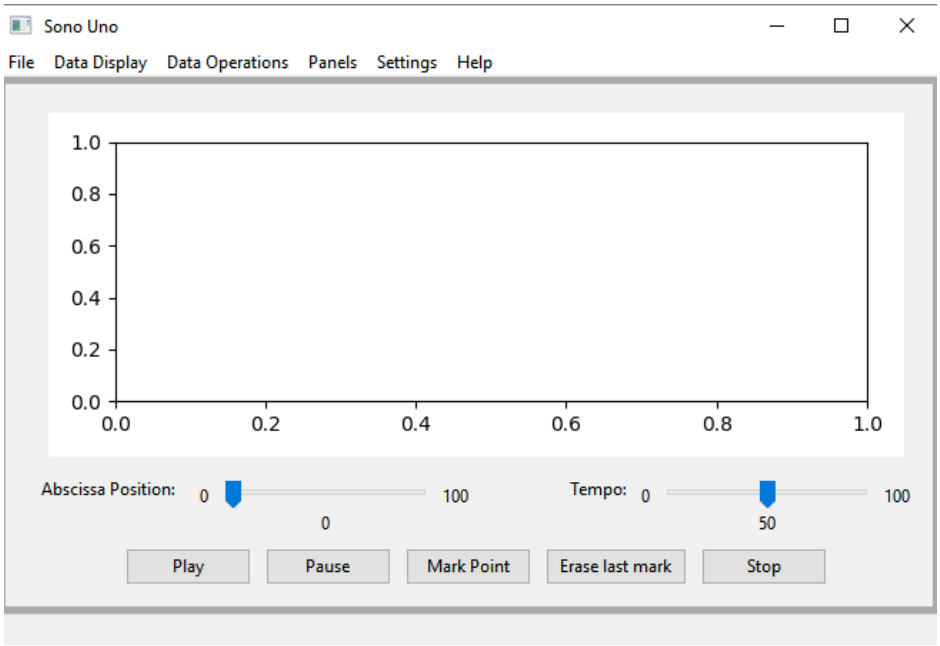

Image 91 - SonoUno main window on Windows.

2.3.1.3. Possible error

If the user install python 2.7 (64 bit) instead of python 2.7 (32 bits) an error with pyfluidsynth can appear like Image 92. To solve it, uninstall python and install python 2.7 (32 bits).

```
C:\Users\sonoUno Team\Downloads\sonoUno-v2.0\sonoUno-v2.0>python sonoUno.py
Traceback (most recent call last):
  File "sonoUno.py", line 19, in <module>
    from soundModule.simpleSound import simpleSound as sound
  File "C:\Users\sonoUno Team\Downloads\sonoUno-v2.0\sonoUno-v2.0\soundModule\simpleSound.py", line 19, in <module>
    from mingus.midi import fluidsynth
  File "C:\Python27\lib\site-packages\mingus\midi\fluidsynth.py", line 36, in <module>
    import pyfluidsynth as fs
  File "C:\Python27\lib\site-packages\mingus\midi\pyfluidsynth.py", line 39, in <module>
    _fl = CDLL(lib)
  File "C:\Python27\lib\ctypes\__init__.py", line 366, in __init__
    self._handle = _dlopen(self._name, mode)
WindowsError: [Error 193] %1 is not a valid Win32 application

C:\Users\sonoUno Team\Downloads\sonoUno-v2.0\sonoUno-v2.0>
```

Image 92 - Error running the software on Windows with python 2.7 (64 bits).

3. Import a file to the software

Once the software is installed, to open it you have to do double click on the desktop icon, or look for the executable “sonoUno.exe” on the directory “C:\sonoUno”. That action opens the sonoUno main window and a windows command windows on the second plain (Image 93).

Image 93 - Errors command window and sonoUno main window.

The command window is shown to detect any problem that is not catch by the program itself. If an error occurs on that windows is recommended to do a screenshot or copy the message and communicate this to the development team. For the final version, that window will be not included.

