



# INSTALATION MANUAL

SonoUno: Sonification Software for astronomical data  
files presented in table format.

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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.

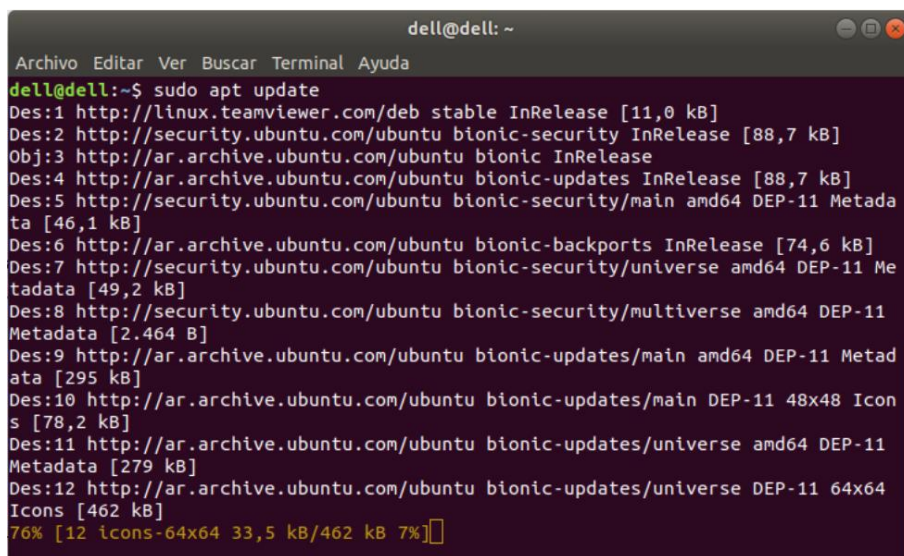
## 2. Software installation

### 2.1. Ubuntu

#### 2.1.1. Octave installation

The next steps describe the octave installation from terminal.

1. First, run the update command (Image 1 and Image 2):
  - a. `sudo apt update`



```
dell@dell: ~
Archivo  Editar  Ver  Buscar  Terminal  Ayuda
dell@dell:~$ sudo apt update
Des:1 http://linux.teamviewer.com/deb stable InRelease [11,0 kB]
Des:2 http://security.ubuntu.com/ubuntu bionic-security InRelease [88,7 kB]
Obj:3 http://ar.archive.ubuntu.com/ubuntu bionic InRelease
Des:4 http://ar.archive.ubuntu.com/ubuntu bionic-updates InRelease [88,7 kB]
Des:5 http://security.ubuntu.com/ubuntu bionic-security/main amd64 DEP-11 Metada
ta [46,1 kB]
Des:6 http://ar.archive.ubuntu.com/ubuntu bionic-backports InRelease [74,6 kB]
Des:7 http://security.ubuntu.com/ubuntu bionic-security/universe amd64 DEP-11 Me
tadata [49,2 kB]
Des:8 http://security.ubuntu.com/ubuntu bionic-security/multiverse amd64 DEP-11
Metadata [2.464 B]
Des:9 http://ar.archive.ubuntu.com/ubuntu bionic-updates/main amd64 DEP-11 Metad
ata [295 kB]
Des:10 http://ar.archive.ubuntu.com/ubuntu bionic-updates/main DEP-11 48x48 Icon
s [78,2 kB]
Des:11 http://ar.archive.ubuntu.com/ubuntu bionic-updates/universe amd64 DEP-11
Metadata [279 kB]
Des:12 http://ar.archive.ubuntu.com/ubuntu bionic-updates/universe DEP-11 64x64
Icons [462 kB]
76% [12 icons-64x64 33,5 kB/462 kB 7%]
```

Image 1 – Shows the result of previous command.

```
dell@dell: ~
Archivo Editar Ver Buscar Terminal Ayuda
ta [46,1 kB]
Des:6 http://ar.archive.ubuntu.com/ubuntu bionic-backports InRelease [74,6 kB]
Des:7 http://security.ubuntu.com/ubuntu bionic-security/universe amd64 DEP-11 Me
tadata [49,2 kB]
Des:8 http://security.ubuntu.com/ubuntu bionic-security/multiverse amd64 DEP-11
Metadata [2.464 B]
Des:9 http://ar.archive.ubuntu.com/ubuntu bionic-updates/main amd64 DEP-11 Metad
ata [295 kB]
Des:10 http://ar.archive.ubuntu.com/ubuntu bionic-updates/main DEP-11 48x48 Icon
s [78,2 kB]
Des:11 http://ar.archive.ubuntu.com/ubuntu bionic-updates/universe amd64 DEP-11
Metadata [279 kB]
Des:12 http://ar.archive.ubuntu.com/ubuntu bionic-updates/universe DEP-11 64x64
Icons [462 kB]
Des:13 http://ar.archive.ubuntu.com/ubuntu bionic-updates/multiverse amd64 DEP-1
1 Metadata [2.468 B]
Des:14 http://ar.archive.ubuntu.com/ubuntu bionic-backports/universe amd64 DEP-1
1 Metadata [7.972 B]
Descargados 1.485 kB en 4s (371 kB/s)
Leyendo lista de paquetes... Hecho
Creando árbol de dependencias
Leyendo la información de estado... Hecho
Se pueden actualizar 20 paquetes. Ejecute «apt list --upgradable» para verlos.
dell@dell:~$
```

Image 2 - Shown the last part of the sudo apt update command.

2. Now we can run the next command to install octave (Image 3, Image 4 and Image 5):
  - a. `sudo apt install octave`

```
dell@dell: ~
Archivo Editar Ver Buscar Terminal Ayuda
dell@dell:~$ sudo apt install octave
Leyendo lista de paquetes... Hecho
Creando árbol de dependencias
Leyendo la información de estado... Hecho
Los paquetes indicados a continuación se instalaron de forma automática y ya no
son necesarios.
  linux-headers-4.15.0-101 linux-headers-4.15.0-101-generic
  linux-image-4.15.0-101-generic linux-modules-4.15.0-101-generic
  linux-modules-extra-4.15.0-101-generic
Utilice «sudo apt autoremove» para eliminarlos.
Se instalarán los siguientes paquetes adicionales:
  epstool libaec0 libamd2 libarpack2 libblas3 libcamd2 libccolamd2 libcholmod3
  libcxspase3 libemf1 libfltk-gli.3 libfltk1.3 libgfortran4 libgl2ps1.4
  libglpk40 libgraphicsmagick++-q16-12 libgraphicsmagick-q16-3 libhdf5-100
  liblapack3 libmagick++-6.q16-7 libmetis5 liboctave4 libopenblas-base
  libosmesa6 libplot2c2 libportaudio2 libpstoedit0c2a libqhull7 libqrupdate1
  libqscintilla2-qt5-13 libqscintilla2-qt5-110n libqt5opengl5 libsz2
  libtext-unidecode-perl libumfpack5 libzip4 octave-common octave-doc pstoedit
  tex-common texinfo
Paquetes sugeridos:
  libiodbc2-dev default-libmysqlclient-dev graphicsmagick-dbg
  libqscintilla2-doc liboctave-dev xfig | ivtools-bin | tgif | transfig
  texlive-base texlive-latex-base texlive-generic-recommended
  texinfo-doc-nonfree texlive-fonts-recommended
```

