



# 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.

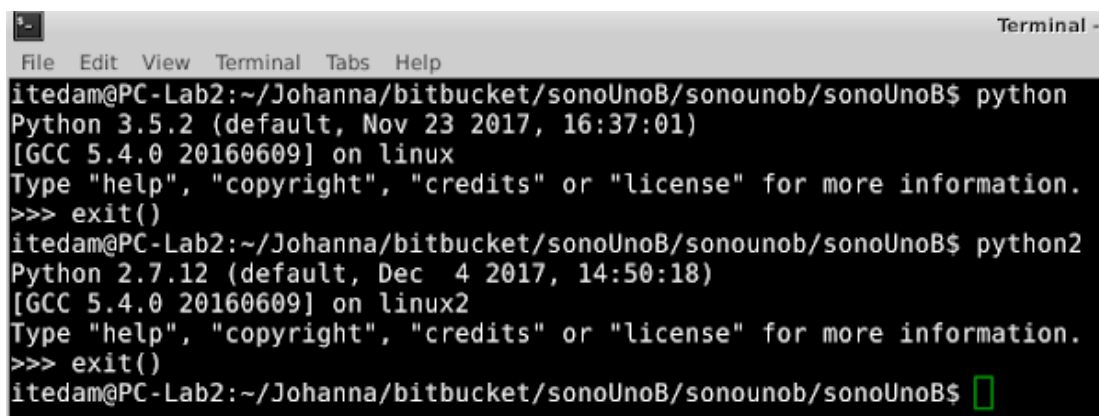
## 2. Software installation

### 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:

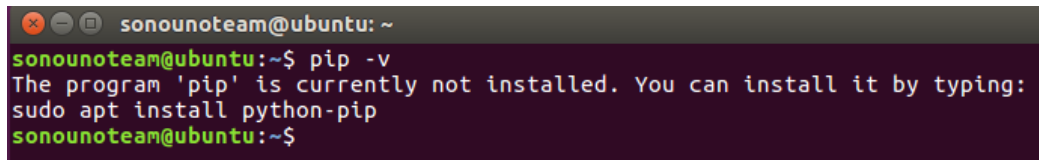


```
itedam@PC-Lab2:~/Johanna/bitbucket/sonoUnoB/sonounob/sonoUnoB$ python
Python 3.5.2 (default, Nov 23 2017, 16:37:01)
[GCC 5.4.0 20160609] on linux
Type "help", "copyright", "credits" or "license" for more information.
>>> exit()
itedam@PC-Lab2:~/Johanna/bitbucket/sonoUnoB/sonounob/sonoUnoB$ python2
Python 2.7.12 (default, Dec 4 2017, 14:50:18)
[GCC 5.4.0 20160609] on linux2
Type "help", "copyright", "credits" or "license" for more information.
>>> exit()
itedam@PC-Lab2:~/Johanna/bitbucket/sonoUnoB/sonounob/sonoUnoB$
```

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

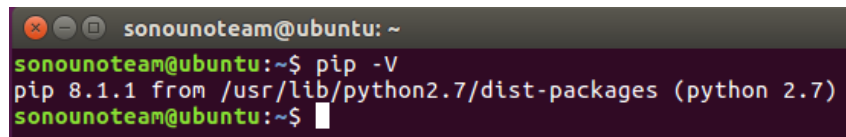
2. If the version is 3.x.x, type exit() and check with 'python2'. If the version here is 2.7.x (see Image 1) we can continue with the following steps, if not, you must install or update python 2.7 in the operating system using the command:
  - a. `sudo apt-get install --upgrade python`

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`



```
sonounoteam@ubuntu: ~  
sonounoteam@ubuntu:~$ pip -v  
The program 'pip' is currently not installed. You can install it by typing:  
sudo apt install python-pip  
sonounoteam@ubuntu:~$
```

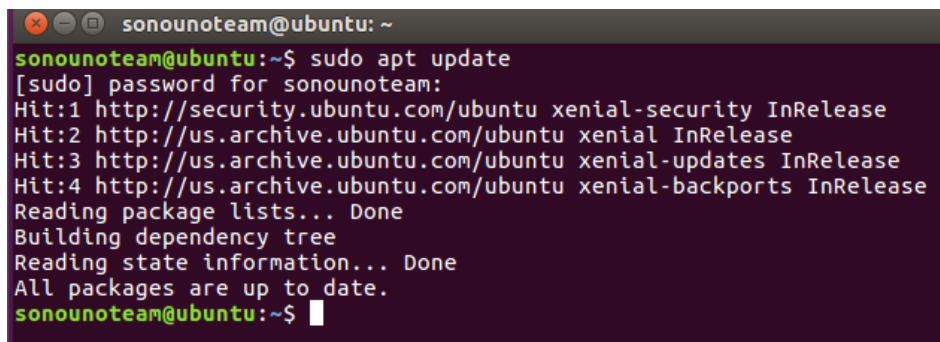
Image 2 – Shows that `pip` is not installed, the message begins with 'The program `pip` is currently not installed'.



```
sonounoteam@ubuntu: ~  
sonounoteam@ubuntu:~$ pip -V  
pip 8.1.1 from /usr/lib/python2.7/dist-packages (python 2.7)  
sonounoteam@ubuntu:~$
```

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

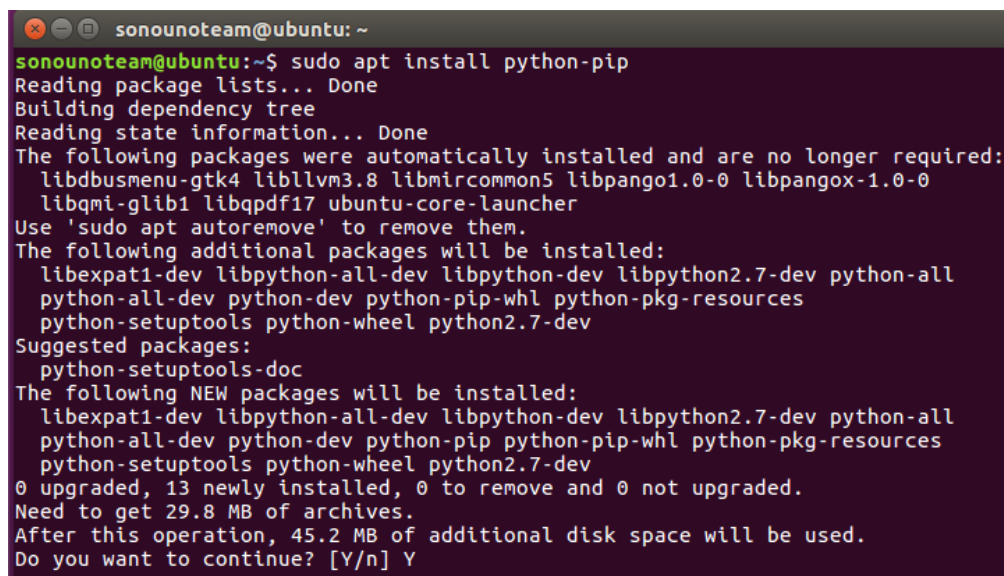
4. If you don't have 'pip' installed (Image 2), execute the next commands (Image 4, Image 5 and Image 6):
  - a. `sudo apt update`



```
sonounoteam@ubuntu: ~  
sonounoteam@ubuntu:~$ sudo apt update  
[sudo] password for sonounoteam:  
Hit:1 http://security.ubuntu.com/ubuntu xenial-security InRelease  
Hit:2 http://us.archive.ubuntu.com/ubuntu xenial InRelease  
Hit:3 http://us.archive.ubuntu.com/ubuntu xenial-updates InRelease  
Hit:4 http://us.archive.ubuntu.com/ubuntu xenial-backports InRelease  
Reading package lists... Done  
Building dependency tree  
Reading state information... Done  
All packages are up to date.  
sonounoteam@ubuntu:~$
```

Image 4 - Implementation of the update command.

- b. `sudo apt install python-pip`



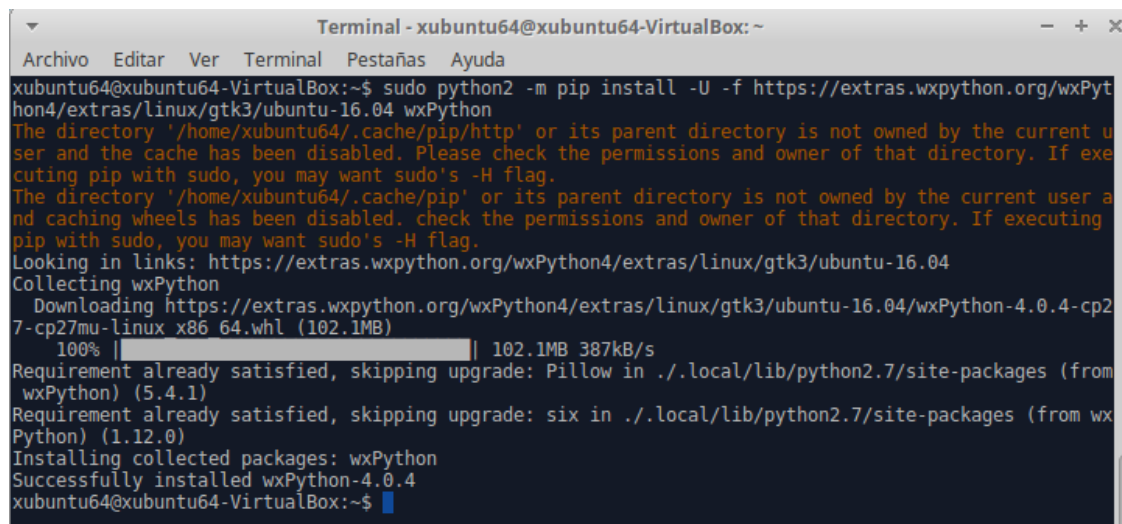
```
sonounoteam@ubuntu: ~  
sonounoteam@ubuntu:~$ sudo apt install python-pip  
Reading package lists... Done  
Building dependency tree  
Reading state information... Done  
The following packages were automatically installed and are no longer required:  
  libdbusmenu-gtk4 libllvm3.8 libmircommon5 libpango1.0-0 libpangox-1.0-0  
  libqmi-glib1 libqpdf17 ubuntu-core-launcher  
Use 'sudo apt autoremove' to remove them.  
The following additional packages will be installed:  
  libexpati-dev libpython-all-dev libpython-dev libpython2.7-dev python-all  
  python-all-dev python-dev python-pip-whl python-pkg-resources  
  python-setuptools python-wheel python2.7-dev  
Suggested packages:  
  python-setuptools-doc  
The following NEW packages will be installed:  
  libexpati-dev libpython-all-dev libpython-dev libpython2.7-dev python-all  
  python-all-dev python-dev python-pip python-pip-whl python-pkg-resources  
  python-setuptools python-wheel python2.7-dev  
0 upgraded, 13 newly installed, 0 to remove and 0 not upgraded.  
Need to get 29.8 MB of archives.  
After this operation, 45.2 MB of additional disk space will be used.  
Do you want to continue? [Y/n] Y
```

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

```
Processing triggers for doc-base (0.10.7) ...
Processing 1 added doc-base file...
Processing triggers for man-db (2.7.5-1) ...
Setting up libexpat1-dev:amd64 (2.1.0-7ubuntu0.16.04.4) ...
Setting up libpython2.7-dev:amd64 (2.7.12-1ubuntu0~16.04.4) ...
Setting up libpython-dev:amd64 (2.7.12-1~16.04) ...
Setting up libpython-all-dev:amd64 (2.7.12-1~16.04) ...
Setting up python-all (2.7.12-1~16.04) ...
Setting up python2.7-dev (2.7.12-1ubuntu0~16.04.4) ...
Setting up python-dev (2.7.12-1~16.04) ...
Setting up python-all-dev (2.7.12-1~16.04) ...
Setting up python-pip-whl (8.1.1-2ubuntu0.4) ...
Setting up python-pip (8.1.1-2ubuntu0.4) ...
Setting up python-pkg-resources (20.7.0-1) ...
Setting up python-setuptools (20.7.0-1) ...
Setting up python-wheel (0.29.0-1) ...
sonounoteam@ubuntu:~$
```

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`



```
Terminal - xubuntu64@xubuntu64-VirtualBox: ~
Archivo  Editor  Ver  Terminal  Pestañas  Ayuda
xubuntu64@xubuntu64-VirtualBox:~$ sudo python2 -m pip install -U -f https://extras.wxpython.org/wxPython4/extras/linux/gtk3/ubuntu-16.04 wxPython
The directory '/home/xubuntu64/.cache/pip/http' or its parent directory is not owned by the current user and the cache has been disabled. Please check the permissions and owner of that directory. If executing pip with sudo, you may want sudo's -H flag.
The directory '/home/xubuntu64/.cache/pip' or its parent directory is not owned by the current user and caching wheels has been disabled. check the permissions and owner of that directory. If executing pip with sudo, you may want sudo's -H flag.
Looking in links: https://extras.wxpython.org/wxPython4/extras/linux/gtk3/ubuntu-16.04
Collecting wxPython
  Downloading https://extras.wxpython.org/wxPython4/extras/linux/gtk3/ubuntu-16.04/wxPython-4.0.4-cp27-cp27mu-linux_x86_64.whl (102.1MB)
    100% |#####| 102.1MB 387kB/s
Requirement already satisfied, skipping upgrade: Pillow in ./local/lib/python2.7/site-packages (from wxPython) (5.4.1)
Requirement already satisfied, skipping upgrade: six in ./local/lib/python2.7/site-packages (from wxPython) (1.12.0)
Installing collected packages: wxPython
Successfully installed wxPython-4.0.4
xubuntu64@xubuntu64-VirtualBox:~$
```

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`

```
Downloading https://files.pythonhosted.org/packages/74/68/d87d9b36a136144254a8d512c0fc48369103a309e
474be9bdf536abfc45/python-dateutil-2.7.5-py2.py3-none-any.whl (225kB)
100% | 235kB 2.6MB/s
Collecting kiwisolver<=1.0.1 (from matplotlib)
  Downloading https://files.pythonhosted.org/packages/3a/62/a8c9bef3059d55ab38e41fe9cba4fad773bfc04e4
7290bab84db1c18262e/kiwisolver-1.0.1-cp27-cp27mu-manylinux1_x86_64.whl (951kB)
100% | 952kB 2.6MB/s
Collecting cycler<=0.10 (from matplotlib)
  Downloading https://files.pythonhosted.org/packages/f7/d2/e07d3ebb2bd7af696440ce7e754c59dd546ffe1bb
e732c8ab68b9c834e61/cyclar-0.10.0-py2.py3-none-any.whl
Collecting numpy<=1.7.1 (from matplotlib)
  Downloading https://files.pythonhosted.org/packages/9f/85/163127d3fb0573deb9eca947cfc73aa3618eaaaf86
56501460574471d114a/numpy-1.16.0-cp27-cp27mu-manylinux1_x86_64.whl (17.0MB)
100% | 17.0MB 1.3MB/s
Requirement already satisfied, skipping upgrade: setuptools in /usr/local/lib/python2.7/dist-packages
(from kiwisolver<=1.0.1->matplotlib) (40.6.3)
Building wheels for collected packages: subprocess32
  Running setup.py bdist_wheel for subprocess32 ... done
  Stored in directory: /home/xubuntu64/.cache/pip/wheels/c0/08/48/bb468e57d688ea6fa40a450d88d7d9f5fb3
c955510077da743
Successfully built subprocess32
Installing collected packages: pyparsing, backports.functools-lru-cache, subprocess32, pytz, python-d
ateutil, kiwisolver, cycler, numpy, matplotlib
Successfully installed backports.functools-lru-cache-1.5 cycler-0.10.0 kiwisolver-1.0.1 matplotlib-2.
2.3 numpy-1.16.0 pyparsing-2.3.1 python-dateutil-2.7.5 pytz-2018.9 subprocess32-3.5.3
xubuntu64@xubuntu64-VirtualBox:~$
```

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`

```
Terminal - xubuntu64@xubuntu64-VirtualBox: ~
Archivo Editar Ver Terminal Pestañas Ayuda
xubuntu64@xubuntu64-VirtualBox:~$ python2 -m pip install --user -U pandas
Collecting pandas
  Downloading https://files.pythonhosted.org/packages/b7/e3/f52d484244105fa3d558ce8217a5190cd3d405360
76bef66d92d01566325/pandas-0.23.4-cp27-cp27mu-manylinux1_x86_64.whl (8.9MB)
100% | 8.9MB 1.4MB/s
Requirement already satisfied, skipping upgrade: numpy>=1.9.0 in ./local/lib/python2.7/site-packages
(from pandas) (1.16.0)
Requirement already satisfied, skipping upgrade: python-dateutil>=2.5.0 in ./local/lib/python2.7/sit
e-packages (from pandas) (2.7.5)
Requirement already satisfied, skipping upgrade: pytz>=2011k in ./local/lib/python2.7/site-packages
(from pandas) (2018.9)
Requirement already satisfied, skipping upgrade: six>=1.5 in ./local/lib/python2.7/site-packages (fr
om python-dateutil>=2.5.0->pandas) (1.12.0)
Installing collected packages: pandas
Successfully installed pandas-0.23.4
xubuntu64@xubuntu64-VirtualBox:~$
```

Image 9 - Installation of pandas with the previous command.

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

```
Terminal - xubuntu64@xubuntu64-VirtualBox: ~
Archivo Editar Ver Terminal Pestañas Ayuda
xubuntu64@xubuntu64-VirtualBox:~$ python2 -m pip install --user -U numpy
Requirement already up-to-date: numpy in ./local/lib/python2.7/site-packages (1.16.0)
xubuntu64@xubuntu64-VirtualBox:~$
```

Image 10 - Installation of numpy with the previous command.