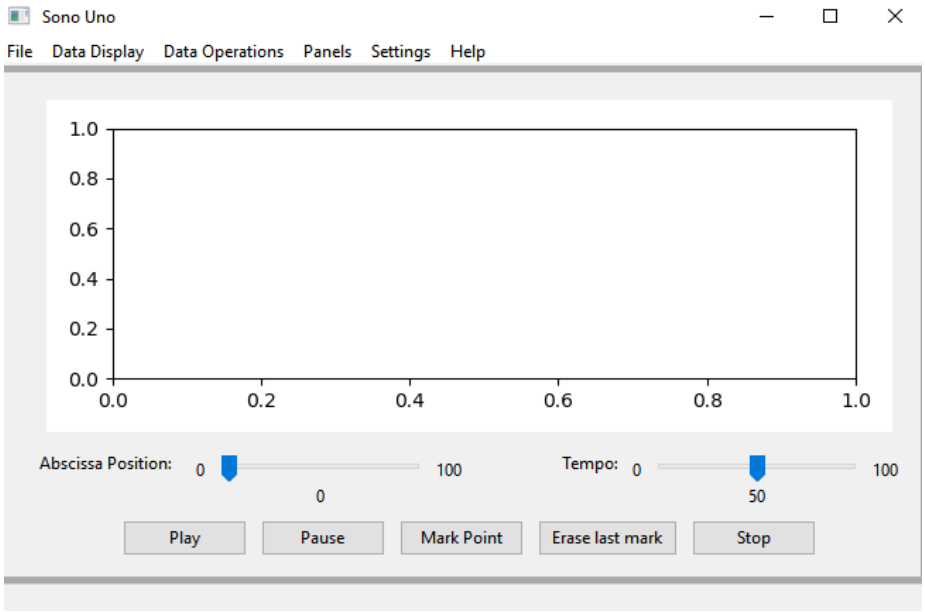

Image 94 - SonoUno initial window.

The initial window of the software only shows the plot and the reproduction options of the data (Image 94), the other functionalities are hide and were shown in the next chapters. This design was based on a user cases study.

In order to probe the SonoUno, you have to import a data file. If you don't have a data file, the installer provides a folder named "data" with simple functions on the installation directory (C:\sonoUno).

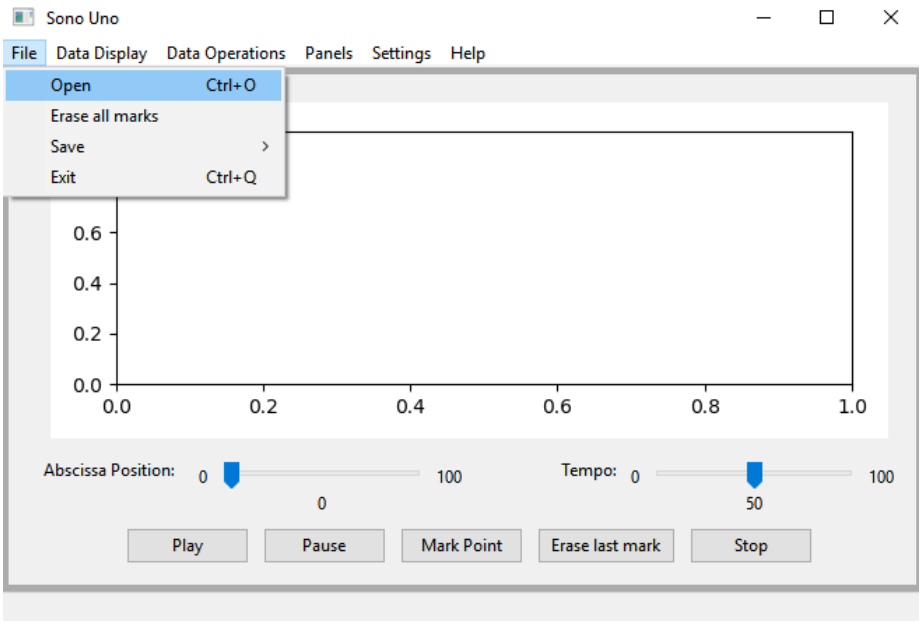

Image 95 - Open a file: choose the item Open on the menu File.

The first step to open a data file, is to select the item Open on the menu File (Image 95). This action shows a new window of the file system of the computer, where you can choose the data file. Once you have the data file selected, press the button “Open” (Image 96).