Image 3 - Shown the first part of the octave installation.

```
dell@dell: ~
Archivo Editar Ver Buscar Terminal Ayuda
libglpk40 libgraphicsmagick++-q16-12 libgraphicsmagick-q16-3 libhdf5-100
liblapack3 libmagick++-6.q16-7 libmetis5 liboctave4 libopenblas-base
libosmesa6 libplot2c2 libportaudio2 libpstoedit0c2a libqhull7 libqrupdate1
libqscintilla2-qt5-13 libqscintilla2-qt5-10n libqt5opengl5 libsz2
libtext-unidecode-perl libumfpack5 libzip4 octave-common octave-doc pstoedit
tex-common texinfo
Paquetes sugeridos:
libiodbc2-dev default-libmysqlclient-dev graphicsmagick-dbg
libqscintilla2-doc liboctave-dev xfig | ivtools-bin | tgif | transfig
texlive-base texlive-latex-base texlive-generic-recommended
texinfo-doc-nonfree texlive-fonts-recommended
Se instalarán los siguientes paquetes NUEVOS:
epstool libaec0 libamd2 libarpack2 libblas3 libcamd2 libccolamd2 libcholmod3
libcxspase3 libemf1 libfltk-gli.3 libfltk1.3 libgfortran4 libgl2ps1.4
libglpk40 libgraphicsmagick++-q16-12 libgraphicsmagick-q16-3 libhdf5-100
liblapack3 libmagick++-6.q16-7 libmetis5 liboctave4 libopenblas-base
libosmesa6 libplot2c2 libportaudio2 libpstoedit0c2a libqhull7 libqrupdate1
libqscintilla2-qt5-13 libqscintilla2-qt5-10n libqt5opengl5 libsz2
libtext-unidecode-perl libumfpack5 libzip4 octave octave-common octave-doc
pstoedit tex-common texinfo
0 actualizados, 42 nuevos se instalarán, 0 para eliminar y 0 no actualizados.
Se necesita descargar 33,8 MB de archivos.
Se utilizarán 164 MB de espacio de disco adicional después de esta operación.
¿Desea continuar? [S/n]
```

Image 4 - Shown the part when the octave installation ask if the user want to continue, after shown all the packages to install.

```
dell@dell: ~
Archivo Editar Ver Buscar Terminal Ayuda
Configurando libgraphicsmagick++-q16-12 (1.3.28-2ubuntu0.1) ...
Configurando libhdf5-100:amd64 (1.10.0-patch1+docs-4) ...
Configurando libglpk40:amd64 (4.65-1) ...
Configurando libfltk-gli.3:amd64 (1.3.4-6) ...
Configurando liblapack3:amd64 (3.7.1-4ubuntu1) ...
Configurando libqscintilla2-qt5-13 (2.10.2+dfsg-4) ...
Configurando libcholmod3:amd64 (1:5.1.2-2) ...
Configurando libqrupdate1:amd64 (1.1.2-2build1) ...
Configurando libpstoedit0c2a (3.70-5) ...
Configurando libarpack2:amd64 (3.5.0+real-2) ...
Configurando libumfpack5:amd64 (1:5.1.2-2) ...
Configurando pstoedit (3.70-5) ...
Configurando liboctave4:amd64 (4.2.2-1ubuntu1) ...
Configurando octave (4.2.2-1ubuntu1) ...
Procesando disparadores para desktop-file-utils (0.23-1ubuntu3.18.04.2) ...
Procesando disparadores para install-info (6.5.0.dfsg.1-2) ...
Procesando disparadores para libc-bin (2.27-3ubuntu1) ...
Procesando disparadores para man-db (2.8.3-2ubuntu0.1) ...
Procesando disparadores para gnome-menus (3.13.3-11ubuntu1.1) ...
Procesando disparadores para hicolor-icon-theme (0.17-2) ...
Procesando disparadores para mime-support (3.60ubuntu1) ...
dell@dell:~$
```

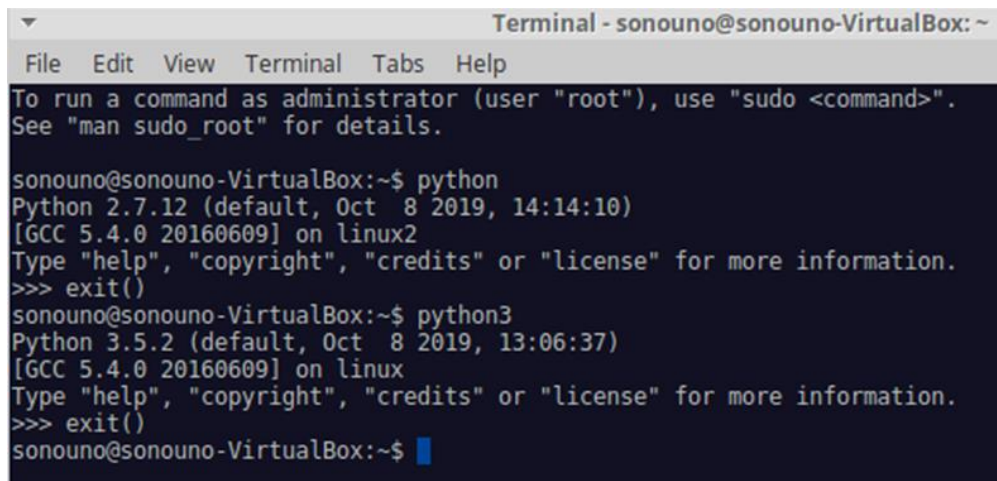
Image 5 - Shown the last part of the octave installation.

## 2.1.2. Python installation

If you installed previously the soft with python 3 at your computer, do not take into account this section. If not, the next steps contain the python installation.