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



```

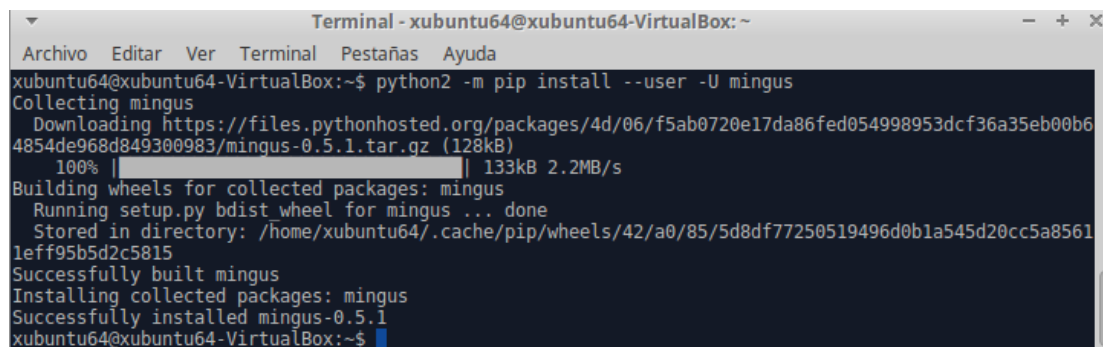
Selecting previously unselected package fluidsynth.
Preparing to unpack .../fluidsynth_1.1.6-3_amd64.deb ...
Unpacking fluidsynth (1.1.6-3) ...
Selecting previously unselected package libqt5x11extras5:amd64.
Preparing to unpack .../libqt5x11extras5_5.5.1-3build1_amd64.deb ...
Unpacking libqt5x11extras5:amd64 (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~b2r0+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`



```

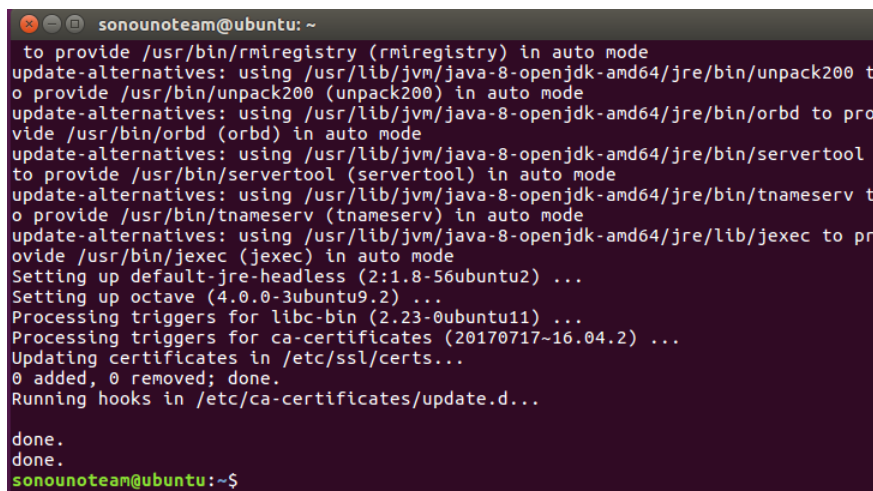
Terminal - xubuntu64@xubuntu64-VirtualBox: ~
Archivo  Editar  Ver  Terminal  Pestañas  Ayuda
xubuntu64@xubuntu64-VirtualBox:~$ python2 -m pip install --user -U mingus
Collecting mingus
  Downloading https://files.pythonhosted.org/packages/4d/06/f5ab0720e17da86fed054998953dcf36a35eb00b64854de968d849300983/mingus-0.5.1.tar.gz (128kB)
    100% |#####| 133kB 2.2MB/s
Building wheels for collected packages: mingus
  Running setup.py bdist_wheel for mingus ... done
  Stored in directory: /home/xubuntu64/.cache/pip/wheels/42/a0/85/5d8df77250519496d0b1a545d20cc5a8561leff95b5d2c5815
Successfully built mingus
Installing collected packages: mingus
Successfully installed mingus-0.5.1
xubuntu64@xubuntu64-VirtualBox:~$

```

Image 12 - Installation of mingus with the previous command.

## 13. Install Octave (Image 13):

- a. `sudo apt install octave`



```

sonounoteam@ubuntu: ~
to provide /usr/bin/rmiregistry (rmiregistry) in auto mode
update-alternatives: using /usr/lib/jvm/java-8-openjdk-amd64/jre/bin/unpack200 to provide /usr/bin/unpack200 (unpack200) in auto mode
update-alternatives: using /usr/lib/jvm/java-8-openjdk-amd64/jre/bin/orbd to provide /usr/bin/orbd (orbd) in auto mode
update-alternatives: using /usr/lib/jvm/java-8-openjdk-amd64/jre/bin/servertool to provide /usr/bin/servertool (servertool) in auto mode
update-alternatives: using /usr/lib/jvm/java-8-openjdk-amd64/jre/bin/tnameserv to provide /usr/bin/tnameserv (tnameserv) in auto mode
update-alternatives: using /usr/lib/jvm/java-8-openjdk-amd64/jre/lib/jexec to provide /usr/bin/jexec (jexec) in auto mode
Setting up default-jre-headless (2:1.8-56ubuntu2) ...
Setting up octave (4.0.0-3ubuntu9.2) ...
Processing triggers for libc-bin (2.23-0ubuntu11) ...
Processing triggers for ca-certificates (20170717~16.04.2) ...
Updating certificates in /etc/ssl/certs...
0 added, 0 removed; done.
Running hooks in /etc/ca-certificates/update.d...
done.
done.
sonounoteam@ubuntu:~$

```

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`

```

sonounoteam@ubuntu: ~
ing, use --no-warn-script-location.
WARNING: The scripts jupyter-kernel, jupyter-kernelspec and jupyter-run are in
stalled in '/home/sonounoteam/.local/bin' which is not on PATH.
Consider adding this directory to PATH or, if you prefer to suppress this warn
ing, use --no-warn-script-location.
WARNING: The script pygmentize is installed in '/home/sonounoteam/.local/bin'
which is not on PATH.
Consider adding this directory to PATH or, if you prefer to suppress this warn
ing, use --no-warn-script-location.
WARNING: The scripts iptest, iptest2, ipython and ipython2 are installed in '/
home/sonounoteam/.local/bin' which is not on PATH.
Consider adding this directory to PATH or, if you prefer to suppress this warn
ing, use --no-warn-script-location.
WARNING: The scripts ipcluster, ipcontroller and ipengine are installed in '/h
ome/sonounoteam/.local/bin' which is not on PATH.
Consider adding this directory to PATH or, if you prefer to suppress this warn
ing, use --no-warn-script-location.
Successfully installed backports.shutil-get-terminal-size-1.0.0 decorator-4.4.0
enum34-1.1.6 futures-3.3.0 ipykernel-4.10.0 ipyparallel-6.2.4 ipython-5.8.0 ipyt
hon-genutils-0.2.0 jupyter-client-5.3.1 jupyter-core-4.5.0 metakernel-0.24.2 oct
2py-5.0.4 octave-kernel-0.31.0 pathlib2-2.3.4 pexpect-4.7.0 pickleshare-0.7.5 pr
ompt-toolkit-1.0.16 ptyprocess-0.6.0 pygments-2.4.2 pyzmq-18.0.2 scandir-1.10.0
scipy-1.2.2 simplegeneric-0.8.1 tornado-6.0.3 traitlets-4.3.2 wcwidth-0.1.7
sonounoteam@ubuntu:~$

```

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

**NOTE:** 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.

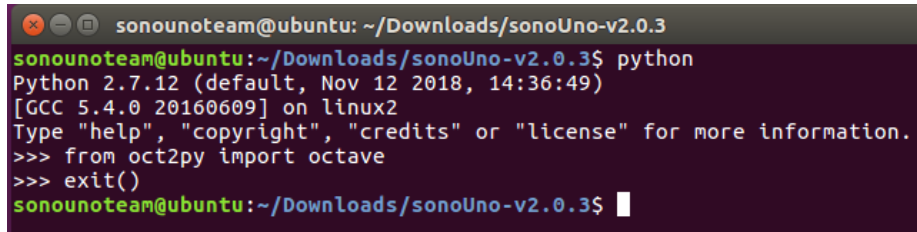
```

sonounoteam@ubuntu:~/Downloads/sonoUno-v2.0.3$ python
Python 2.7.12 (default, Nov 12 2018, 14:36:49)
[GCC 5.4.0 20160609] on linux2
Type "help", "copyright", "credits" or "license" for more information.
>>> from oct2py import octave
Traceback (most recent call last):
  File "<stdin>", line 1, in <module>
  File "/home/sonounoteam/.local/lib/python2.7/site-packages/oct2py/__init__.py",
line 26, in <module>
    from .core import Oct2Py
  File "/home/sonounoteam/.local/lib/python2.7/site-packages/oct2py/core.py", li
ne 14, in <module>
    from metakernel.pexpect import EOF, TIMEOUT
  File "/home/sonounoteam/.local/lib/python2.7/site-packages/metakernel/__init__
.py", line 1, in <module>
    from .metakernel import (
  File "/home/sonounoteam/.local/lib/python2.7/site-packages/metakernel/_metake
nel.py", line 22, in <module>
    from ipykernel.kernelapp import IPKernelApp
  File "/home/sonounoteam/.local/lib/python2.7/site-packages/ipykernel/kernelapp
.py", line 15, in <module>
    from tornado import ioloop
  File "/home/sonounoteam/.local/lib/python2.7/site-packages/tornado/ioloop.py",
line 67
    def fileno(self) -> int:
                        ^
SyntaxError: invalid syntax
>>>

```

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





```

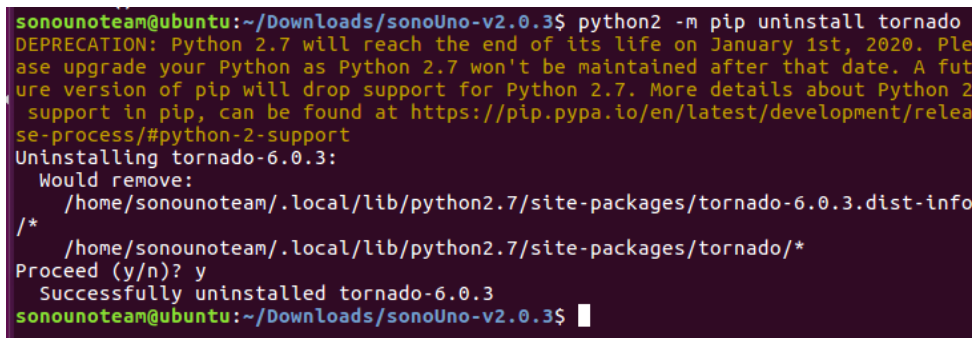
sonounoteam@ubuntu: ~/Downloads/sonoUno-v2.0.3
sonounoteam@ubuntu:~/Downloads/sonoUno-v2.0.3$ python
Python 2.7.12 (default, Nov 12 2018, 14:36:49)
[GCC 5.4.0 20160609] on linux2
Type "help", "copyright", "credits" or "license" for more information.
>>> from oct2py import octave
>>> exit()
sonounoteam@ubuntu:~/Downloads/sonoUno-v2.0.3$

```

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`



```

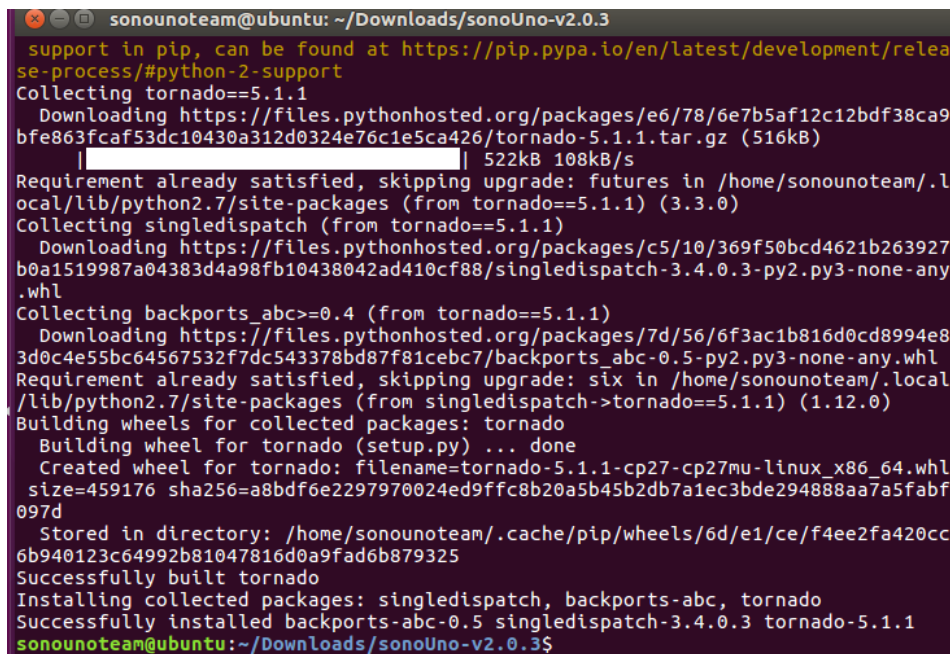
sonounoteam@ubuntu:~/Downloads/sonoUno-v2.0.3$ python2 -m pip uninstall tornado
DEPRECATION: Python 2.7 will reach the end of its life on January 1st, 2020. Please
upgrade your Python as Python 2.7 won't be maintained after that date. A future
version of pip will drop support for Python 2.7. More details about Python 2
support in pip, can be found at https://pip.pypa.io/en/latest/development/release-process/#python-2-support
Uninstalling tornado-6.0.3:
  Would remove:
    /home/sonounoteam/.local/lib/python2.7/site-packages/tornado-6.0.3.dist-info/*
    /home/sonounoteam/.local/lib/python2.7/site-packages/tornado/*
Proceed (y/n)? y
Successfully uninstalled tornado-6.0.3
sonounoteam@ubuntu:~/Downloads/sonoUno-v2.0.3$

```

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`



```

sonounoteam@ubuntu: ~/Downloads/sonoUno-v2.0.3
support in pip, can be found at https://pip.pypa.io/en/latest/development/release-process/#python-2-support
Collecting tornado==5.1.1
  Downloading https://files.pythonhosted.org/packages/e6/78/6e7b5af12c12bdf38ca9bfe863fcaf53dc10430a312d0324e76c1e5ca426/tornado-5.1.1.tar.gz (516kB)
    | 522kB 108kB/s
Requirement already satisfied, skipping upgrade: futures in /home/sonounoteam/.local/lib/python2.7/site-packages (from tornado==5.1.1) (3.3.0)
Collecting singledispatch (from tornado==5.1.1)
  Downloading https://files.pythonhosted.org/packages/c5/10/369f50bcd4621b263927b0a1519987a04383d4a98fb10438042ad410cf88/singledispatch-3.4.0.3-py2.py3-none-any.whl
Collecting backports_abc>=0.4 (from tornado==5.1.1)
  Downloading https://files.pythonhosted.org/packages/7d/56/6f3ac1b816d0cd8994e83d0c4e55bc64567532f7dc543378bd87f81cebc7/backports_abc-0.5-py2.py3-none-any.whl
Requirement already satisfied, skipping upgrade: six in /home/sonounoteam/.local/lib/python2.7/site-packages (from singledispatch->tornado==5.1.1) (1.12.0)
Building wheels for collected packages: tornado
  Building wheel for tornado (setup.py) ... done
  Created wheel for tornado: filename=tornado-5.1.1-cp27-cp27mu-linux_x86_64.whl size=459176 sha256=a8bdf6e2297970024ed9ffc8b20a5b45b2db7a1ec3bde294888aa7a5fabf097d
  Stored in directory: /home/sonounoteam/.cache/pip/wheels/6d/e1/ce/f4ee2fa420cc6b940123c64992b81047816d0a9fad6b879325
Successfully built tornado
Installing collected packages: singledispatch, backports-abc, tornado
Successfully installed backports-abc-0.5 singledispatch-3.4.0.3 tornado-5.1.1
sonounoteam@ubuntu:~/Downloads/sonoUno-v2.0.3$

```

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

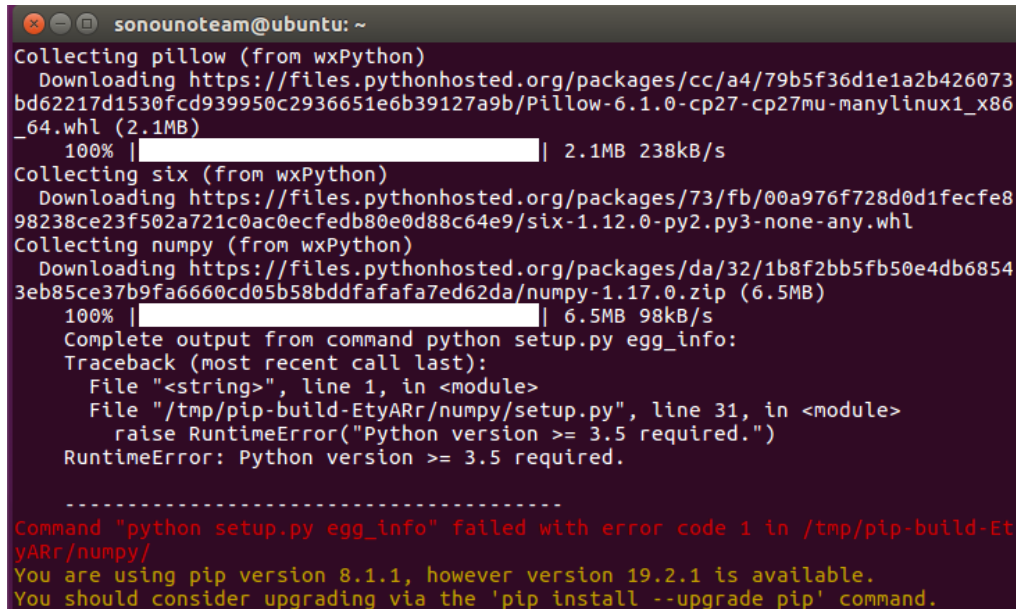
18. Finally, we test to import octave from the oct2py library:

- 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`

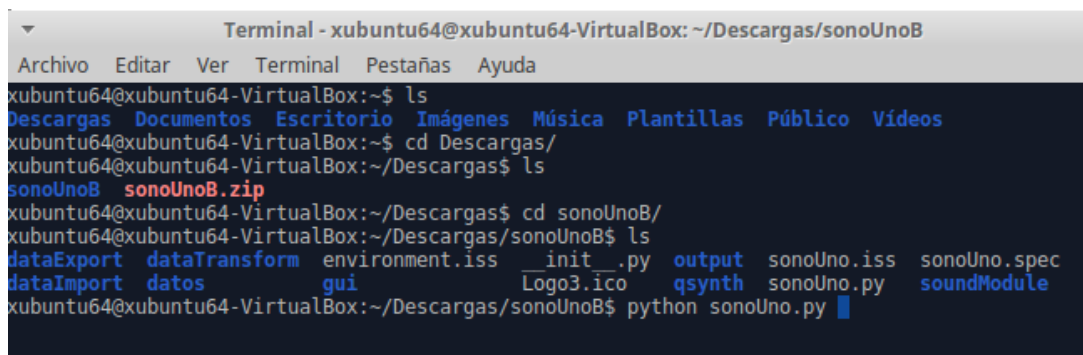


```
sonounoteam@ubuntu: ~  
Collecting pillow (from wxPython)  
  Downloading https://files.pythonhosted.org/packages/cc/a4/79b5f36d1e1a2b426073bd62217d1530fcd939950c2936651e6b39127a9b/Pillow-6.1.0-cp27-cp27mu-manylinux1_x86_64.whl (2.1MB)  
    100% |#####| 2.1MB 238kB/s  
Collecting six (from wxPython)  
  Downloading https://files.pythonhosted.org/packages/73/fb/00a976f728d0d1fecfe898238ce23f502a721c0ac0ecfedb80e0d88c64e9/six-1.12.0-py2.py3-none-any.whl  
Collecting numpy (from wxPython)  
  Downloading https://files.pythonhosted.org/packages/da/32/1b8f2bb5fb50e4db68543eb85ce37b9fa6660cd05b58bddfafafa7ed62da/numpy-1.17.0.zip (6.5MB)  
    100% |#####| 6.5MB 98kB/s  
Complete output from command python setup.py egg_info:  
Traceback (most recent call last):  
  File "<string>", line 1, in <module>  
  File "/tmp/pip-build-EtyARr/numpy/setup.py", line 31, in <module>  
    raise RuntimeError("Python version >= 3.5 required.")  
RuntimeError: Python version >= 3.5 required.  
-----  
Command "python setup.py egg_info" failed with error code 1 in /tmp/pip-build-EtyARr/numpy/  
You are using pip version 8.1.1, however version 19.2.1 is available.  
You should consider upgrading via the 'pip install --upgrade pip' command.
```

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.