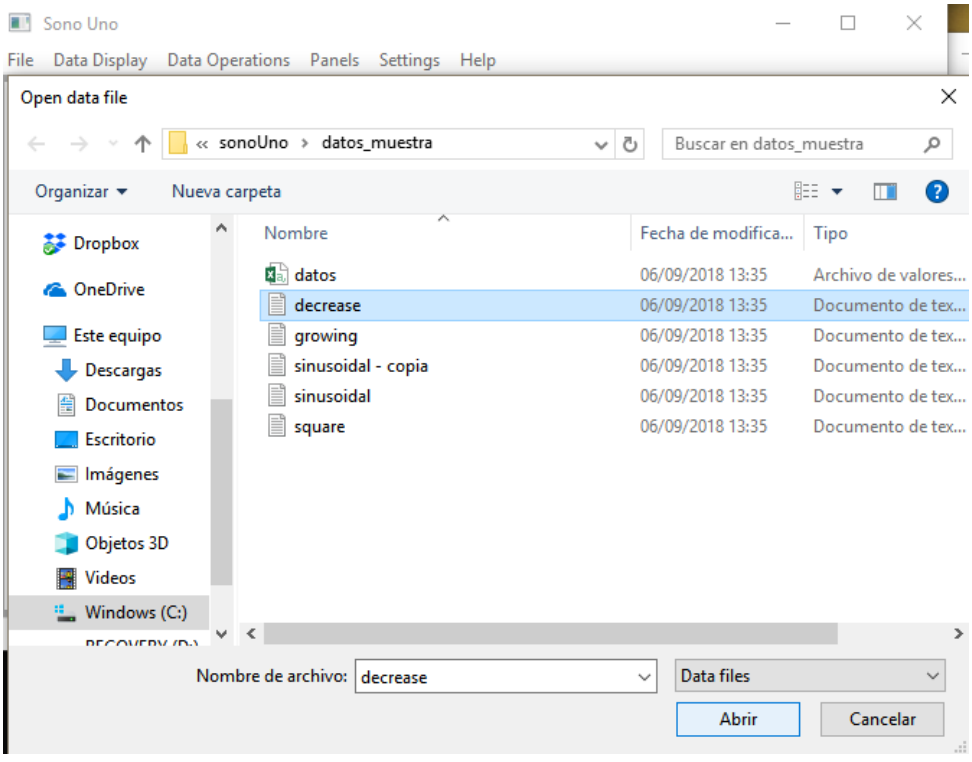

Image 96 - New window of the file system of the computer.

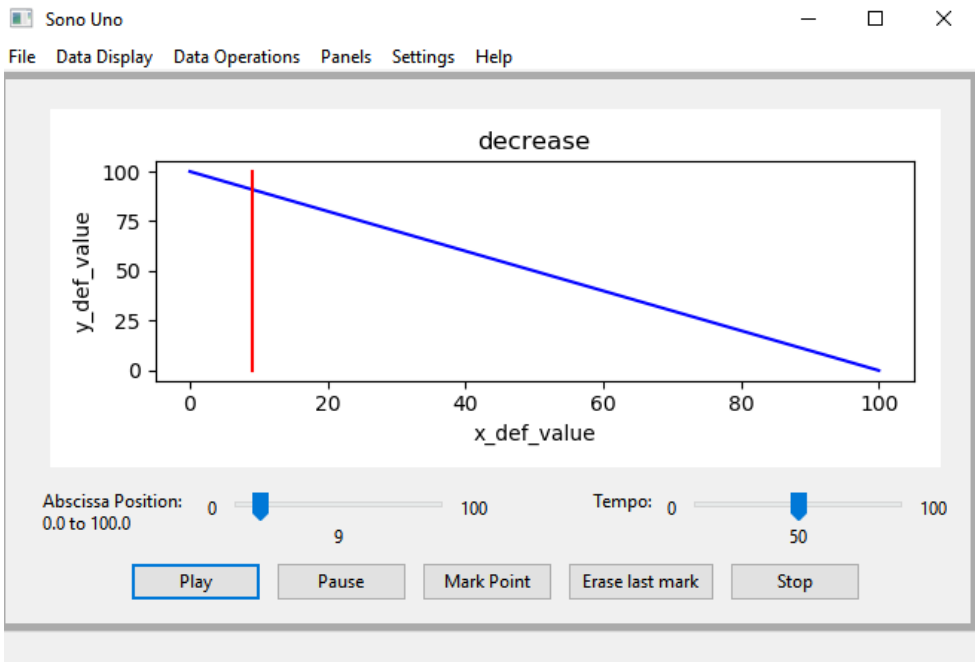

Image 97 - Reproduction of the data file after press the button Play.

After open the data file, the SonoUno show the plot and is ready to reproduce the pitch variation in Piano. In order to reproduce the sound, you have to press the button Play (Image 97). If the software installation is correct, you must listen a pitch variation on Piano and see a red vertical bar moving through the data, this bar indicate the position of the data that is been sonificated.

If the software doesn't produce sound, check the speakers or headphones on your computer. If the problems continue or you have another problem, inform this to the developer team.