3. Go to the terminal and execute 'python' command:



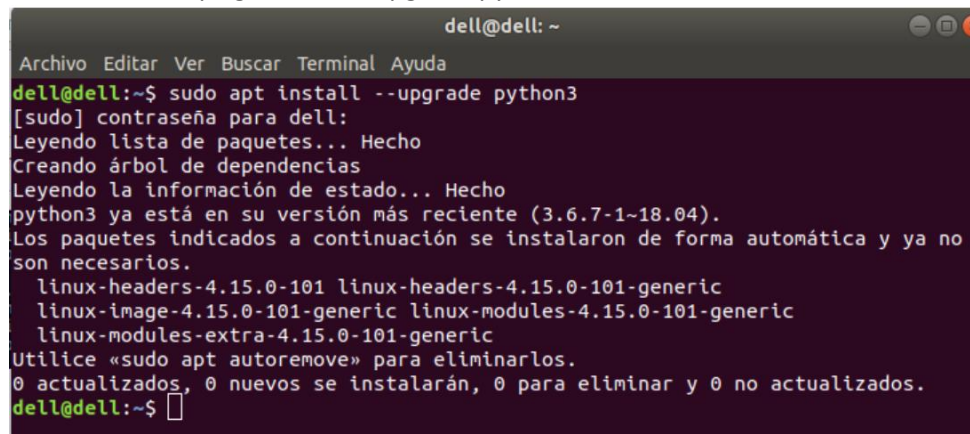
A terminal window titled 'Terminal - sonouno@sonouno-VirtualBox: ~'. It shows the command 'python' being executed, which outputs 'Python 2.7.12 (default, Oct 8 2019, 14:14:10) [GCC 5.4.0 20160609] on linux2'. Then 'python3' is executed, outputting 'Python 3.5.2 (default, Oct 8 2019, 13:06:37) [GCC 5.4.0 20160609] on linux'. Both sessions end with 'exit()'.

```
Terminal - sonouno@sonouno-VirtualBox: ~
File Edit View Terminal Tabs Help
To run a command as administrator (user "root"), use "sudo <command>".
See "man sudo_root" for details.

sonouno@sonouno-VirtualBox:~$ python
Python 2.7.12 (default, Oct 8 2019, 14:14:10)
[GCC 5.4.0 20160609] on linux2
Type "help", "copyright", "credits" or "license" for more information.
>>> exit()
sonouno@sonouno-VirtualBox:~$ python3
Python 3.5.2 (default, Oct 8 2019, 13:06:37)
[GCC 5.4.0 20160609] on linux
Type "help", "copyright", "credits" or "license" for more information.
>>> exit()
sonouno@sonouno-VirtualBox:~$
```

Image 6 - Checking the installed version of Python in your computer.

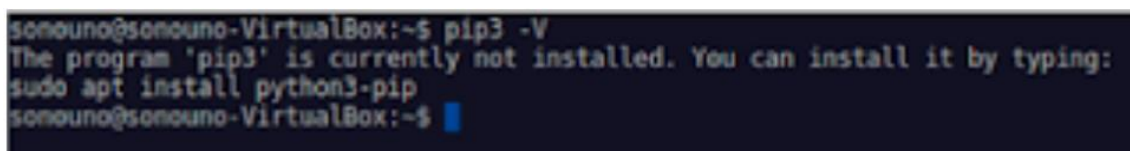
4. If the version is 2.x.x, type exit() and check with 'python3'. If the version here is 3.x.x (see Image 6) we can continue with the following steps, if not, you must install or update python 3 in the operating system using the command:
  - a. `sudo apt-get install --upgrade python3`

A terminal window titled 'dell@dell: ~'. It shows the command 'sudo apt install --upgrade python3'. The output indicates that python3 is already at the latest version (3.6.7-1~18.04) and no packages need to be installed.

```
dell@dell: ~
Archivo Editar Ver Buscar Terminal Ayuda
dell@dell:~$ sudo apt install --upgrade python3
[sudo] contraseña para dell:
Leyendo lista de paquetes... Hecho
Creando árbol de dependencias
Leyendo la información de estado... Hecho
python3 ya está en su versión más reciente (3.6.7-1~18.04).
Los paquetes indicados a continuación se instalaron de forma automática y ya no
son necesarios.
  linux-headers-4.15.0-101 linux-headers-4.15.0-101-generic
  linux-image-4.15.0-101-generic linux-modules-4.15.0-101-generic
  linux-modules-extra-4.15.0-101-generic
Utilice «sudo apt autoremove» para eliminarlos.
0 actualizados, 0 nuevos se instalarán, 0 para eliminar y 0 no actualizados.
dell@dell:~$
```

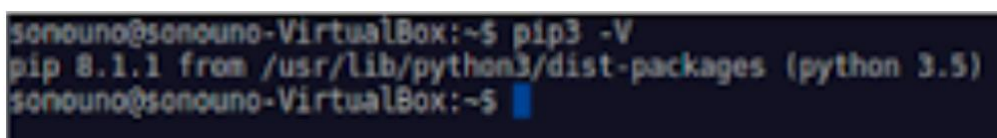
Image 7 - Shown the result of the command 'sudo apt-get install --upgrade python3'.

5. Once that we checked that we have python 3 installed (is called python3 in this instructive), check if you have 'pip' installed:
  - a. `python3 -m pip -V`

A terminal window showing the command 'pip3 -V'. The output states that 'pip3' is not installed and suggests installing it with 'sudo apt install python3-pip'.

```
sonouno@sonouno-VirtualBox:~$ pip3 -V
The program 'pip3' is currently not installed. You can install it by typing:
sudo apt install python3-pip
sonouno@sonouno-VirtualBox:~$
```

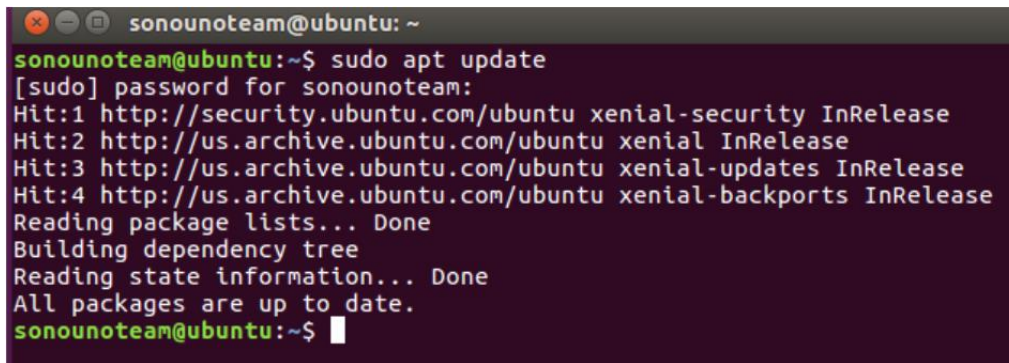
Image 8 – Shows that pip is not installed, the message begins with 'The program pip is currently not installed'. This image is illustrative.

A terminal window showing the command 'pip3 -V'. The output shows the version '8.1.1' and the path '/usr/lib/python3/dist-packages (python 3.5)'.

```
sonouno@sonouno-VirtualBox:~$ pip3 -V
pip 8.1.1 from /usr/lib/python3/dist-packages (python 3.5)
sonouno@sonouno-VirtualBox:~$
```

Image 9 - Shows the version of pip, indicating that pip is installed. This image is illustrative.