```
Terminal - xubuntu64@xubuntu64-VirtualBox: ~/Descargas/sonoUnoB  
Archivo Editar Ver Terminal Pestañas Ayuda  
xubuntu64@xubuntu64-VirtualBox:~$ ls  
Descargas Documentos Escritorio Imágenes Música Plantillas Público Vídeos  
xubuntu64@xubuntu64-VirtualBox:~$ cd Descargas/  
xubuntu64@xubuntu64-VirtualBox:~/Descargas$ ls  
sonoUnoB sonoUnoB.zip  
xubuntu64@xubuntu64-VirtualBox:~/Descargas$ cd sonoUnoB/  
xubuntu64@xubuntu64-VirtualBox:~/Descargas/sonoUnoB$ ls  
dataExport dataTransform environment.iss __init__.py output sonoUno.iss sonoUno.spec  
dataImport datos gui Logo3.ico qsynth sonoUno.py soundModule  
xubuntu64@xubuntu64-VirtualBox:~/Descargas/sonoUnoB$ python sonoUno.py
```

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/Dscargas/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.

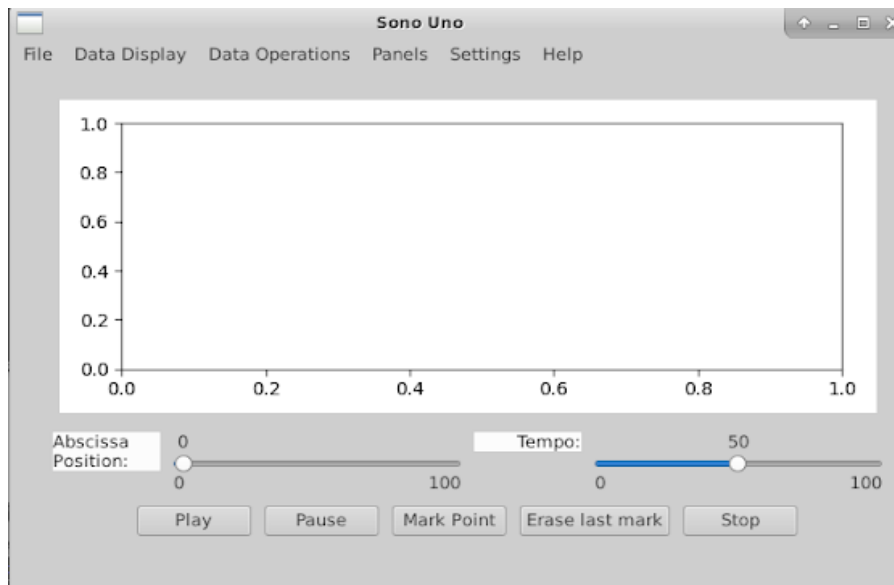


Image 22 - SonoUno main window on Ubuntu.

## 2.2. MacOS

### 2.1.1. Python and needed libraries

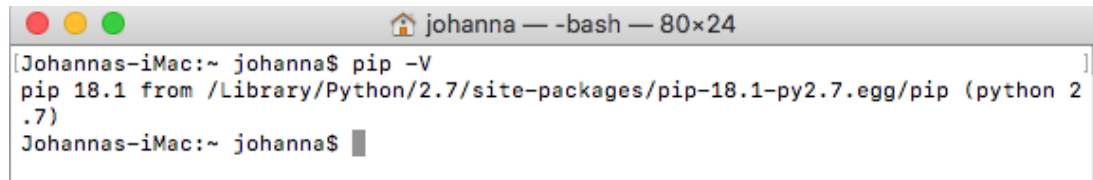
If you installed previously the soft at your computer, do not take into account this section. If not, the next steps are python and the libraries installation.

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

```
johanna — -bash — 80x24
Last login: Sun Jan 13 16:40:08 on console
Johannas-iMac:~ johanna$ python
Python 2.7.10 (default, May 7 2017, 01:41:22)
[GCC 4.2.1 Compatible Apple LLVM 9.0.0 (clang-900.0.19.5)] on darwin
Type "help", "copyright", "credits" or "license" for more information.
[>>> exit()
Johannas-iMac:~ johanna$
```

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

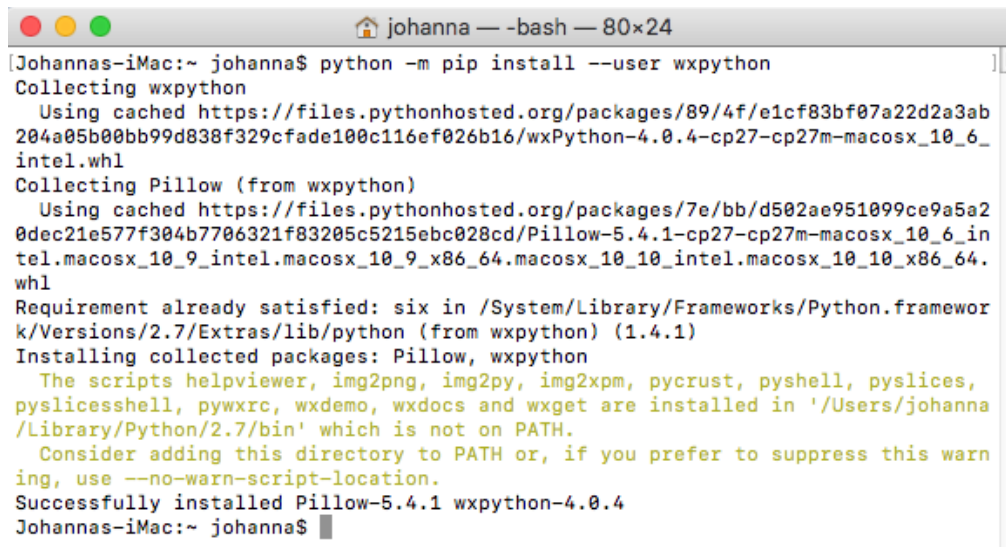


```
johanna — -bash — 80x24
Johannas-iMac:~ johanna$ pip -V
pip 18.1 from /Library/Python/2.7/site-packages/pip-18.1-py2.7.egg/pip (python 2.7)
Johannas-iMac:~ johanna$
```

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

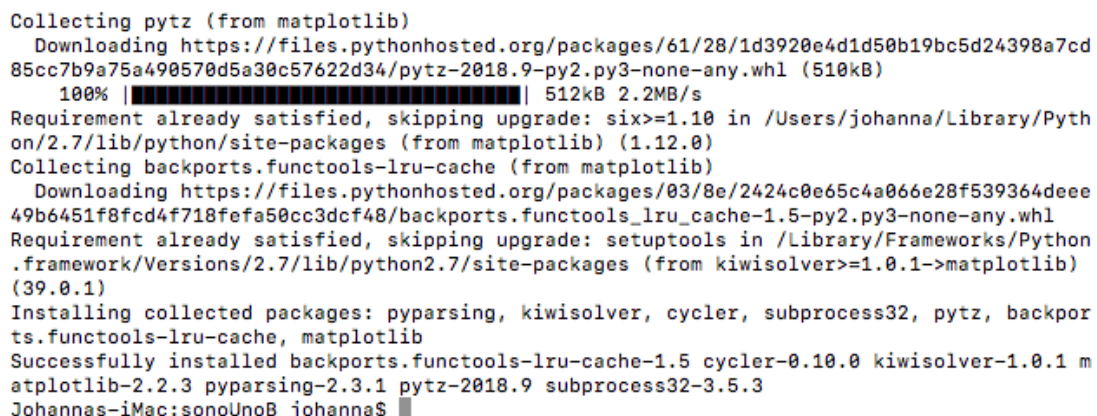


```
johanna — -bash — 80x24
Johannas-iMac:~ johanna$ python -m pip install --user wxpython
Collecting wxpython
  Using cached https://files.pythonhosted.org/packages/89/4f/e1cf83bf07a22d2a3ab204a05b00bb99d838f329cfade100c116ef026b16/wxPython-4.0.4-cp27-cp27m-macosx_10_6_intel.whl
Collecting Pillow (from wxpython)
  Using cached https://files.pythonhosted.org/packages/7e/bb/d502ae951099ce9a5a20dec21e577f304b7706321f83205c5215ebc028cd/Pillow-5.4.1-cp27-cp27m-macosx_10_6_intel.macosx_10_9_intel.macosx_10_9_x86_64.macosx_10_10_intel.macosx_10_10_x86_64.whl
Requirement already satisfied: six in /System/Library/Frameworks/Python.framework/Versions/2.7/Extras/lib/python (from wxpython) (1.4.1)
Installing collected packages: Pillow, wxpython
  The scripts helpviewer, img2png, img2py, img2xpm, pycrust, pyshell, pyslices, pyslicesshell, pywrc, wxdemo, wxdocs and wxget are installed in '/Users/johanna/Library/Python/2.7/bin' which is not on PATH.
  Consider adding this directory to PATH or, if you prefer to suppress this warning, use --no-warn-script-location.
Successfully installed Pillow-5.4.1 wxpython-4.0.4
Johannas-iMac:~ johanna$
```

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

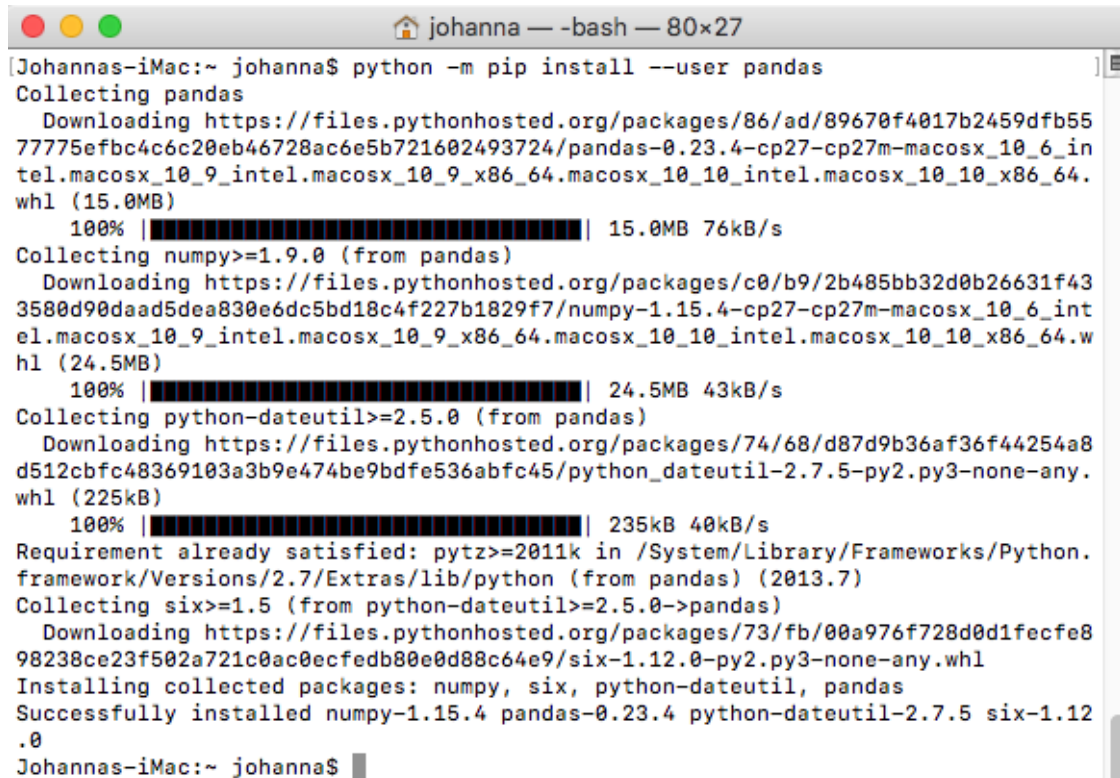


```
Collecting pytz (from matplotlib)
  Downloading https://files.pythonhosted.org/packages/61/28/1d3920e4d1d50b19bc5d24398a7cd85cc7b9a75a490570d5a30c57622d34/pytz-2018.9-py2.py3-none-any.whl (510kB)
    100% |#####| 512kB 2.2MB/s
Requirement already satisfied, skipping upgrade: six>=1.10 in /Users/johanna/Library/Python/2.7/lib/python/site-packages (from matplotlib) (1.12.0)
Collecting backports.functools-lru-cache (from matplotlib)
  Downloading https://files.pythonhosted.org/packages/03/8e/2424c0e65c4a066e28f539364deee49b6451f8fcd4f718fefa50cc3dcf48/backports.functools_lru_cache-1.5-py2.py3-none-any.whl
Requirement already satisfied, skipping upgrade: setuptools in /Library/Frameworks/Python.framework/Versions/2.7/lib/python2.7/site-packages (from kiwisolver>=1.0.1->matplotlib) (39.0.1)
Installing collected packages: pyparsing, kiwisolver, cycler, subprocess32, pytz, backports.functools-lru-cache, matplotlib
Successfully installed backports.functools-lru-cache-1.5 cycler-0.10.0 kiwisolver-1.0.1 matplotlib-2.2.3 pyparsing-2.3.1 pytz-2018.9 subprocess32-3.5.3
Johannas-iMac:sonoUnoB johanna$
```

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



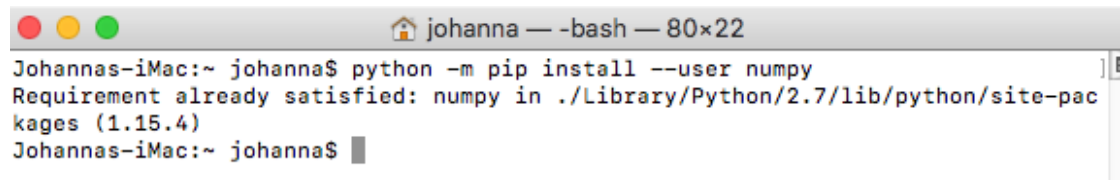
7. Install pandas (Image 27):
  - a. `python -m pip install --user pandas`



```
Johannas-iMac:~ johanna$ python -m pip install --user pandas
Collecting pandas
  Downloading https://files.pythonhosted.org/packages/86/ad/89670f4017b2459dfb5577775efbc4c6c20eb46728ac6e5b721602493724/pandas-0.23.4-cp27-cp27m-macosx_10_6_intel.macosx_10_9_intel.macosx_10_9_x86_64.macosx_10_10_intel.macosx_10_10_x86_64.whl (15.0MB)
    100% |#####| 15.0MB 76kB/s
Collecting numpy>=1.9.0 (from pandas)
  Downloading https://files.pythonhosted.org/packages/c0/b9/2b485bb32d0b26631f433580d90daad5dea830e6dc5bd18c4f227b1829f7/numpy-1.15.4-cp27-cp27m-macosx_10_6_intel.macosx_10_9_intel.macosx_10_9_x86_64.macosx_10_10_intel.macosx_10_10_x86_64.whl (24.5MB)
    100% |#####| 24.5MB 43kB/s
Collecting python-dateutil>=2.5.0 (from pandas)
  Downloading https://files.pythonhosted.org/packages/74/68/d87d9b36af36f44254a8d512cbfc48369103a3b9e474be9bdf536abfc45/python_dateutil-2.7.5-py2.py3-none-any.whl (225kB)
    100% |#####| 235kB 40kB/s
Requirement already satisfied: pytz>=2011k in /System/Library/Frameworks/Python.framework/Versions/2.7/Extras/lib/python (from pandas) (2013.7)
Collecting six>=1.5 (from python-dateutil>=2.5.0->pandas)
  Downloading https://files.pythonhosted.org/packages/73/fb/00a976f728d0d1fecfe898238ce23f502a721c0ac0ecfedb80e0d88c64e9/six-1.12.0-py2.py3-none-any.whl
Installing collected packages: numpy, six, python-dateutil, pandas
Successfully installed numpy-1.15.4 pandas-0.23.4 python-dateutil-2.7.5 six-1.12.0
Johannas-iMac:~ johanna$
```

Image 27 - Installation of pandas with the previous command.

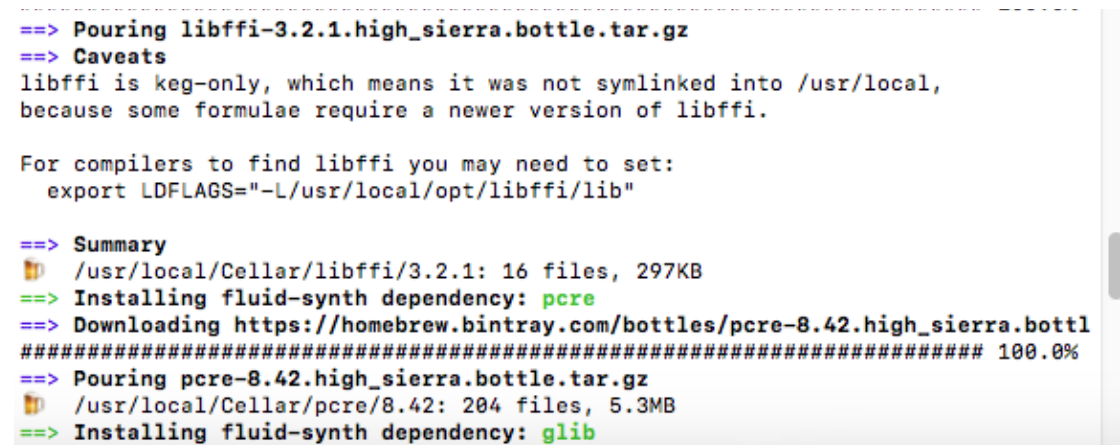
8. Install numpy (Image 28):
  - a. `python -m pip install --user numpy`



```
Johannas-iMac:~ johanna$ python -m pip install --user numpy
Requirement already satisfied: numpy in ./Library/Python/2.7/lib/python/site-packages (1.15.4)
Johannas-iMac:~ johanna$
```

Image 28 - Installation of numpy with the previous command.

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



```
==> Pouring libffi-3.2.1.high_sierra.bottle.tar.gz
==> Caveats
libffi is keg-only, which means it was not symlinked into /usr/local,
because some formulae require a newer version of libffi.


For compilers to find libffi you may need to set:
  export LDFLAGS="-L/usr/local/opt/libffi/lib"

==> Summary
📦 /usr/local/Cellar/libffi/3.2.1: 16 files, 297KB
==> Installing fluid-synth dependency: pcre
==> Downloading https://homebrew.bintray.com/bottles/pcre-8.42.high_sierra.bottl
##### 100.0%
==> Pouring pcre-8.42.high_sierra.bottle.tar.gz
📦 /usr/local/Cellar/pcre/8.42: 204 files, 5.3MB
==> Installing fluid-synth dependency: glib
```

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>).

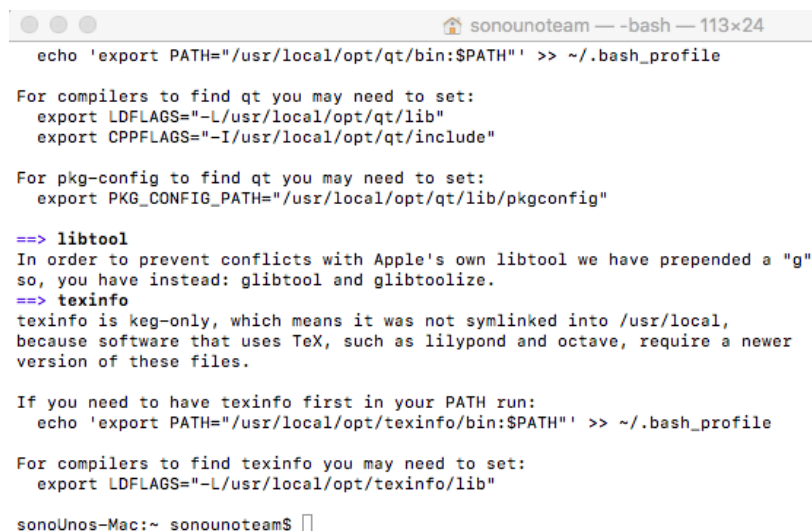
10. Install mingus (Image 30):
  - a. `python -m pip install --user mingus`



```
johanna — -bash — 80x21
Johannas-iMac:~ johanna$ python -m pip install --user mingus
Collecting mingus
  Downloading https://files.pythonhosted.org/packages/4d/06/f5ab0720e17da86fed054998953dcf36a35eb00b64854de968d849300983/mingus-0.5.1.tar.gz (128kB)
    100% |#####| 133kB 119kB/s
Installing collected packages: mingus
  Running setup.py install for mingus ... done
Successfully installed mingus-0.5.1
Johannas-iMac:~ johanna$
```

Image 30 - Installation of mingus with the previous command.

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



```
sonounoteam — -bash — 113x24
echo 'export PATH="/usr/local/opt/qt/bin:$PATH"' >> ~/.bash_profile

For compilers to find qt you may need to set:
export LDFLAGS="-L/usr/local/opt/qt/lib"
export CPPFLAGS="-I/usr/local/opt/qt/include"

For pkg-config to find qt you may need to set:
export PKG_CONFIG_PATH="/usr/local/opt/qt/lib/pkgconfig"

==> libtool
In order to prevent conflicts with Apple's own libtool we have prepended a "g"
so, you have instead: glibtool and glibtoolize.
==> texinfo
texinfo is keg-only, which means it was not symlinked into /usr/local,
because software that uses TeX, such as lilypond and octave, require a newer
version of these files.