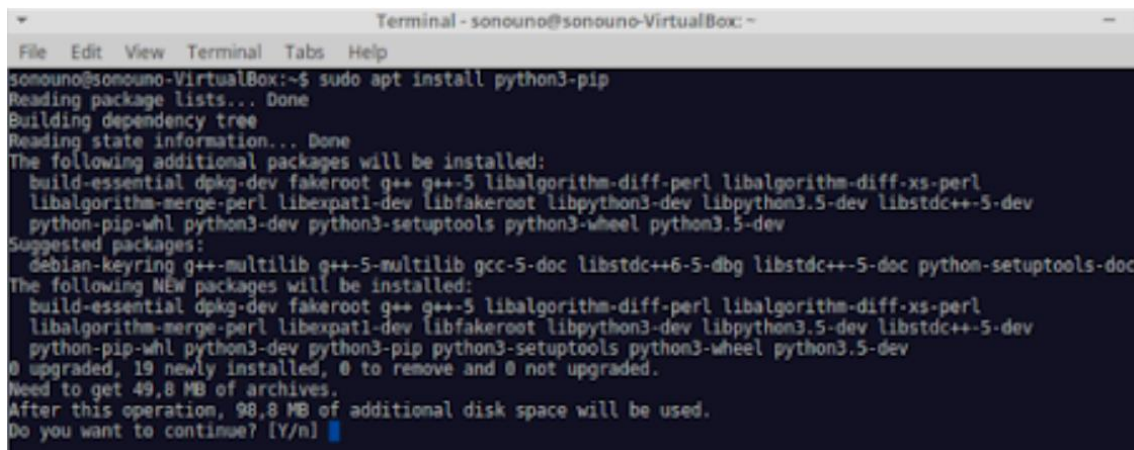
6. If you don't have 'pip' installed (Image 8), execute the next commands (Image 10, Image 11 and Image 12):
  - a. `sudo apt update`



```
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:~$
```

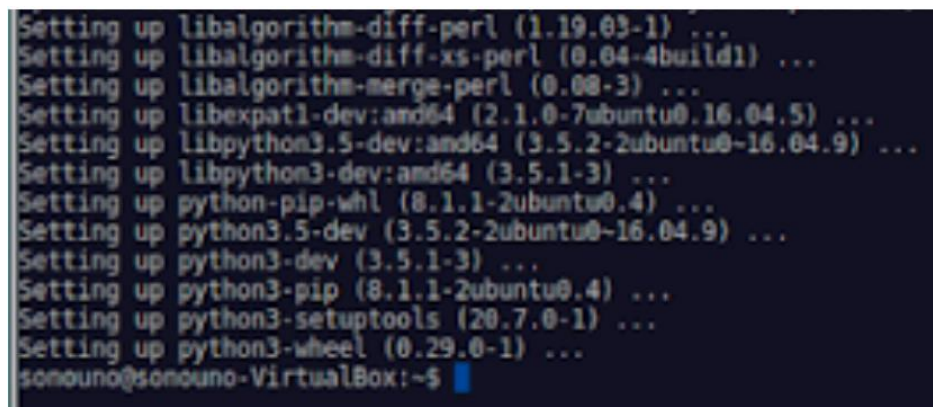
Image 10 - Implementation of the update command.

b. `sudo apt install python3-pip`



```
Terminal - sonouno@sonouno-VirtualBox: ~  
File Edit View Terminal Tabs Help  
sonouno@sonouno-VirtualBox:~$ sudo apt install python3-pip  
Reading package lists... Done  
Building dependency tree  
Reading state information... Done  
The following additional packages will be installed:  
  build-essential dpkg-dev fakeroot g++ g++-5 libalgorithm-diff-perl libalgorithm-diff-xs-perl  
  libalgorithm-merge-perl libexpat1-dev libfakeroot libpython3-dev libpython3.5-dev libstdc++-5-dev  
  python-pip-whl python3-dev python3-setuptools python3-wheel python3.5-dev  
Suggested packages:  
  debian-keyring g++-multilib g++-5-multilib gcc-5-doc libstdc++6-5-dbg libstdc++-5-doc python-setuptools-doc  
The following NEW packages will be installed:  
  build-essential dpkg-dev fakeroot g++ g++-5 libalgorithm-diff-perl libalgorithm-diff-xs-perl  
  libalgorithm-merge-perl libexpat1-dev libfakeroot libpython3-dev libpython3.5-dev libstdc++-5-dev  
  python-pip-whl python3-dev python3-pip python3-setuptools python3-wheel python3.5-dev  
0 upgraded, 19 newly installed, 0 to remove and 0 not upgraded.  
Need to get 49,8 MB of archives.  
After this operation, 98,8 MB of additional disk space will be used.  
Do you want to continue? [Y/n]
```

Image 11 - Shows the pip installation, on the question 'Do you want to continue?' you have to type 'Y' and press Enter.



```
Setting up libalgorithm-diff-perl (1.19.03-1) ...  
Setting up libalgorithm-diff-xs-perl (0.04-4build1) ...  
Setting up libalgorithm-merge-perl (0.08-3) ...  
Setting up libexpat1-dev:amd64 (2.1.0-7ubuntu0.16.04.5) ...  
Setting up libpython3.5-dev:amd64 (3.5.2-2ubuntu0-16.04.9) ...  
Setting up libpython3-dev:amd64 (3.5.1-3) ...  
Setting up python-pip-whl (8.1.1-2ubuntu0.4) ...  
Setting up python3.5-dev (3.5.2-2ubuntu0-16.04.9) ...  
Setting up python3-dev (3.5.1-3) ...  
Setting up python3-pip (8.1.1-2ubuntu0.4) ...  
Setting up python3-setuptools (20.7.0-1) ...  
Setting up python3-wheel (0.29.0-1) ...  
sonouno@sonouno-VirtualBox:~$
```

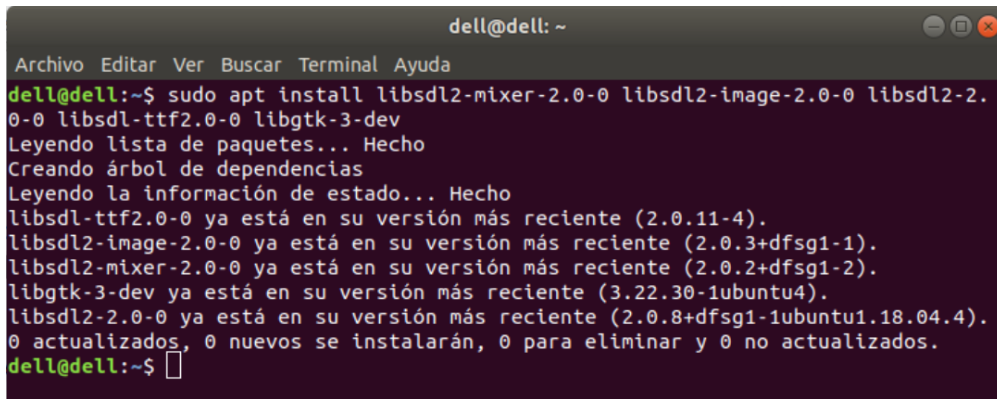
Image 12 - Shows the final lines of pip installation.

7. Once we have pip installed (Image 9), we can proceed.

### 2.1.3. Previous packages needed for Ubuntu

Some libraries are required to run the software on Ubuntu, to install them run the next command (Image 13):

- `sudo apt install libsdl2-mixer-2.0-0 libsdl2-image-2.0-0 libsdl2-2.0-0 libsdl-ttf2.0-0 libgtk-3-dev`

A terminal window titled 'dell@dell: ~' with a menu bar (Archivo, Editar, Ver, Buscar, Terminal, Ayuda). The command 'sudo apt install libsndl2-mixer-2.0-0 libsndl2-image-2.0-0 libsndl2-2.0-0 libsndl-ttf2.0-0 libgtk-3-dev' has been executed. The output shows that the packages are already installed at their latest versions: libsndl-ttf2.0-0 (2.0.11-4), libsndl2-image-2.0-0 (2.0.3+dfsg1-1), libsndl2-mixer-2.0-0 (2.0.2+dfsg1-2), libgtk-3-dev (3.22.30-1ubuntu4), and libsndl2-2.0-0 (2.0.8+dfsg1-1ubuntu1.18.04.4). The prompt 'dell@dell:~\$' is shown at the bottom.

```
dell@dell:~$ sudo apt install libsndl2-mixer-2.0-0 libsndl2-image-2.0-0 libsndl2-2.0-0 libsndl-ttf2.0-0 libgtk-3-dev
Leyendo lista de paquetes... Hecho
Creando árbol de dependencias
Leyendo la información de estado... Hecho
libsndl-ttf2.0-0 ya está en su versión más reciente (2.0.11-4).
libsndl2-image-2.0-0 ya está en su versión más reciente (2.0.3+dfsg1-1).
libsndl2-mixer-2.0-0 ya está en su versión más reciente (2.0.2+dfsg1-2).
libgtk-3-dev ya está en su versión más reciente (3.22.30-1ubuntu4).
libsndl2-2.0-0 ya está en su versión más reciente (2.0.8+dfsg1-1ubuntu1.18.04.4).
0 actualizados, 0 nuevos se instalarán, 0 para eliminar y 0 no actualizados.
dell@dell:~$
```

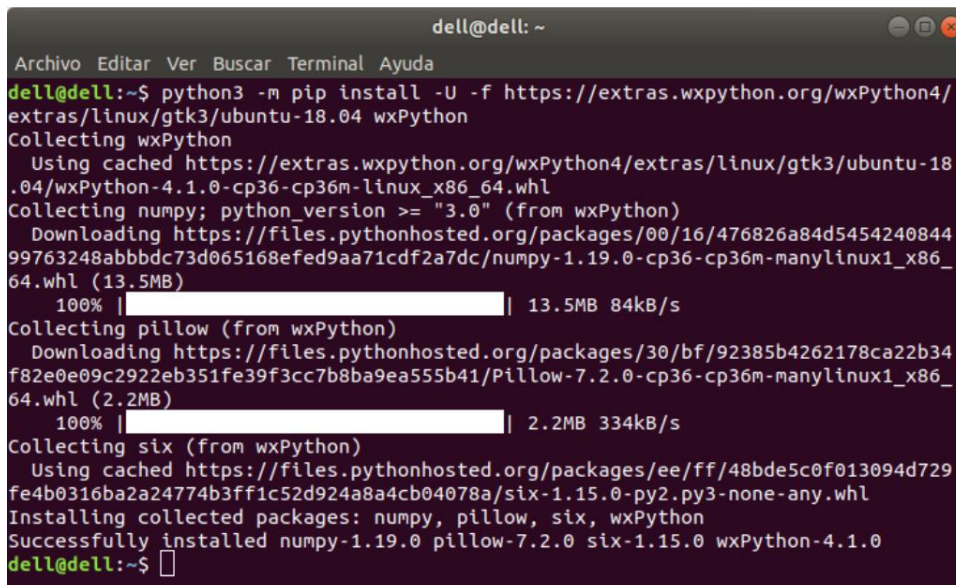
Image 13 - Shown the result of the libraries installation.

## 2.1.4. SonoUno installation

### 2.1.4.1. Installation with pip

First of all, you have to install wxPython with the next command:

- For ubuntu-16.04:
  - `python3 -m pip install -U -f https://extras.wxpython.org/wxPython4/extras/linux/gtk3/ubuntu-16.04 wxPython`
- For ubuntu-18.04 (Image 14):
  - `python3 -m pip install -U -f https://extras.wxpython.org/wxPython4/extras/linux/gtk3/ubuntu-18.04 wxPython`

A terminal window titled 'dell@dell: ~' with a menu bar (Archivo, Editar, Ver, Buscar, Terminal, Ayuda). The command 'python3 -m pip install -U -f https://extras.wxpython.org/wxPython4/extras/linux/gtk3/ubuntu-18.04 wxPython' has been executed. The output shows the collection and installation of wxPython and its dependencies: numpy, pillow, and six. The prompt 'dell@dell:~\$' is shown at the bottom.

```
dell@dell:~$ python3 -m pip install -U -f https://extras.wxpython.org/wxPython4/extras/linux/gtk3/ubuntu-18.04 wxPython
Collecting wxPython
  Using cached https://extras.wxpython.org/wxPython4/extras/linux/gtk3/ubuntu-18.04/wxPython-4.1.0-cp36-cp36m-linux_x86_64.whl
Collecting numpy; python_version >= "3.0" (from wxPython)
  Downloading https://files.pythonhosted.org/packages/00/16/476826a84d545424084499763248abbbdc73d065168efed9aa71cdf2a7dc/numpy-1.19.0-cp36-cp36m-manylinux1_x86_64.whl (13.5MB)
    100% |#####| 13.5MB 84kB/s
Collecting pillow (from wxPython)
  Downloading https://files.pythonhosted.org/packages/30/bf/92385b4262178ca22b34f82e0e09c2922eb351fe39f3cc7b8ba9ea555b41/Pillow-7.2.0-cp36-cp36m-manylinux1_x86_64.whl (2.2MB)
    100% |#####| 2.2MB 334kB/s
Collecting six (from wxPython)
  Using cached https://files.pythonhosted.org/packages/ee/ff/48bde5c0f013094d729fe4b0316ba2a24774b3ff1c52d924a8a4cb04078a/six-1.15.0-py2.py3-none-any.whl
Installing collected packages: numpy, pillow, six, wxPython
Successfully installed numpy-1.19.0 pillow-7.2.0 six-1.15.0 wxPython-4.1.0
dell@dell:~$
```

Image 14 - Installation of wxPython with the previous command.

If you have a previous version or you are not sure, run the next command to uninstall a possible version:

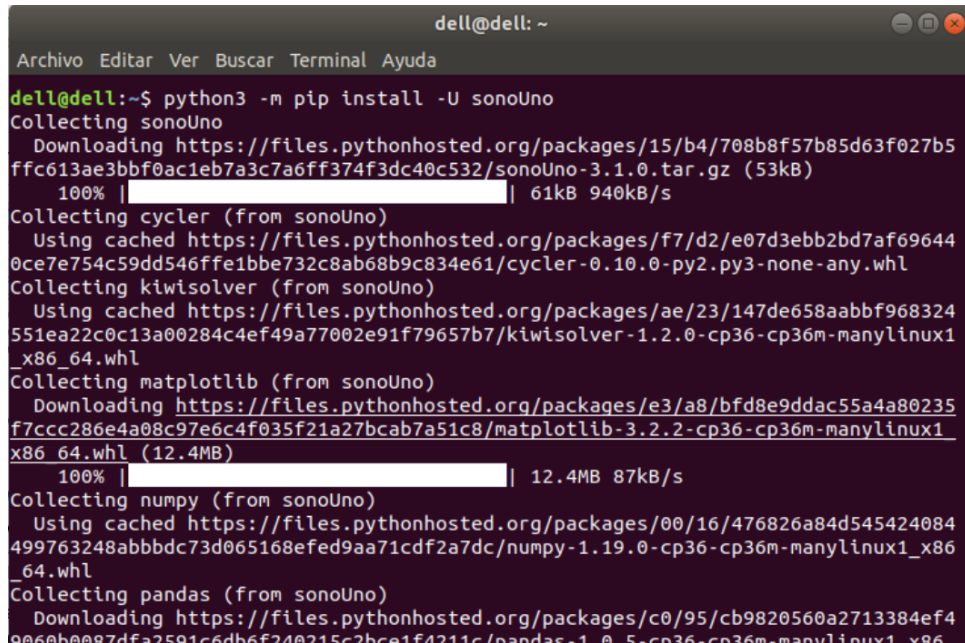
- `sudo python3 -m pip uninstall sonoUno`

The previous command can show an error if the program is not installed. To install sonoUno run the next command (Image 15 and Image 16):

- `sudo python3 -m pip install sonoUno`

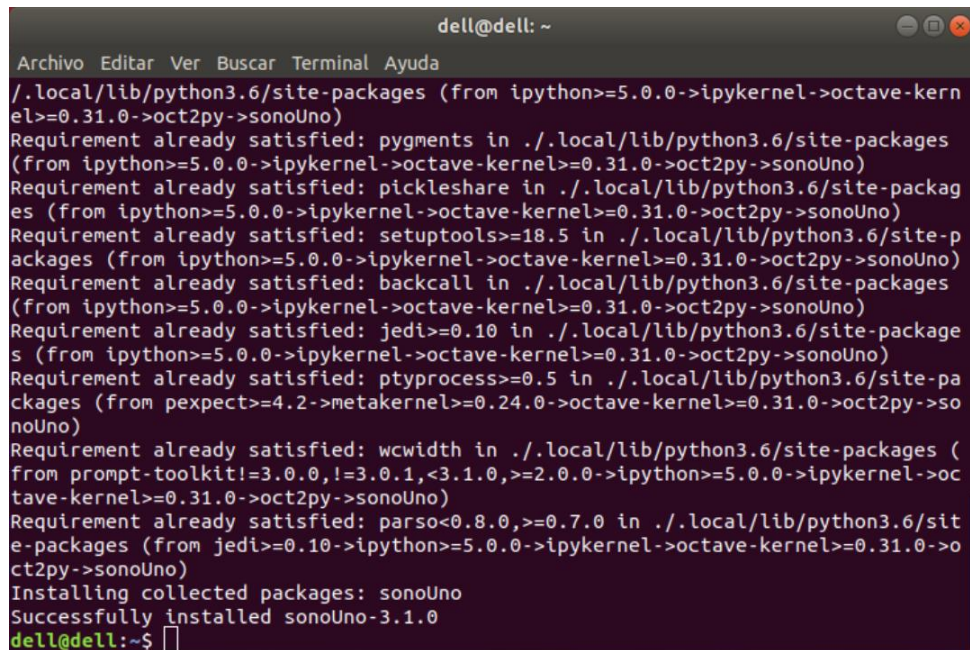


**NOTE:** The command update is not recommended because produce a problem trying to install wxPython from pip and in some cases do not allow to install the sonoUno program with pip.



```
dell@dell: ~  
Archivo Editar Ver Buscar Terminal Ayuda  
dell@dell:~$ python3 -m pip install -U sonoUno  
Collecting sonoUno  
  Downloading https://files.pythonhosted.org/packages/15/b4/708b8f57b85d63f027b5  
ffc613ae3bbf0ac1eb7a3c7a6ff374f3dc40c532/sonoUno-3.1.0.tar.gz (53kB)  
    100% |████████████████████████████████████████| 61kB 940kB/s  
Collecting cyciler (from sonoUno)  
  Using cached https://files.pythonhosted.org/packages/f7/d2/e07d3ebb2bd7af69644  
0ce7e754c59dd546ffe1bbe732c8ab68b9c834e61/cyciler-0.10.0-py2.py3-none-any.whl  
Collecting kiwisolver (from sonoUno)  
  Using cached https://files.pythonhosted.org/packages/ae/23/147de658aabbf968324  
551ea22c0c13a00284c4ef49a77002e91f79657b7/kiwisolver-1.2.0-cp36-cp36m-manylinux1  
_x86_64.whl  
Collecting matplotlib (from sonoUno)  
  Downloading https://files.pythonhosted.org/packages/e3/a8/bfd8e9ddac55a4a80235  
f7ccc286e4a08c97e6c4f035f21a27bcab7a51c8/matplotlib-3.2.2-cp36-cp36m-manylinux1  
_x86_64.whl (12.4MB)  
    100% |████████████████████████████████████████| 12.4MB 87kB/s  
Collecting numpy (from sonoUno)  
  Using cached https://files.pythonhosted.org/packages/00/16/476826a84d545424084  
499763248abbdc73d065168efed9aa71cdf2a7dc/numpy-1.19.0-cp36-cp36m-manylinux1_x86  
_64.whl  
Collecting pandas (from sonoUno)  
  Downloading https://files.pythonhosted.org/packages/c0/95/cb9820560a2713384ef4  
0a60b0097df32591c6db6f240215c2bca1f4211c/pandas-1.0.5-cp36-cp36m-manylinux1_x86
```

Image 15 - Shown the first part of the sonoUno installation.



```
dell@dell: ~  
Archivo Editar Ver Buscar Terminal Ayuda  
./local/lib/python3.6/site-packages (from ipython>=5.0.0->ipykernel->octave-kern  
el>=0.31.0->oct2py->sonoUno)  
Requirement already satisfied: pygments in ./local/lib/python3.6/site-packages  
(from ipython>=5.0.0->ipykernel->octave-kernel>=0.31.0->oct2py->sonoUno)  
Requirement already satisfied: pickleshare in ./local/lib/python3.6/site-packag  
es (from ipython>=5.0.0->ipykernel->octave-kernel>=0.31.0->oct2py->sonoUno)  
Requirement already satisfied: setuptools>=18.5 in ./local/lib/python3.6/site-p  
ackages (from ipython>=5.0.0->ipykernel->octave-kernel>=0.31.0->oct2py->sonoUno)  
Requirement already satisfied: backcall in ./local/lib/python3.6/site-packages  
(from ipython>=5.0.0->ipykernel->octave-kernel>=0.31.0->oct2py->sonoUno)  
Requirement already satisfied: jedi>=0.10 in ./local/lib/python3.6/site-package  
s (from ipython>=5.0.0->ipykernel->octave-kernel>=0.31.0->oct2py->sonoUno)  
Requirement already satisfied: ptyprocess>=0.5 in ./local/lib/python3.6/site-pa  
ckages (from pexpect>=4.2->metakernel>=0.24.0->octave-kernel>=0.31.0->oct2py->so  
noUno)  
Requirement already satisfied: wcwidth in ./local/lib/python3.6/site-packages (  
from prompt-toolkit!=3.0.0,!<3.1.0,>=2.0.0->ipython>=5.0.0->ipykernel->oc  
tave-kernel>=0.31.0->oct2py->sonoUno)  
Requirement already satisfied: parso<0.8.0,>=0.7.0 in ./local/lib/python3.6/sit  
e-packages (from jedi>=0.10->ipython>=5.0.0->ipykernel->octave-kernel>=0.31.0->o  
ct2py->sonoUno)  
Installing collected packages: sonoUno  
Successfully installed sonoUno-3.1.0  
dell@dell:~$
```

Image 16 - Shown the last part of the sonoUno installation.