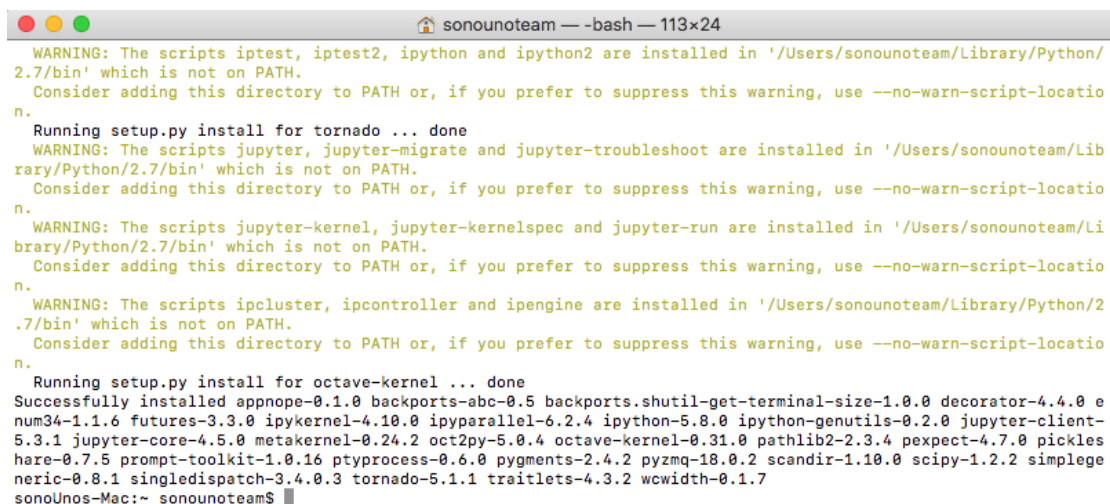
If you need to have texinfo first in your PATH run:
echo 'export PATH="/usr/local/opt/texinfo/bin:$PATH"' >> ~/.bash_profile

For compilers to find texinfo you may need to set:
export LDFLAGS="-L/usr/local/opt/texinfo/lib"

sonoUnos-Mac:~ sonounoteam$
```

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`

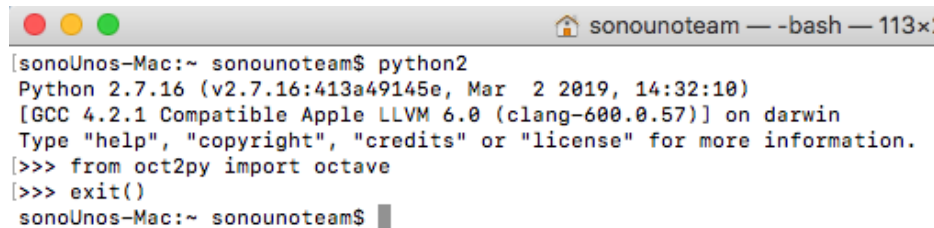


```
sonounoteam — -bash — 113x24
WARNING: The scripts iptest, iptest2, ipython and ipython2 are installed in '/Users/sonounoteam/Library/Python/2.7/bin' which is not on PATH.
Consider adding this directory to PATH or, if you prefer to suppress this warning, use --no-warn-script-location.
Running setup.py install for tornado ... done
WARNING: The scripts jupyter, jupyter-migrate and jupyter-troubleshoot are installed in '/Users/sonounoteam/Library/Python/2.7/bin' which is not on PATH.
Consider adding this directory to PATH or, if you prefer to suppress this warning, use --no-warn-script-location.
WARNING: The scripts jupyter-kernel, jupyter-kernelspec and jupyter-run are installed in '/Users/sonounoteam/Library/Python/2.7/bin' which is not on PATH.
Consider adding this directory to PATH or, if you prefer to suppress this warning, use --no-warn-script-location.
WARNING: The scripts ipcluster, ipcontroller and ipengine are installed in '/Users/sonounoteam/Library/Python/2.7/bin' which is not on PATH.
Consider adding this directory to PATH or, if you prefer to suppress this warning, use --no-warn-script-location.
Running setup.py install for octave-kernel ... done
Successfully installed appnope-0.1.0 backports-abc-0.5 backports.shutil-get-terminal-size-1.0.0 decorator-4.4.0 enum34-1.1.6 futures-3.3.0 ipykernel-4.10.0 ipyparallel-6.2.4 ipython-5.8.0 ipython-genutils-0.2.0 jupyter-client-5.3.1 jupyter-core-4.5.0 metakernel-0.24.2 oct2py-5.0.4 octave-kernel-0.31.0 pathlib2-2.3.4 pexpect-4.7.0 pickleshare-0.7.5 prompt-toolkit-1.0.16 ptyprocess-0.6.0 pygments-2.4.2 pyzmq-18.0.2 scandir-1.10.0 scipy-1.2.2 simplegeneric-0.8.1 singledispatch-3.4.0.3 tornado-5.1.1 traitlets-4.3.2 wcwidth-0.1.7
sonoUnos-Mac:~ sonounoteam$
```

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.



```

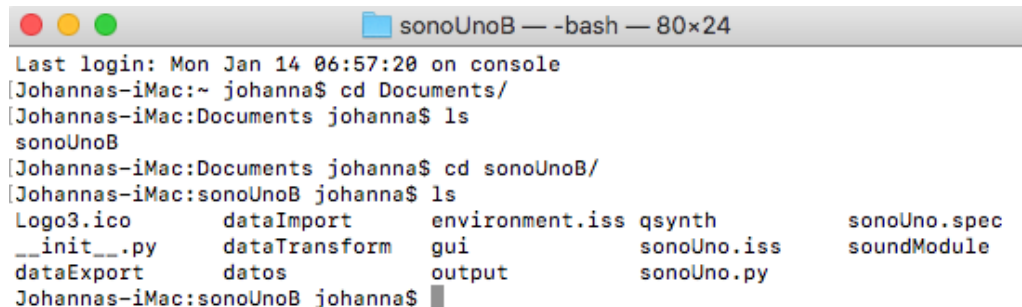
[sonoUnos-Mac:~ sonounoteam$ python2
Python 2.7.16 (v2.7.16:413a49145e, Mar  2 2019, 14:32:10)
[GCC 4.2.1 Compatible Apple LLVM 6.0 (clang-600.0.57)] on darwin
Type "help", "copyright", "credits" or "license" for more information.
[>>> from oct2py import octave
[>>> exit()
sonoUnos-Mac:~ sonounoteam$ ]
    
```

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

**NOTE:** 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.



```

Last login: Mon Jan 14 06:57:20 on console
[Johannas-iMac:~ johanna$ cd Documents/
[Johannas-iMac:Documents johanna$ ls
sonoUnoB
[Johannas-iMac:Documents johanna$ cd sonoUnoB/
[Johannas-iMac:sonoUnoB johanna$ ls
Logo3.ico      dataImport    environment.iss  qsynth        sonoUno.spec
__init__.py    dataTransform gui             sonoUno.iss   soundModule
dataExport     datos        output          sonoUno.py
Johannas-iMac:sonoUnoB johanna$ ]
    