Finally, to run the sonoUno software write the next command on the terminal (Image 17):

- sonoUno

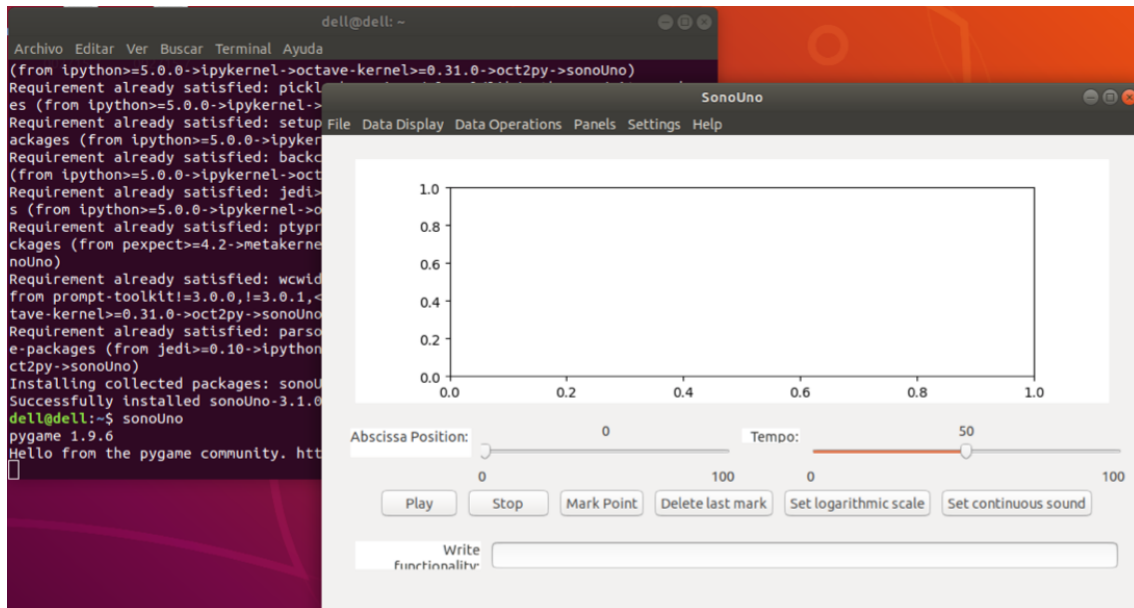


Image 17 - Shown the sonoUno display opened with the command 'sonoUno' after its installation with pip.

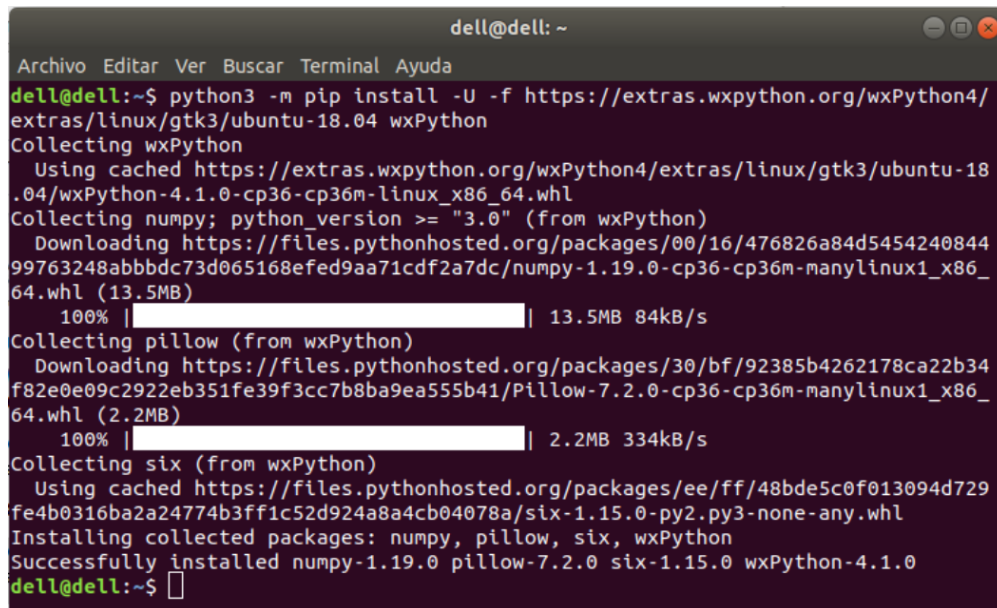
#### 2.1.4.1. Installation from the source

Here we explain how to install each one of the libraries to run sonoUno from source.