```

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.

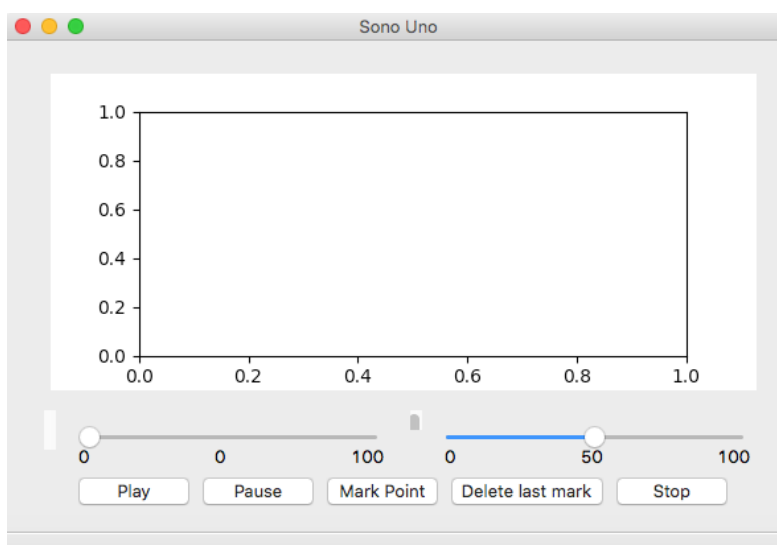


Image 35 - SonoUno main window on Mac.

## 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).

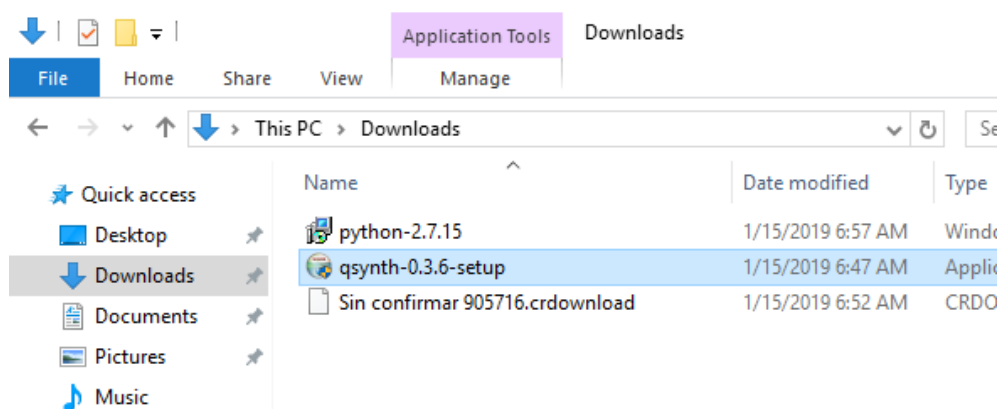


Image 36 - Download folder of the Windows 7 file system. Contain the qsynth installer.

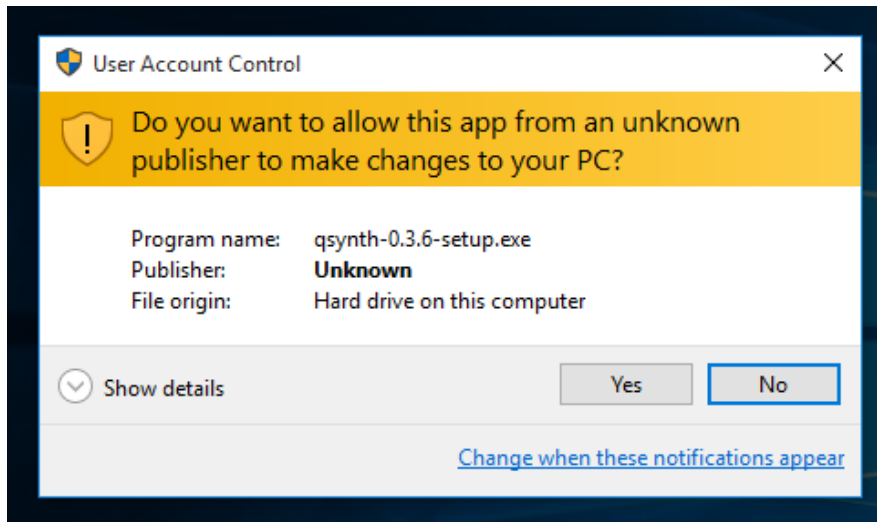


Image 37 - Qsynth installer asking for permission to install the software.

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.

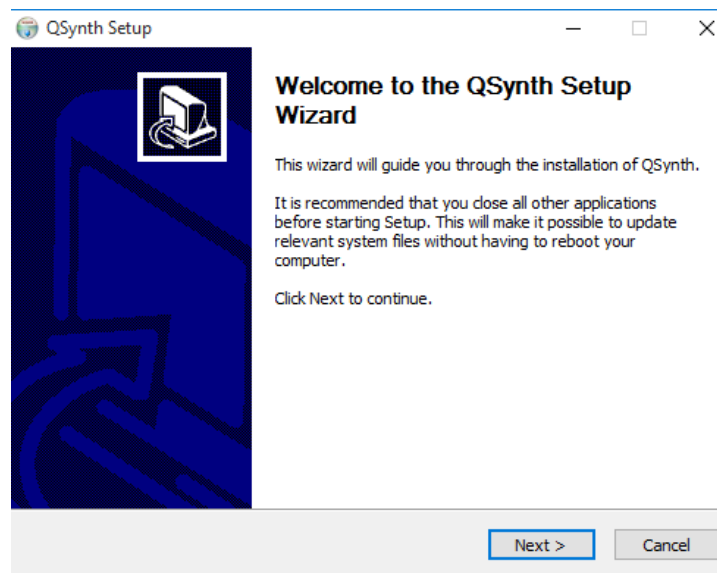


Image 38 - First window of the Qsynth installation wizard.

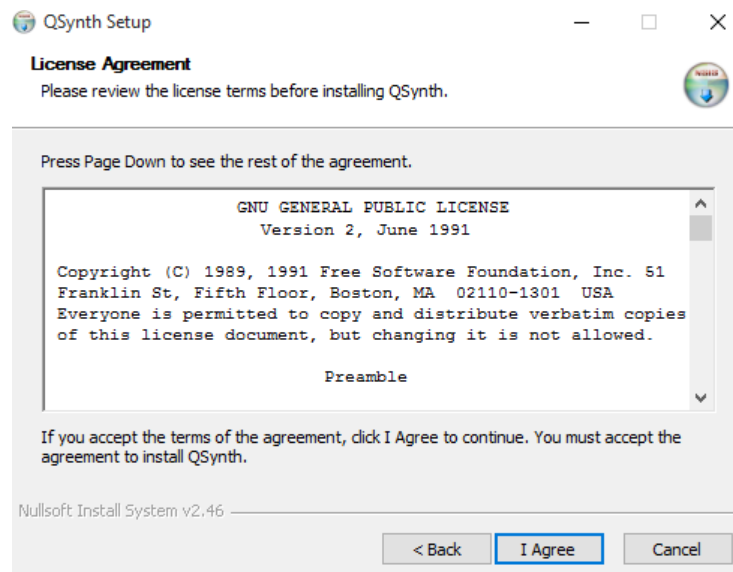


Image 39 - Text of the license agreement that must be accepted to continue with the installation.

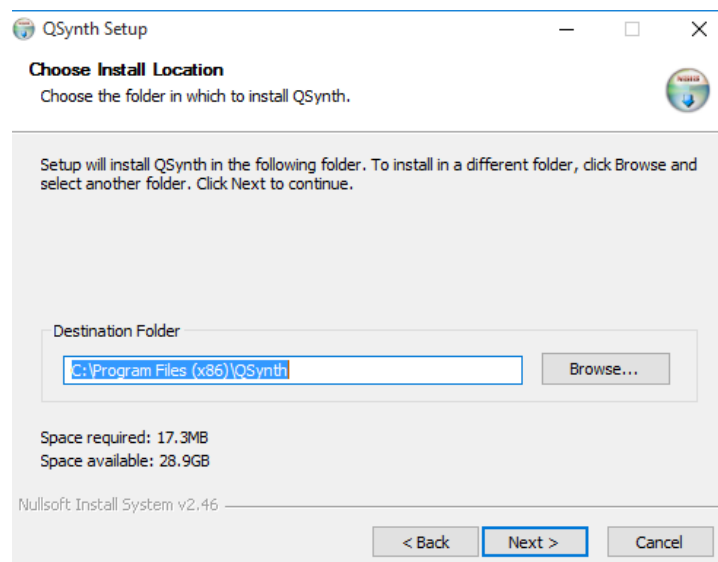


Image 40 - Window to select the destination folder of the installation, by default is C:\Program Files (x86)\QSynth.

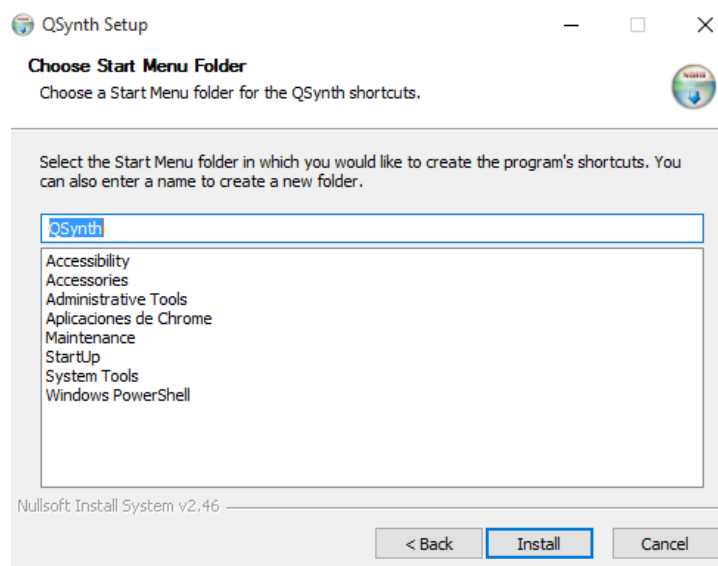


Image 41 - Window to choose the destination folder of the start menu.

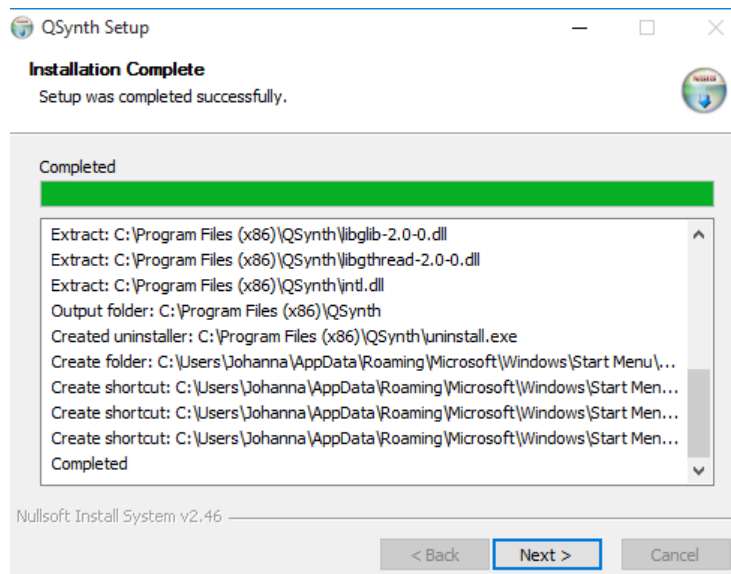


Image 42 - Installation process.

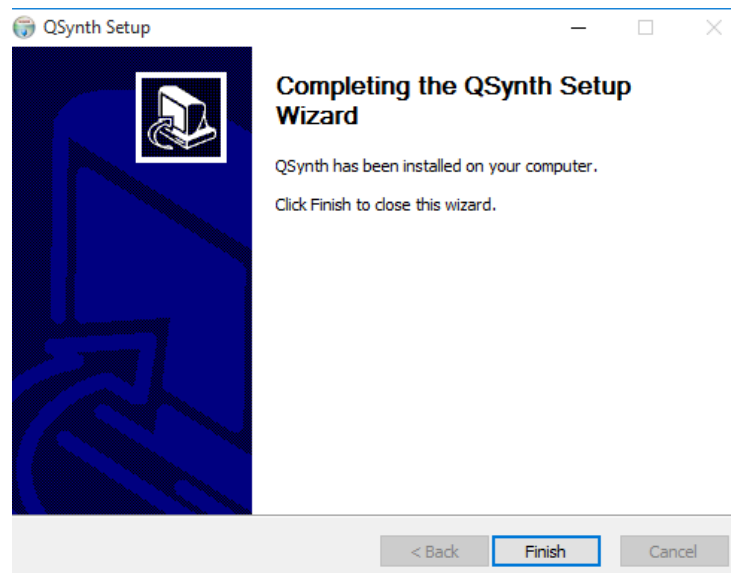


Image 43 - The last window of the Qsynth installation wizard.

#### 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.

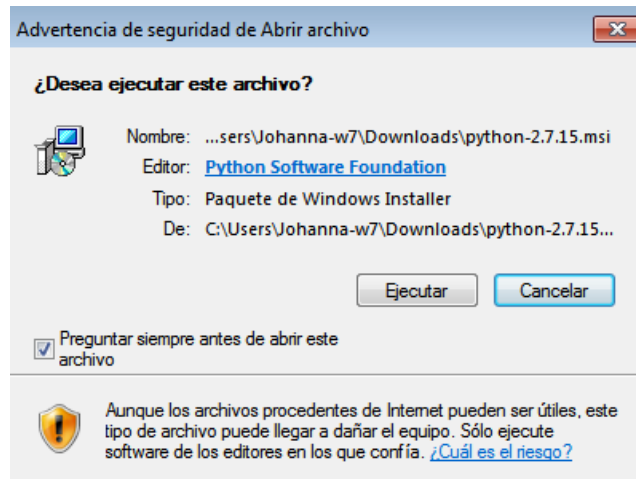


Image 44 - Pop-up window asking for permission to execute the installer of python on Windows.



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).



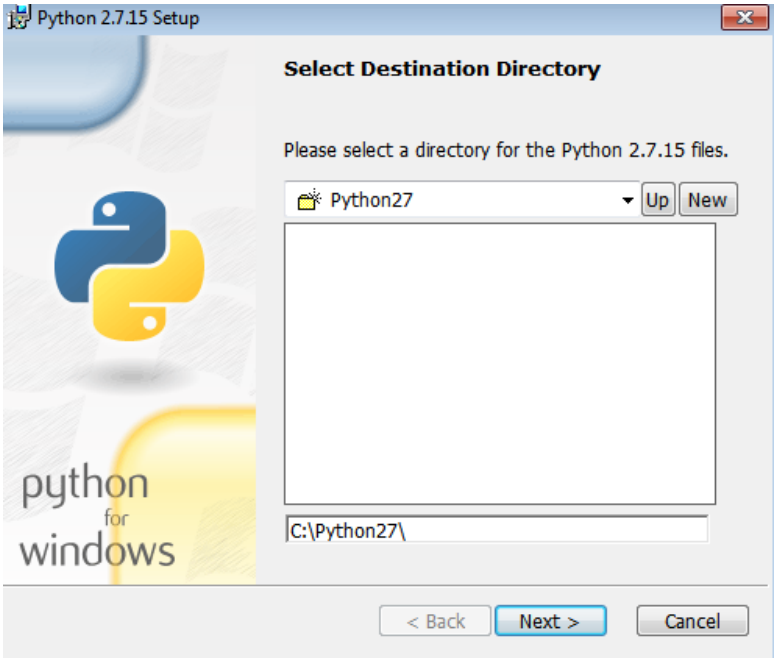


Image 46 - "Select destination directory" window, the "C:\Python27\" directory is set by default.



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

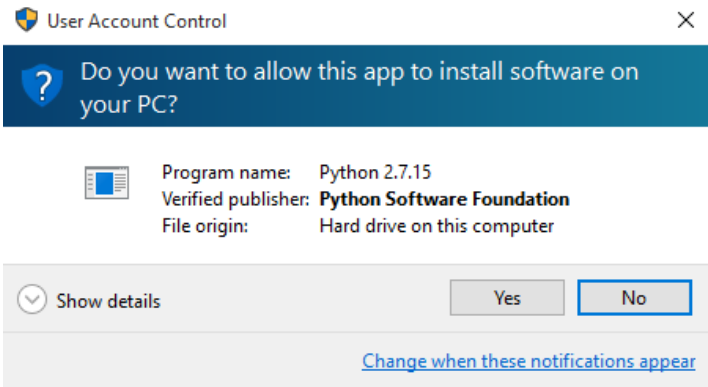


Image 48 - The installer ask for permission again.

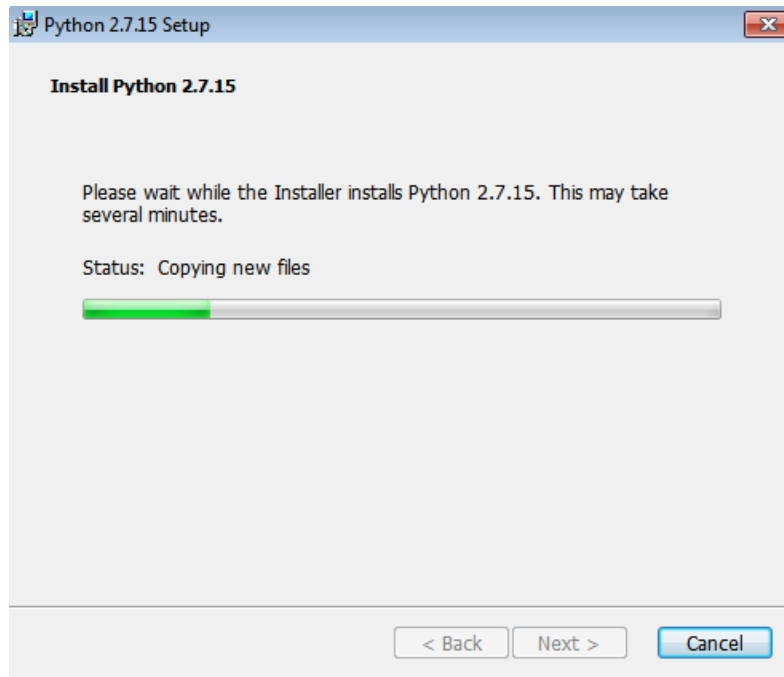


Image 49 - The next window is the installation process, with a status bar.



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.

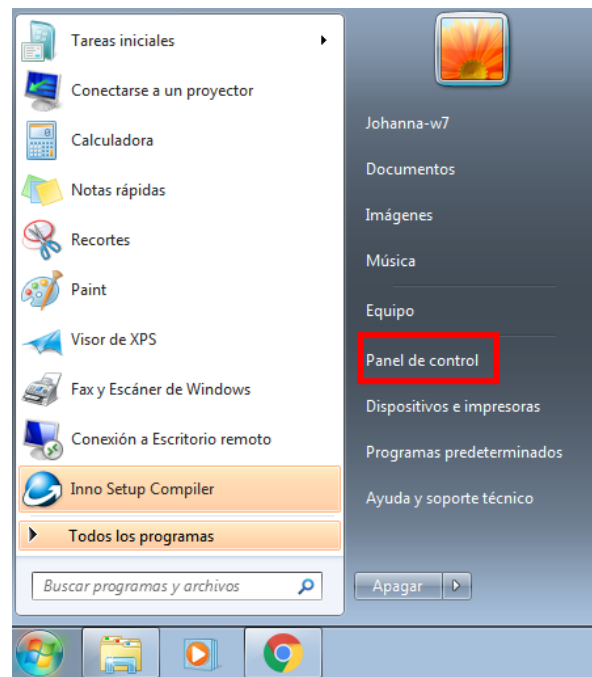


Image 51 - Selection of control panel on the start menu of Windows 7 system.

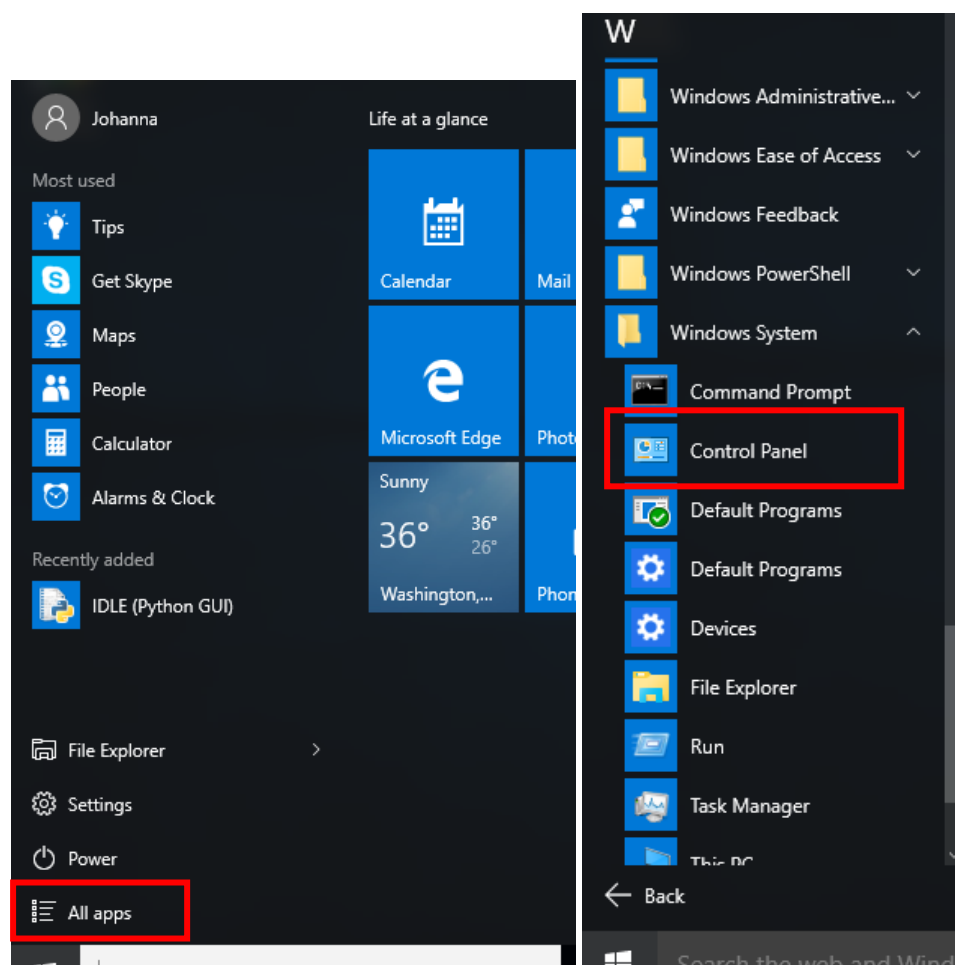


Image 52 - Selection of control panel on the start menu of Windows 10 system.

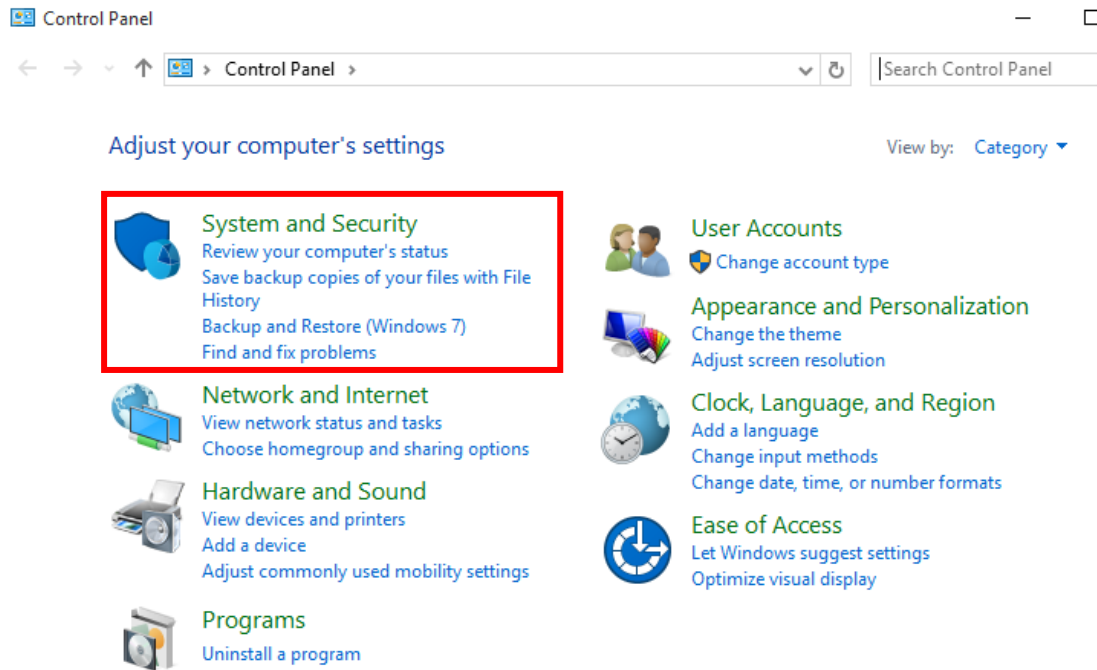


Image 53 – “System and security” section marked with a rectangle on the control panel.

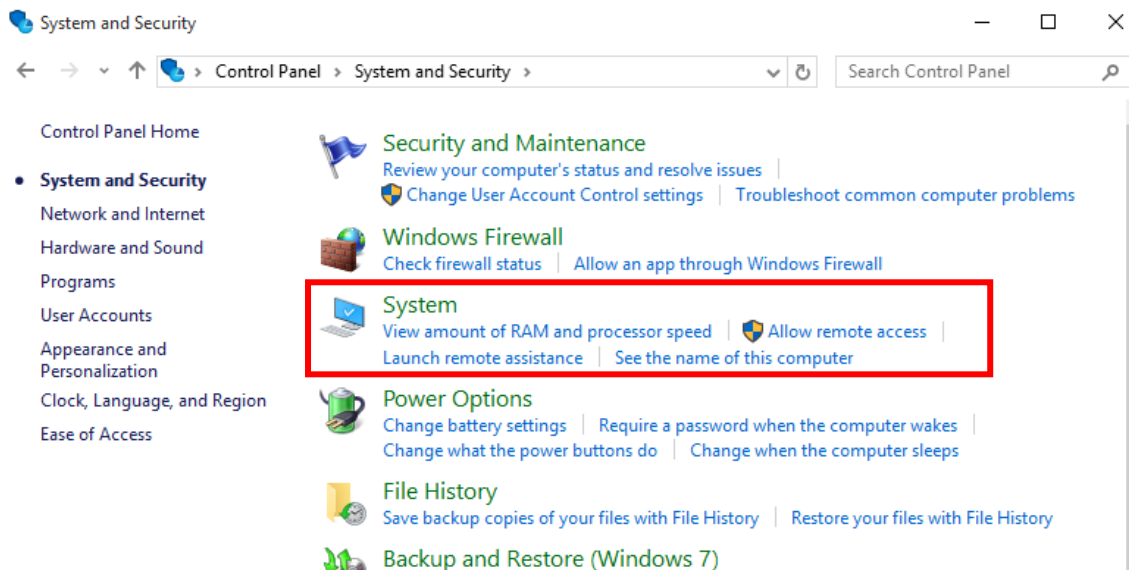


Image 54 - System section marked with a rectangle on “System and security”.

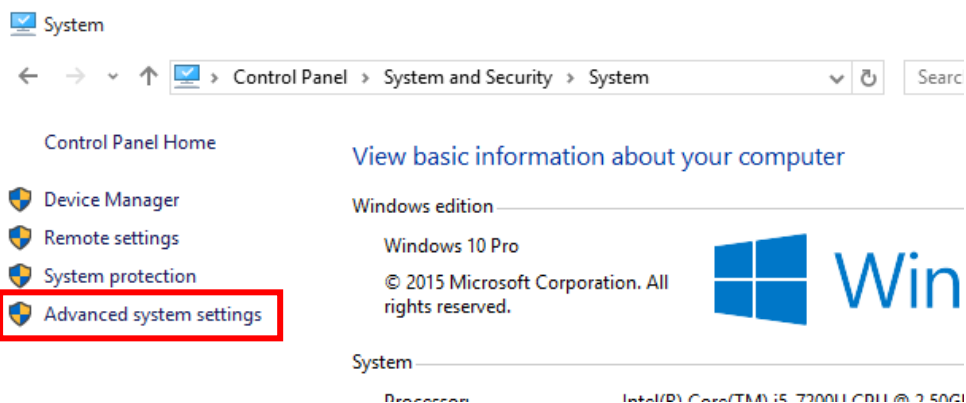


Image 55 - “Advanced system settings” section marked with a rectangle on “System”.

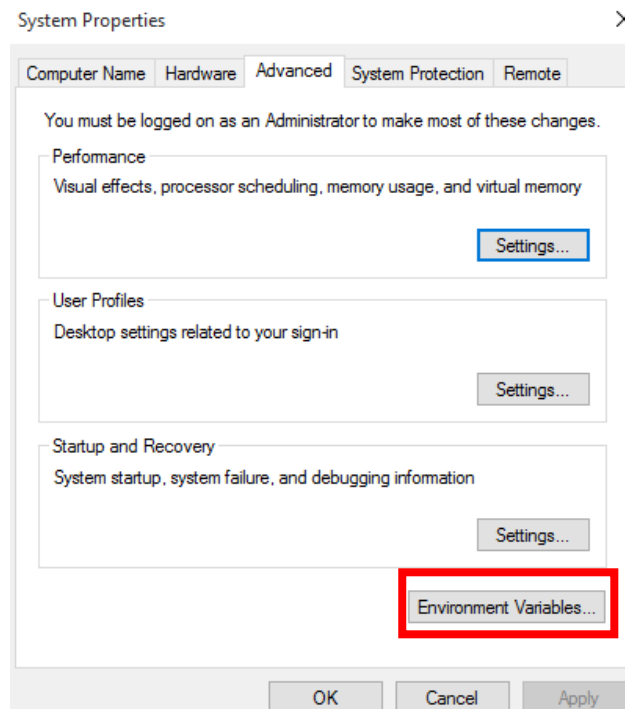


Image 56 - "Environment Variables" button marked with a rectangle on "System properties".

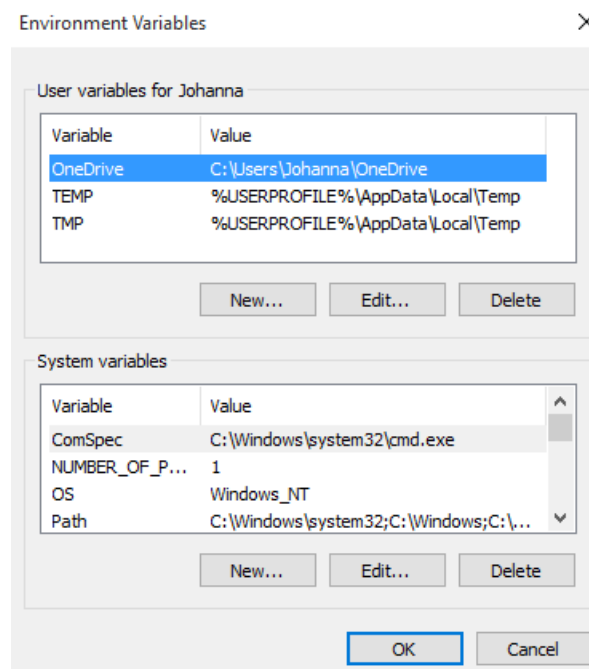


Image 57 - Environment variables window.

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.

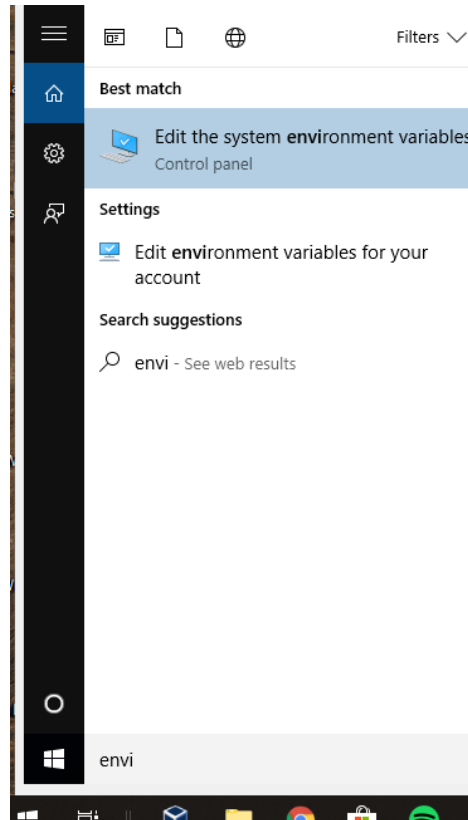


Image 58 - Search on start menu typing "Environment variable".

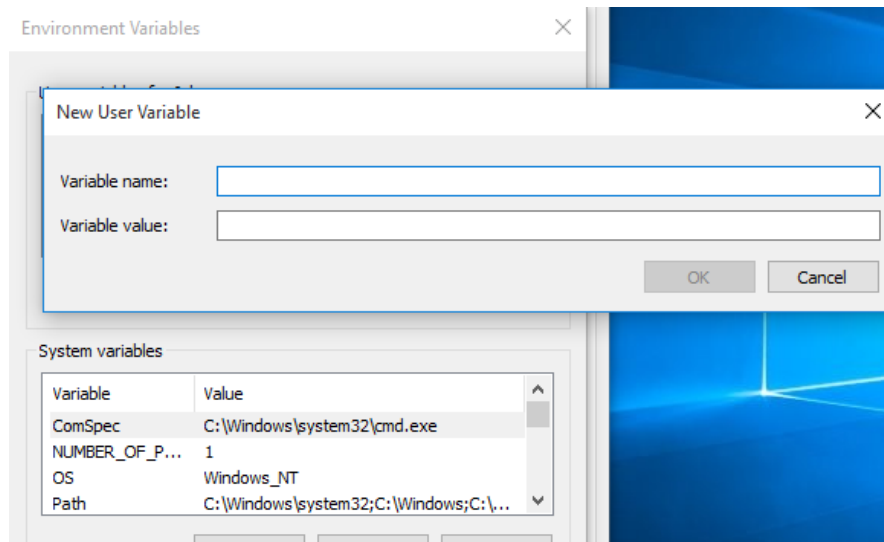


Image 59 - Press the new button on the user variables section of the environment variable window.

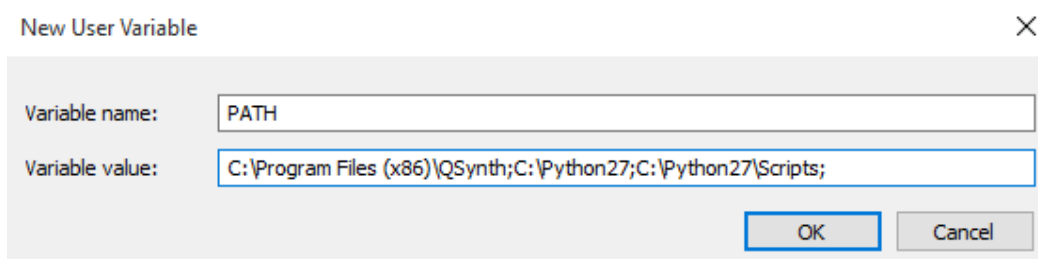


Image 60 - Select the name PATH and paste the directories on the value box.



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:

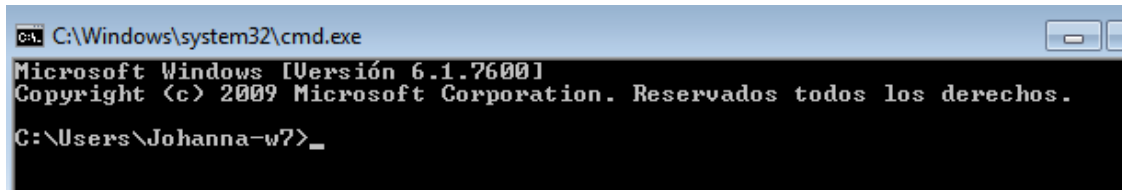


Image 61 - Command window on Windows operative system.

1. Install wxPython with the next command:

- a. `python -m pip install -U wxPython`

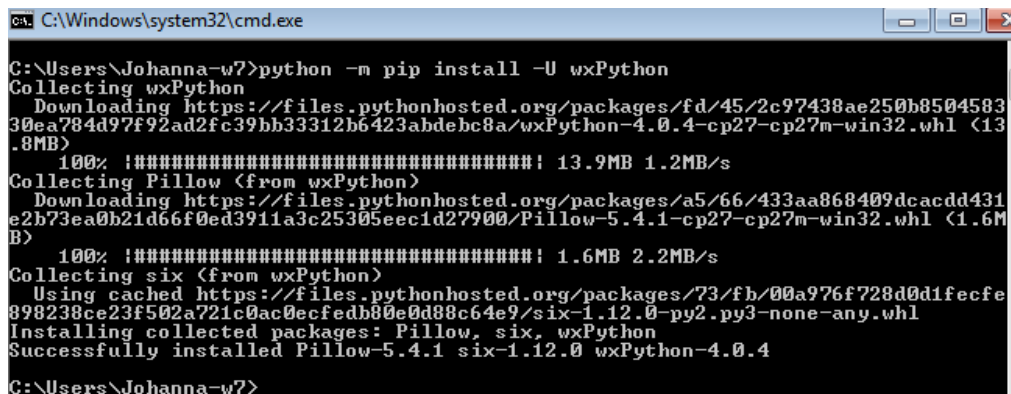


Image 62 - Installation of wxPython with the previous command.

**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`

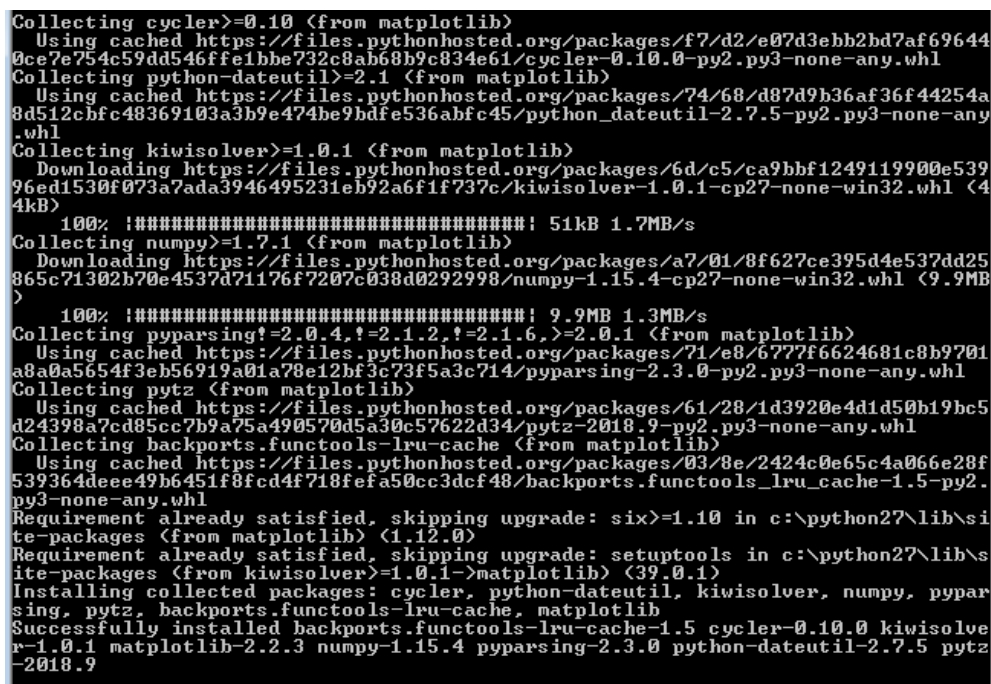
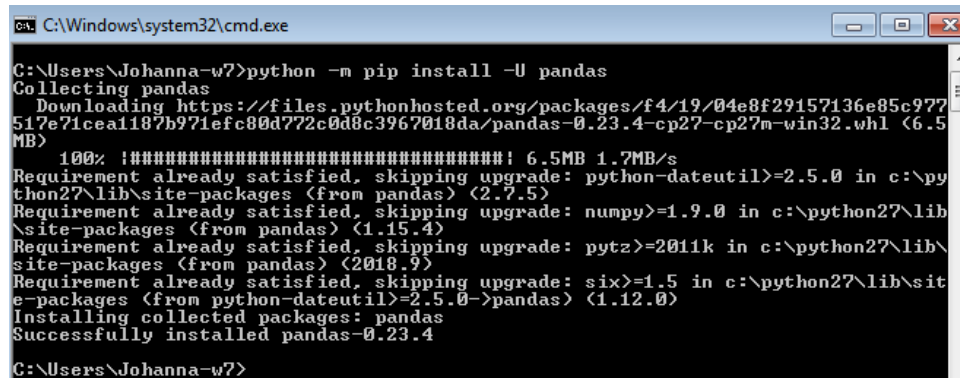


Image 63 – Part of the installation of matplotlib with the previous command.

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



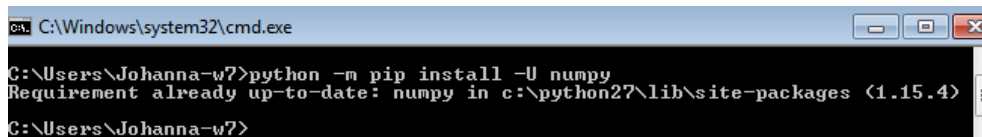
```
C:\Windows\system32\cmd.exe

C:\Users\Johanna-w7>python -m pip install -U pandas
Collecting pandas
  Downloading https://files.pythonhosted.org/packages/f4/19/04e8f29157136e85c977517e71cea1187b971efc80d772c0d8c3967018da/pandas-0.23.4-cp27-cp27m-win32.whl (6.5 MB)
    100% |#####| 6.5MB 1.7MB/s
Requirement already satisfied, skipping upgrade: python-dateutil>=2.5.0 in c:\python27\lib\site-packages (from pandas) (2.7.5)
Requirement already satisfied, skipping upgrade: numpy>=1.9.0 in c:\python27\lib\site-packages (from pandas) (1.15.4)
Requirement already satisfied, skipping upgrade: pytz>=2011k in c:\python27\lib\site-packages (from pandas) (2018.9)
Requirement already satisfied, skipping upgrade: six>=1.5 in c:\python27\lib\site-packages (from python-dateutil>=2.5.0->pandas) (1.12.0)
Installing collected packages: pandas
Successfully installed pandas-0.23.4

C:\Users\Johanna-w7>
```

Image 64 - Installation of pandas with the previous command.

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



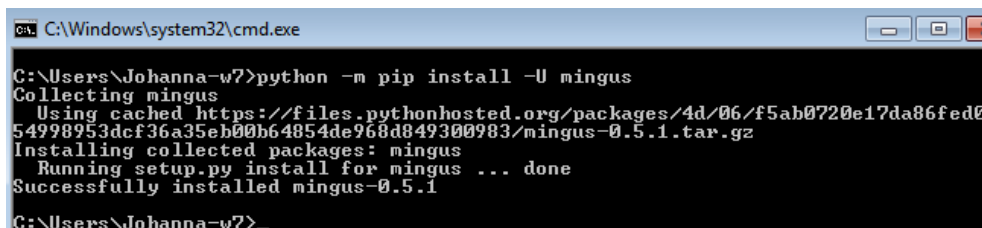
```
C:\Windows\system32\cmd.exe

C:\Users\Johanna-w7>python -m pip install -U numpy
Requirement already up-to-date: numpy in c:\python27\lib\site-packages (1.15.4)

C:\Users\Johanna-w7>
```

Image 65 - Installation of numpy with the previous command.

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



```
C:\Windows\system32\cmd.exe

C:\Users\Johanna-w7>python -m pip install -U mingus
Collecting mingus
  Using cached https://files.pythonhosted.org/packages/4d/06/f5ab0720e17da86fed054998953dcf36a35eb00b64854de968d849300983/mingus-0.5.1.tar.gz
Installing collected packages: mingus
  Running setup.py install for mingus ... done
Successfully installed mingus-0.5.1

C:\Users\Johanna-w7>
```

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).

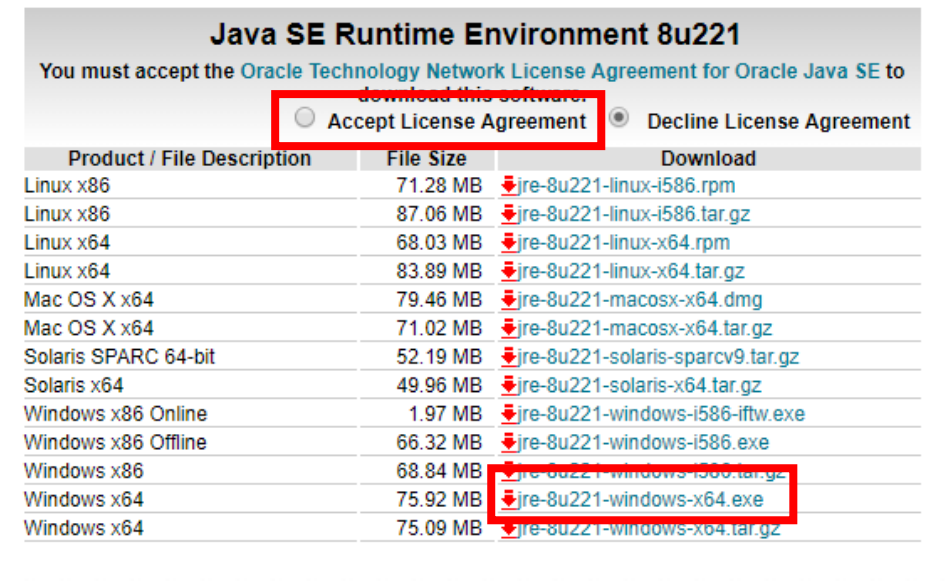


Image 67 - Part of the web page to download the Java SE Runtime Environment 8u221.

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

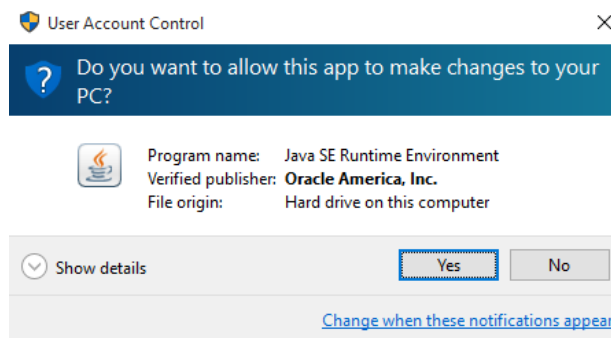


Image 68 - JRE installer asking for permission to install the software.

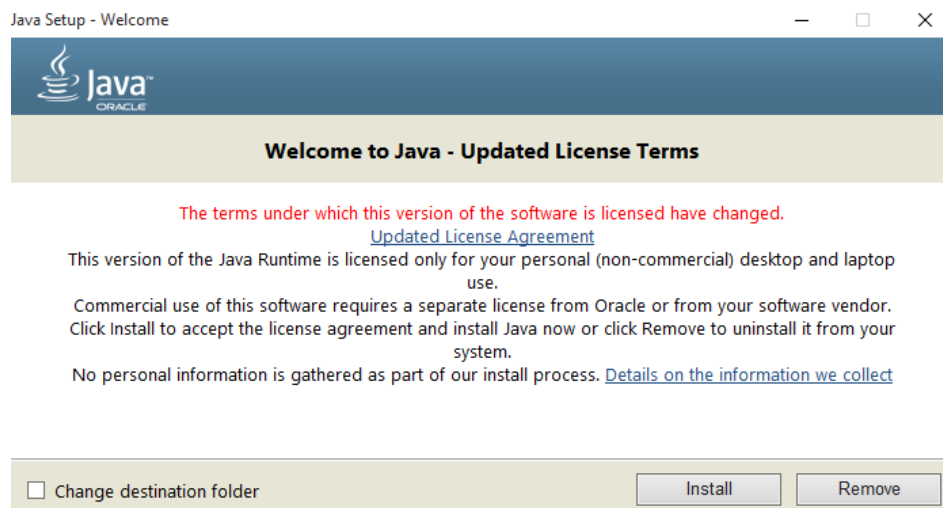


Image 69 - Shown the license terms of JRE, to continue with the installation press Install.



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

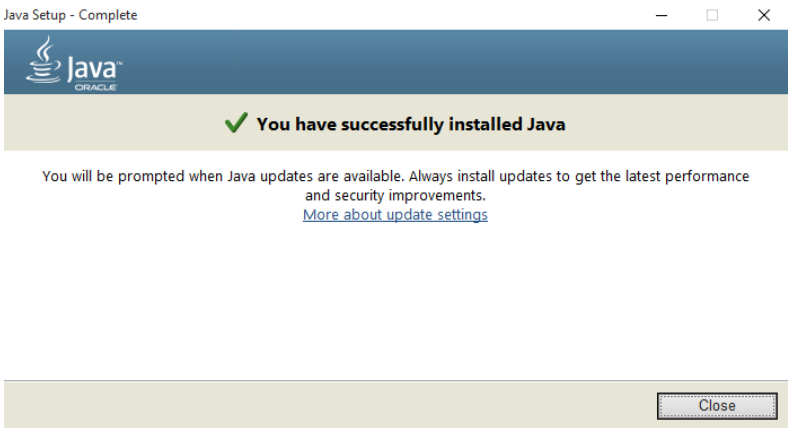


Image 71 - Shown the final windows of the installation process, to finish the installation press Close button.

- 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 <a href="#">Oracle Technology Network License Agreement for Oracle Java SE</a> to download this software.		
<input type="radio"/> Accept License Agreement <input checked="" type="radio"/> Decline License Agreement		
Product / File Description	File Size	Download
Linux ARM 32 Hard Float ABI	72.9 MB	<a href="#">jdk-8u221-linux-arm32-vfp-hflt.tar.gz</a>
Linux ARM 64 Hard Float ABI	69.81 MB	<a href="#">jdk-8u221-linux-arm64-vfp-hflt.tar.gz</a>
Linux x86	174.18 MB	<a href="#">jdk-8u221-linux-i586.rpm</a>
Linux x86	189.03 MB	<a href="#">jdk-8u221-linux-i586.tar.gz</a>
Linux x64	171.19 MB	<a href="#">jdk-8u221-linux-x64.rpm</a>
Linux x64	186.06 MB	<a href="#">jdk-8u221-linux-x64.tar.gz</a>
Mac OS X x64	252.52 MB	<a href="#">jdk-8u221-macosx-x64.dmg</a>
Solaris SPARC 64-bit (SVR4 package)	132.99 MB	<a href="#">jdk-8u221-solaris-sparcv9.tar.Z</a>
Solaris SPARC 64-bit	94.23 MB	<a href="#">jdk-8u221-solaris-sparcv9.tar.gz</a>
Solaris x64 (SVR4 package)	133.66 MB	<a href="#">jdk-8u221-solaris-x64.tar.Z</a>
Solaris x64	91.95 MB	<a href="#">jdk-8u221-solaris-x64.tar.gz</a>
Windows x86	202.73 MB	<a href="#">jdk-8u221-windows-i586.exe</a>
Windows x64	215.35 MB	<a href="#">jdk-8u221-windows-x64.exe</a>

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).

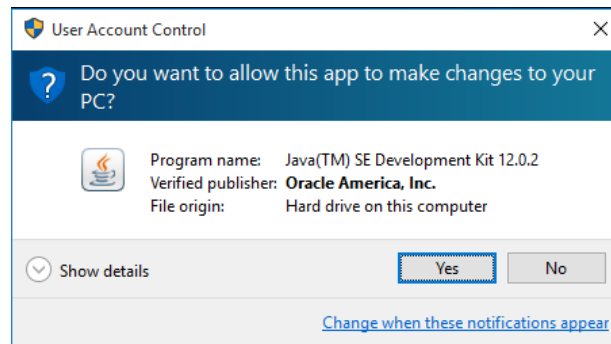


Image 73 - JDK installer asking for permission to install the software.

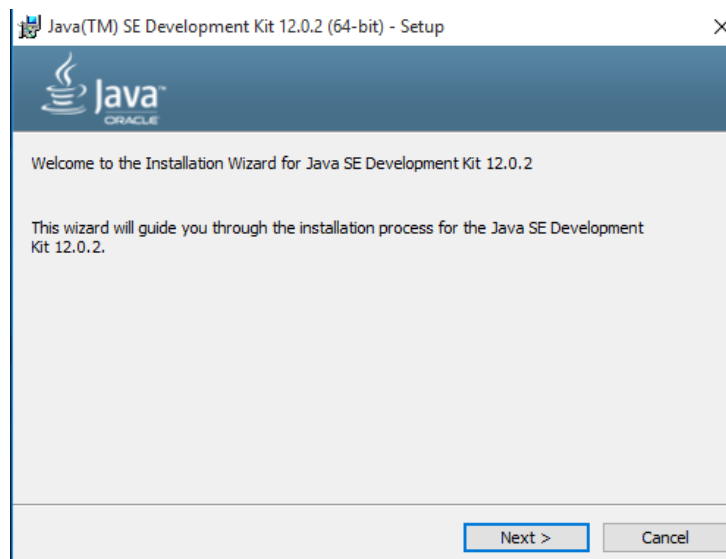


Image 74 - Shown the welcome windows, to continue press Next button.

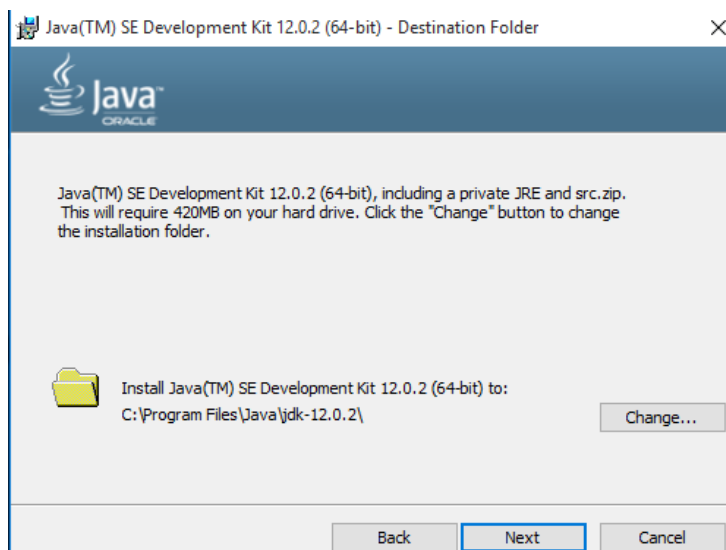


Image 75 - This window allows to change the destination folder of the JDK, to continue press Next button.

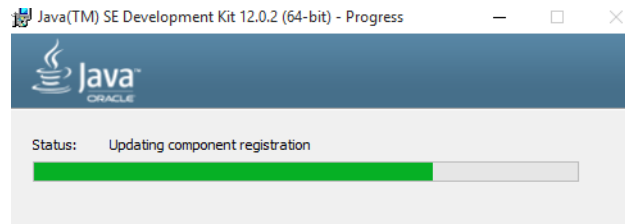


Image 76 - Shown a progress bar indicating the installation status.

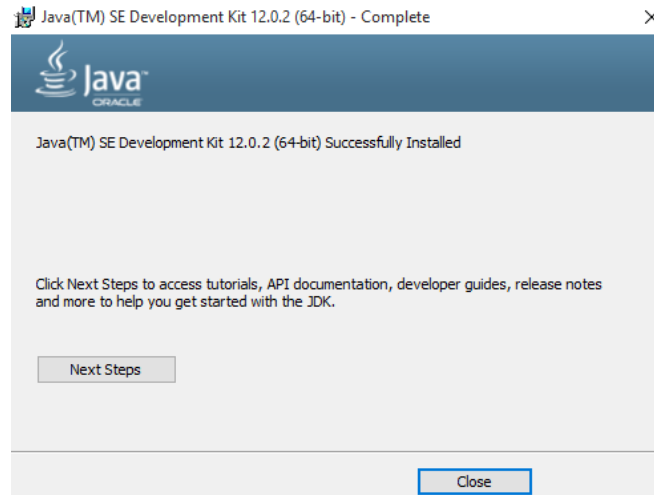


Image 77 - The final window indicate that the software is installed, to finish press Close button.

- 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).

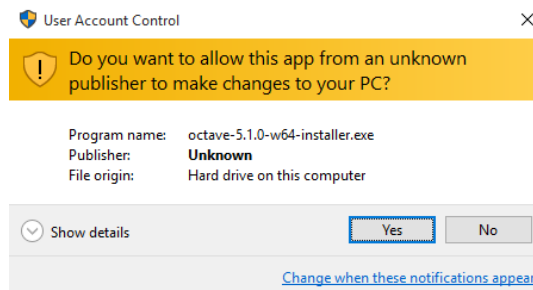


Image 78 - Octave installer asking for permission to install the software.

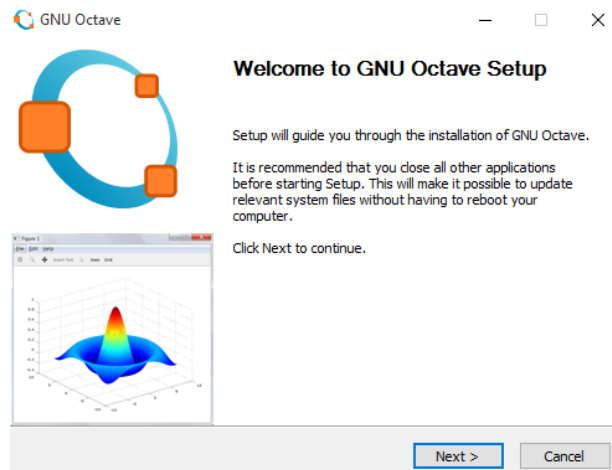


Image 79 - The first window shown a welcome message, to continue press Next button.



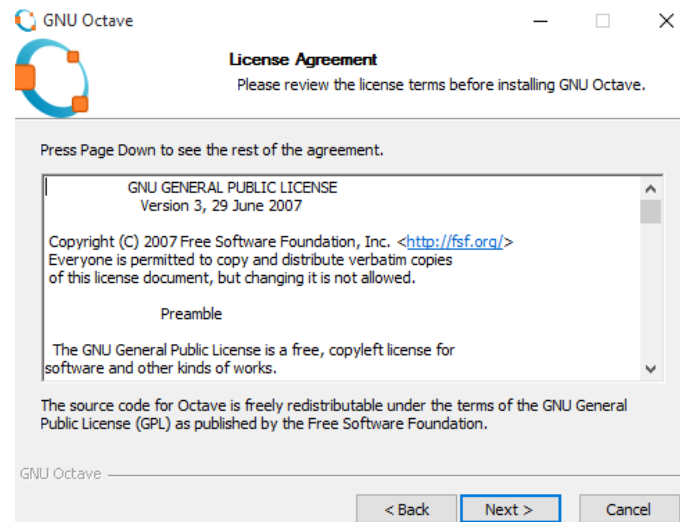


Image 80 - The second window shown the license agreement, to accept and continue press Next button.

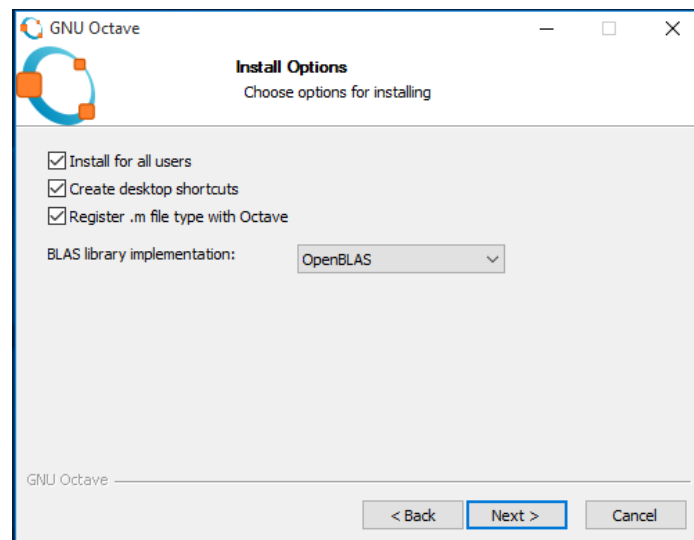


Image 81 - The third window shown some configurations checkbox, to continue press Next button.

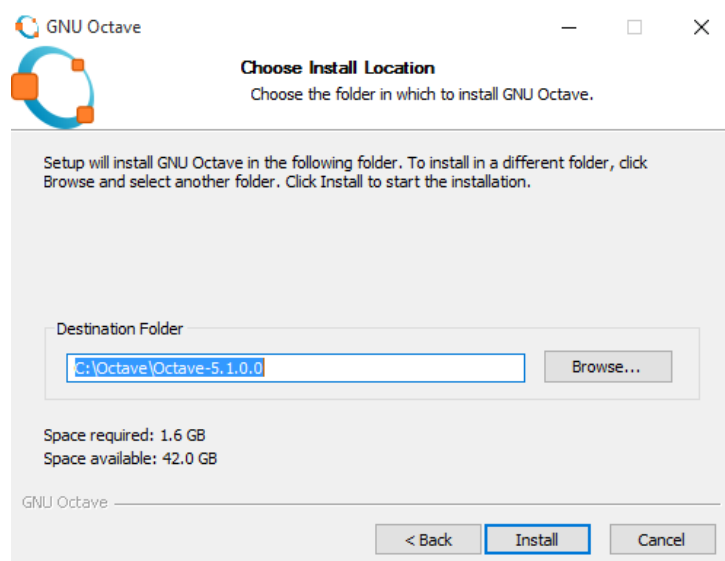


Image 82 - The fourth window allow to change the destination folder, to continue press Install button.

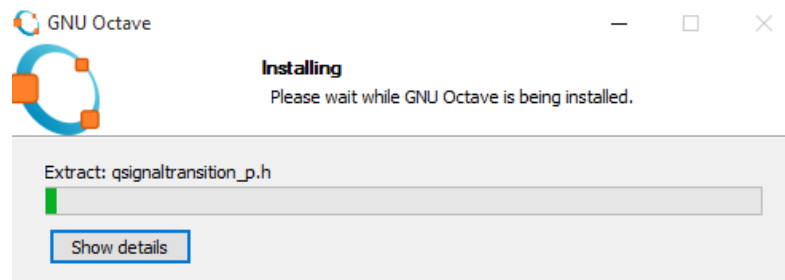


Image 83 - The next window shown a progress bar indicating the installation status.

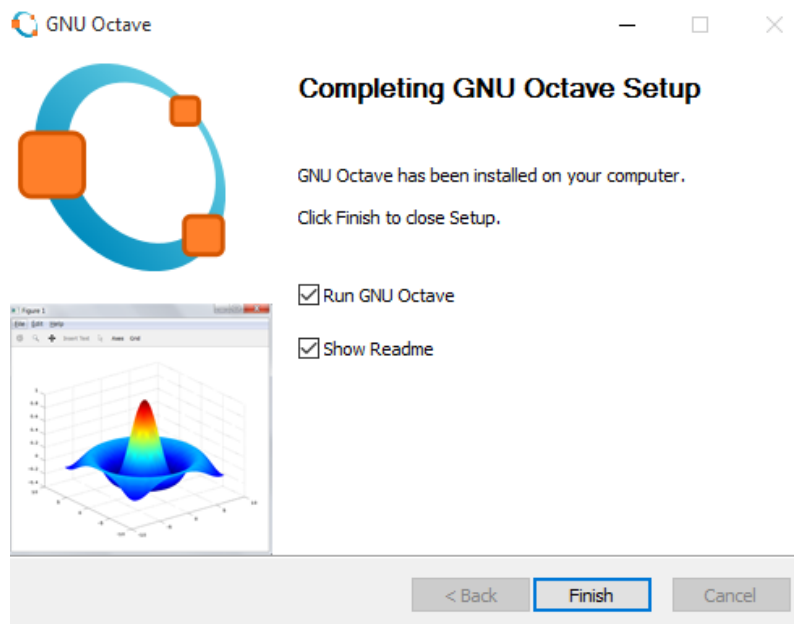


Image 84 - The final window indicate that the software is installed and shown two preselected checkboxes (run octave and show readme), to finish you can unselect the checkboxes item and press Finish button.

- 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;).

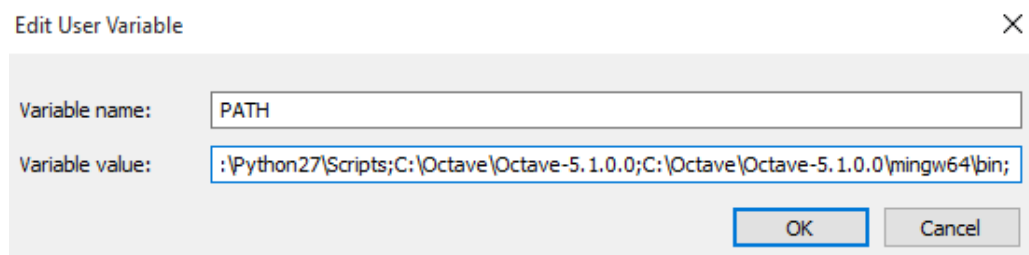
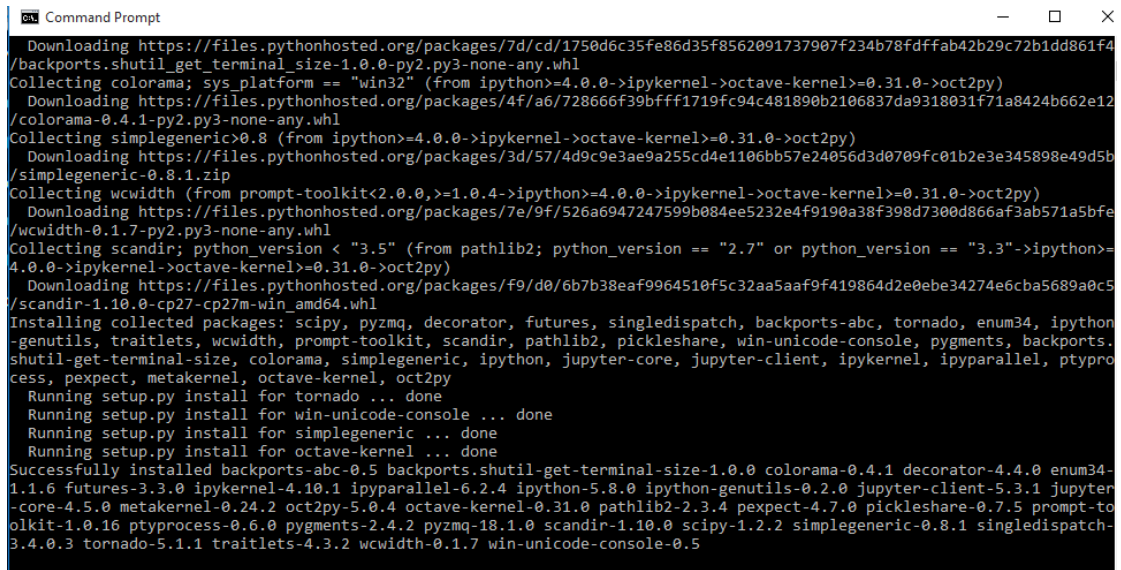


Image 85 - Shown the window to set the PATH variable. If you don't remember how access to this window see Image 51 to Image 59.

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



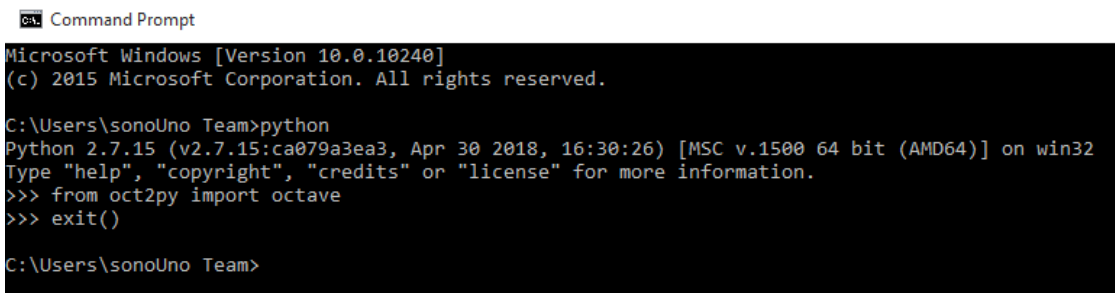
```

Command Prompt
Downloading https://files.pythonhosted.org/packages/7d/cd/1750d6c35fe86d35f8562091737907f234b78fdffab42b29c72b1dd861f4
/backports.shutil_get_terminal_size-1.0.0-py2.py3-none-any.whl
Collecting colorama; sys_platform == "win32" (from ipython>=4.0.0->ipykernel->octave-kernel>=0.31.0->oct2py)
Downloading https://files.pythonhosted.org/packages/4f/a6/728666f39bfff1719fc94c481890b2106837da9318031f1a8424b662e12
/colorama-0.4.1-py2.py3-none-any.whl
Collecting simplegeneric>=0.8 (from ipython>=4.0.0->ipykernel->octave-kernel>=0.31.0->oct2py)
Downloading https://files.pythonhosted.org/packages/3d/57/4d9c9e3ae9a255cd4e1106bb57e24056d3d0709fc01b2e3e345898e49d5b
/simplegeneric-0.8.1.zip
Collecting wcwidth (from prompt-toolkit<2.0.0,>=1.0.4->ipython>=4.0.0->ipykernel->octave-kernel>=0.31.0->oct2py)
Downloading https://files.pythonhosted.org/packages/7e/9f/526a6947247599b084ee5232e4f9190a38f398d7300d866af3ab571a5bfe
/wcwidth-0.1.7-py2.py3-none-any.whl
Collecting scandir; python_version < "3.5" (from pathlib2; python_version == "2.7" or python_version == "3.3"->ipython>=
4.0.0->ipykernel->octave-kernel>=0.31.0->oct2py)
Downloading https://files.pythonhosted.org/packages/f9/d0/6b7b38eaf9964510f5c32aa5aaf9f419864d2e0be34274e6c3a5689a0c5
/scandir-1.10.0-cp27-cp27m-win_amd64.whl
Installing collected packages: scipy, pyzmq, decorator, futures, singledispatch, backports-abc, tornado, enum34, ipython
-genutils, traitlets, wcwidth, prompt-toolkit, scandir, pathlib2, pickleshare, win-unicode-console, pygments, backports.
shutil-get-terminal-size, colorama, simplegeneric, ipython, jupyter-core, jupyter-client, ipykernel, ipyparallel, ptypro
cess, pexpect, metakernel, octave-kernel, oct2py
Running setup.py install for tornado ... done
Running setup.py install for win-unicode-console ... done
Running setup.py install for simplegeneric ... done
Running setup.py install for octave-kernel ... done
Successfully installed backports-abc-0.5 backports.shutil-get-terminal-size-1.0.0 colorama-0.4.1 decorator-4.4.0 enum34-
1.1.6 futures-3.3.0 ipykernel-4.10.1 ipyparallel-6.2.4 ipython-5.8.0 ipython-genutils-0.2.0 jupyter-client-5.3.1 jupyter
-core-4.5.0 metakernel-0.24.2 oct2py-5.0.4 octave-kernel-0.31.0 pathlib2-2.3.4 pexpect-4.7.0 pickleshare-0.7.5 prompt-to
olkit-1.0.16 ptyprocess-0.6.0 pygments-2.4.2 pyzmq-18.1.0 scandir-1.10.0 scipy-1.2.2 simplegeneric-0.8.1 singledispatch-
3.4.0.3 tornado-5.1.1 traitlets-4.3.2 wcwidth-0.1.7 win-unicode-console-0.5

```

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



```

Command Prompt
Microsoft Windows [Version 10.0.10240]
(c) 2015 Microsoft Corporation. All rights reserved.

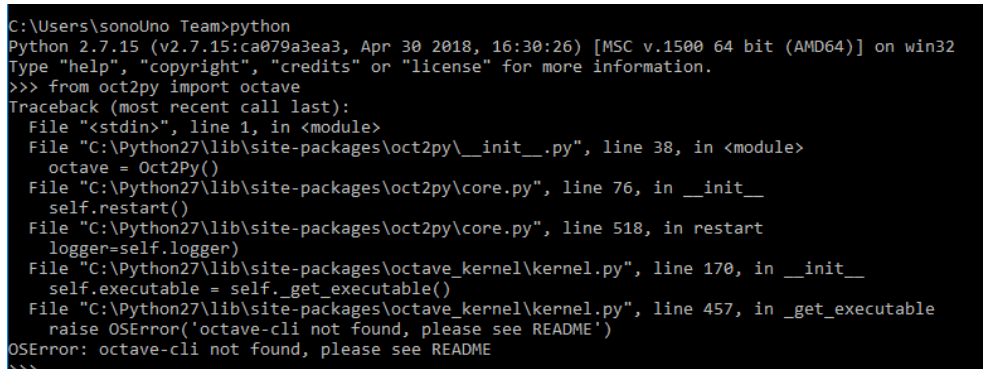
C:\Users\sonoUno Team>python
Python 2.7.15 (v2.7.15:ca079a3ea3, Apr 30 2018, 16:30:26) [MSC v.1500 64 bit (AMD64)] on win32
Type "help", "copyright", "credits" or "license" for more information.
>>> from oct2py import octave
>>> exit()

C:\Users\sonoUno Team>

```

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.



```

C:\Users\sonoUno Team>python
Python 2.7.15 (v2.7.15:ca079a3ea3, Apr 30 2018, 16:30:26) [MSC v.1500 64 bit (AMD64)] on win32
Type "help", "copyright", "credits" or "license" for more information.
>>> from oct2py import octave
Traceback (most recent call last):
  File "<stdin>", line 1, in <module>
  File "C:\Python27\lib\site-packages\oct2py\_init_.py", line 38, in <module>
    octave = Oct2Py()
  File "C:\Python27\lib\site-packages\oct2py\core.py", line 76, in __init__
    self.restart()
  File "C:\Python27\lib\site-packages\oct2py\core.py", line 518, in restart
    logger=self.logger)
  File "C:\Python27\lib\site-packages\octave_kernel\kernel.py", line 170, in __init__
    self.executable = self._get_executable()
  File "C:\Python27\lib\site-packages\octave_kernel\kernel.py", line 457, in _get_executable
    raise OSError('octave-cli not found, please see README')
OSError: octave-cli not found, please see README
>>>

```

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

**NOTE:** 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.

```
C:\Users\Johanna-w7>cd Documents
C:\Users\Johanna-w7\Documents>dir
El volumen de la unidad C no tiene etiqueta.
El número de serie del volumen es: 68D5-BC04

Directorio de C:\Users\Johanna-w7\Documents
10/01/2019  16:08    <DIR>        .
10/01/2019  16:08    <DIR>        ..
10/01/2019  15:58    <DIR>        sonoUnoB
               0 archivos             0 bytes
               3 dirs  19.114.565.632 bytes libres
C:\Users\Johanna-w7\Documents>
```

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.

```
C:\Windows\system32\cmd.exe
C:\Users\Johanna-w7\Documents>cd sonoUnoB
C:\Users\Johanna-w7\Documents\sonoUnoB>dir
El volumen de la unidad C no tiene etiqueta.
El número de serie del volumen es: 68D5-BC04

Directorio de C:\Users\Johanna-w7\Documents\sonoUnoB
10/01/2019  16:23    <DIR>        .
10/01/2019  16:23    <DIR>        ..
10/01/2019  14:42    <DIR>        dataExport
10/01/2019  14:46    <DIR>        dataImport
10/01/2019  14:47    <DIR>        dataTransform
10/01/2019  14:42    <DIR>        datos
10/01/2019  14:46    <DIR>        gui
02/12/2018  17:59             45.483 Logo3.ico
10/01/2019  14:44    <DIR>        output
10/01/2019  14:44    <DIR>        qsynth
09/01/2019  18:19             60.157 sonoUno.py
10/01/2019  14:34             1.126 sonoUno.spec
10/01/2019  14:47    <DIR>        soundModule
06/09/2018  14:35             27 __init__.py
               4 archivos             106.793 bytes
               10 dirs  19.063.734.272 bytes libres
C:\Users\Johanna-w7\Documents\sonoUnoB>
```

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.

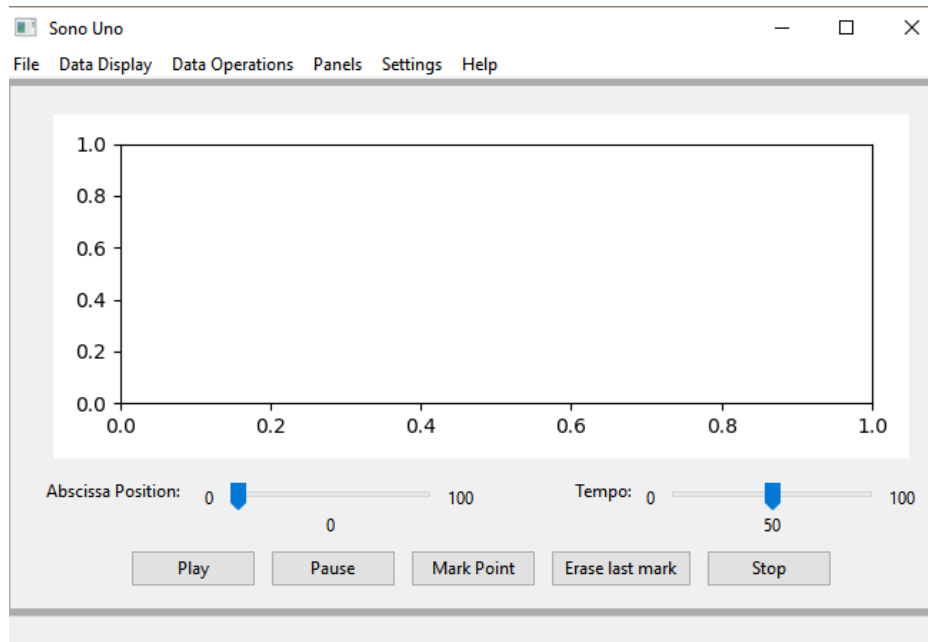


Image 91 - SonoUno main window on Windows.

### 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).

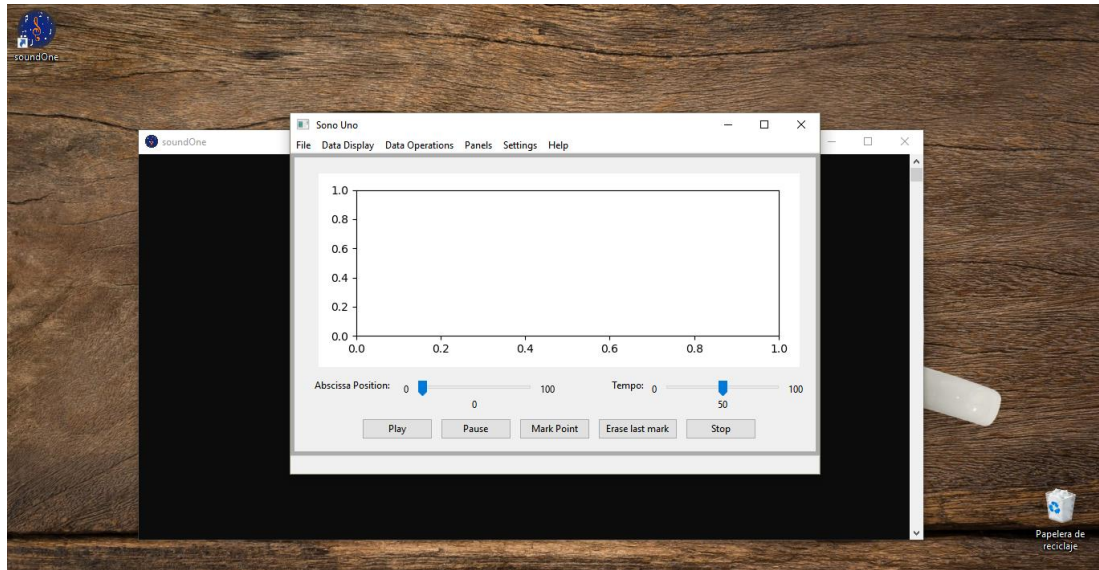


Image 93 - Errors command window and sonoUno main window.

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.

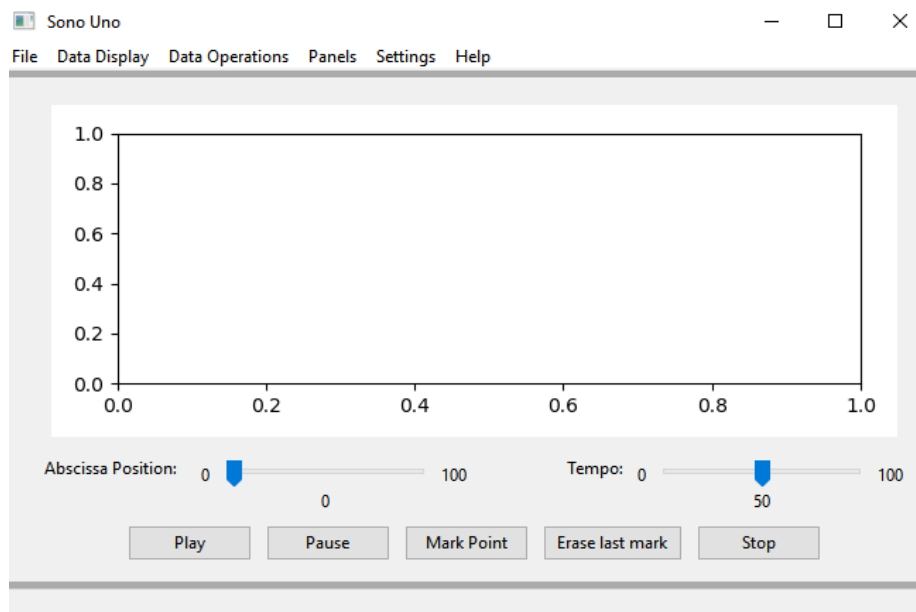


Image 94 - SonoUno initial window.

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).

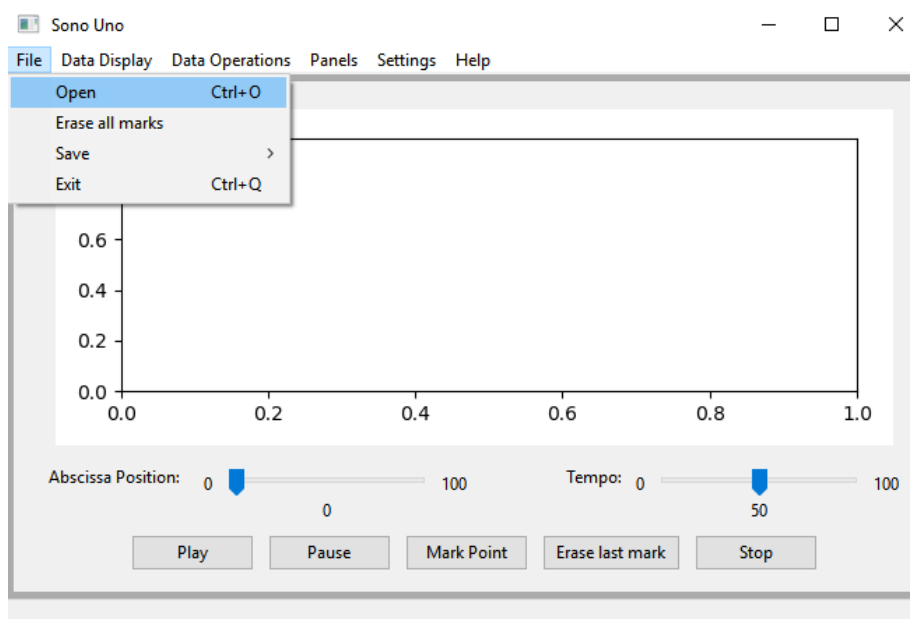


Image 95 - Open a file: choose the item Open on the menu File.

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).

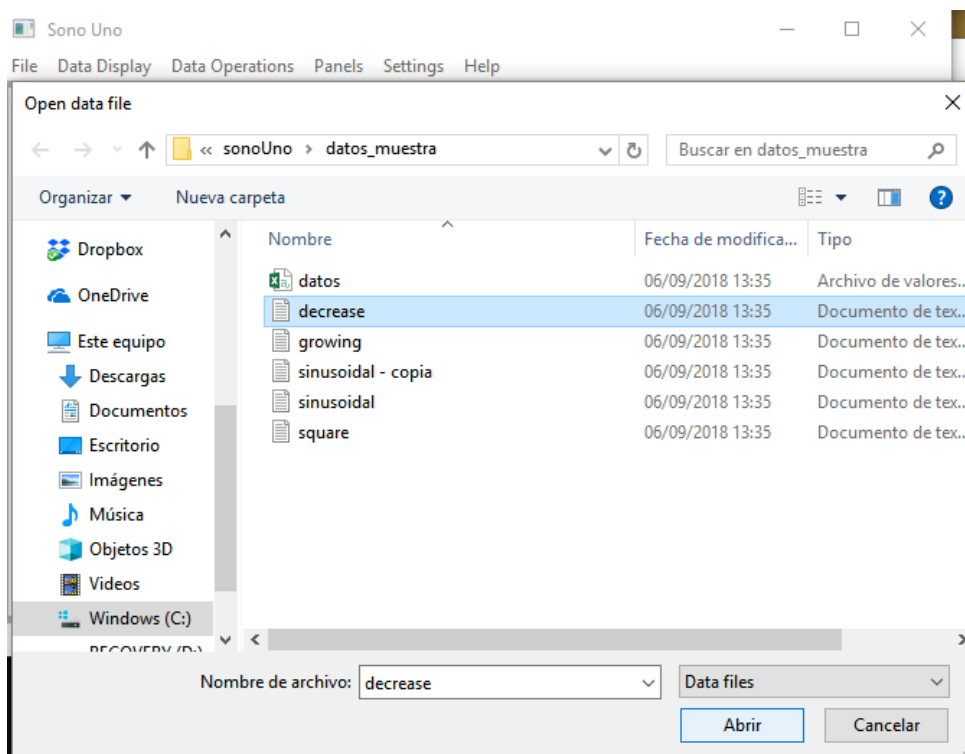


Image 96 - New window of the file system of the computer.

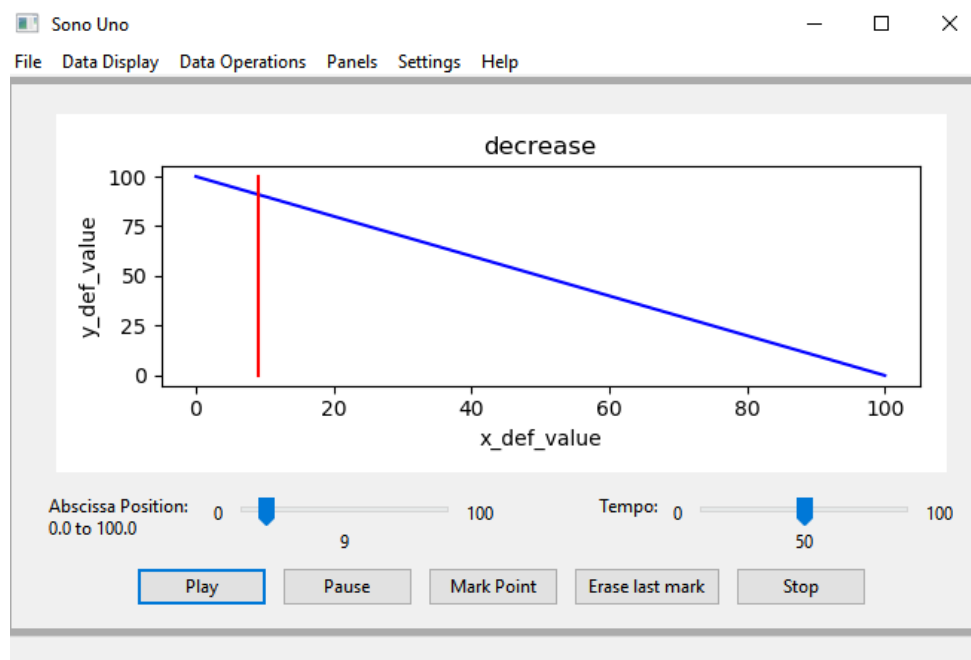


Image 97 - Reproduction of the data file after press the button Play.

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.