1. First you have to type (Image 1):
  - a. `sudo apt update`
2. Install wxPython with the next command (Image 18):

**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 18.

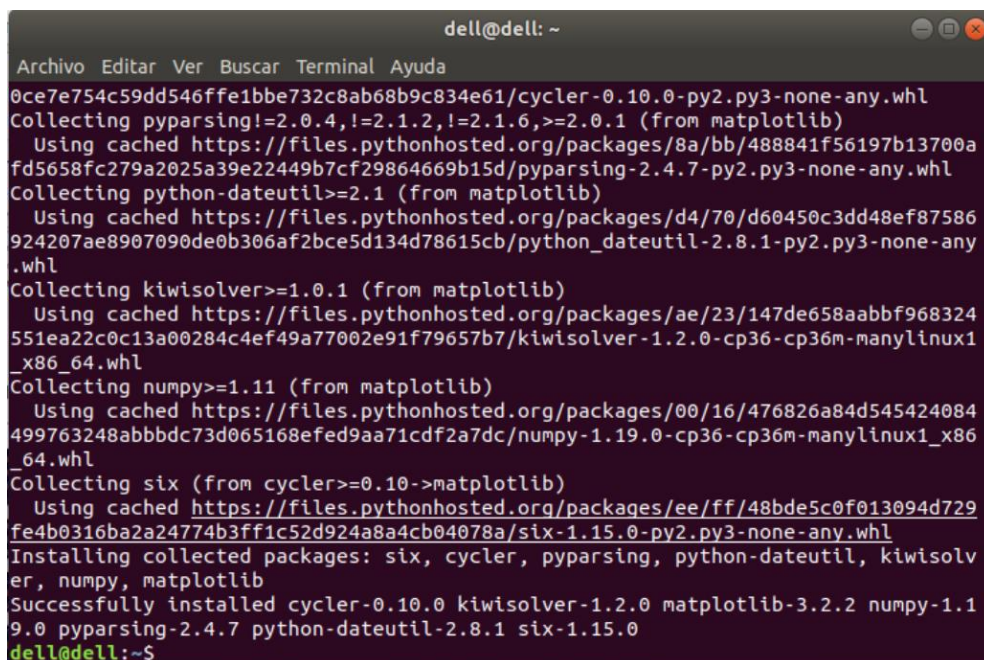
- a. For ubuntu 18.04
  - i. `python3 -m pip install --user -U -f https://extras.wxpython.org/wxPython4/extras/linux/gtk3/ubuntu-18.04 wxPython`
- b. For ubuntu 16.04
  - i. `python3 -m pip install --user -U -f https://extras.wxpython.org/wxPython4/extras/linux/gtk3/ubuntu-16.04 wxPython`



```
dell@dell: ~  
Archivo Editar Ver Buscar Terminal Ayuda  
dell@dell:~$ python3 -m pip install -U -f https://extras.wxpython.org/wxPython4/  
extras/linux/gtk3/ubuntu-18.04 wxPython  
Collecting wxPython  
  Using cached https://extras.wxpython.org/wxPython4/extras/linux/gtk3/ubuntu-18  
.04/wxPython-4.1.0-cp36-cp36m-linux_x86_64.whl  
Collecting numpy; python_version >= "3.0" (from wxPython)  
  Downloading https://files.pythonhosted.org/packages/00/16/476826a84d5454240844  
99763248abbbdc73d065168efed9aa71cdf2a7dc/numpy-1.19.0-cp36-cp36m-manylinux1_x86_  
64.whl (13.5MB)  
    100% |#####| 13.5MB 84kB/s  
Collecting pillow (from wxPython)  
  Downloading https://files.pythonhosted.org/packages/30/bf/92385b4262178ca22b34  
f82e0e09c2922eb351fe39f3cc7b8ba9ea555b41/Pillow-7.2.0-cp36-cp36m-manylinux1_x86_  
64.whl (2.2MB)  
    100% |#####| 2.2MB 334kB/s  
Collecting six (from wxPython)  
  Using cached https://files.pythonhosted.org/packages/ee/ff/48bde5c0f013094d729  
fe4b0316ba2a24774b3ff1c52d924a8a4cb04078a/six-1.15.0-py2.py3-none-any.whl  
Installing collected packages: numpy, pillow, six, wxPython  
Successfully installed numpy-1.19.0 pillow-7.2.0 six-1.15.0 wxPython-4.1.0  
dell@dell:~$
```

Image 18 - Installation of wxPython with the previous command.

3. Install matplotlib 2.2.3 or upper (Image 19):
  - a. `python3 -m pip install --user -U matplotlib`

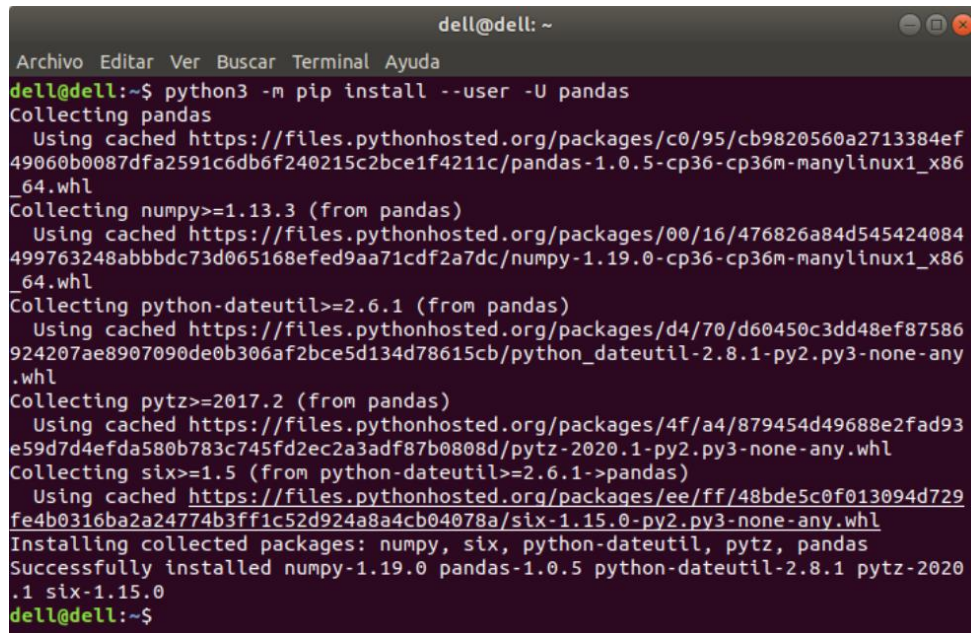


```
dell@dell: ~  
Archivo Editar Ver Buscar Terminal Ayuda  
0ce7e754c59dd546ffe1bbe732c8ab68b9c834e61/cycler-0.10.0-py2.py3-none-any.whl  
Collecting pyparsing!=2.0.4,!=2.1.2,!=2.1.6,>=2.0.1 (from matplotlib)  
  Using cached https://files.pythonhosted.org/packages/8a/bb/488841f56197b13700a  
fd5658fc279a2025a39e22449b7cf29864669b15d/pyparsing-2.4.7-py2.py3-none-any.whl  
Collecting python-dateutil>=2.1 (from matplotlib)  
  Using cached https://files.pythonhosted.org/packages/d4/70/d60450c3dd48ef87586  
924207ae8907090de0b306af2bce5d134d78615cb/python_dateutil-2.8.1-py2.py3-none-any  
.whl  
Collecting kiwisolver>=1.0.1 (from matplotlib)  
  Using cached https://files.pythonhosted.org/packages/ae/23/147de658aabbf968324  
551ea22c0c13a00284c4ef49a77002e91f79657b7/kiwisolver-1.2.0-cp36-cp36m-manylinux1  
_x86_64.whl  
Collecting numpy>=1.11 (from matplotlib)  
  Using cached https://files.pythonhosted.org/packages/00/16/476826a84d545424084  
499763248abbbdc73d065168efed9aa71cdf2a7dc/numpy-1.19.0-cp36-cp36m-manylinux1_x86_  
64.whl  
Collecting six (from cycler>=0.10->matplotlib)  
  Using cached https://files.pythonhosted.org/packages/ee/ff/48bde5c0f013094d729  
fe4b0316ba2a24774b3ff1c52d924a8a4cb04078a/six-1.15.0-py2.py3-none-any.whl  
Installing collected packages: six, cycler, pyparsing, python-dateutil, kiwisolv  
er, numpy, matplotlib  
Successfully installed cycler-0.10.0 kiwisolver-1.2.0 matplotlib-3.2.2 numpy-1.1  
9.0 pyparsing-2.4.7 python-dateutil-2.8.1 six-1.15.0  
dell@dell:~$
```

Image 19 - Last part of the installation of matplotlib with the previous command.

4. Install pandas (Image 20):
  - a. `python3 -m pip install --user -U pandas`

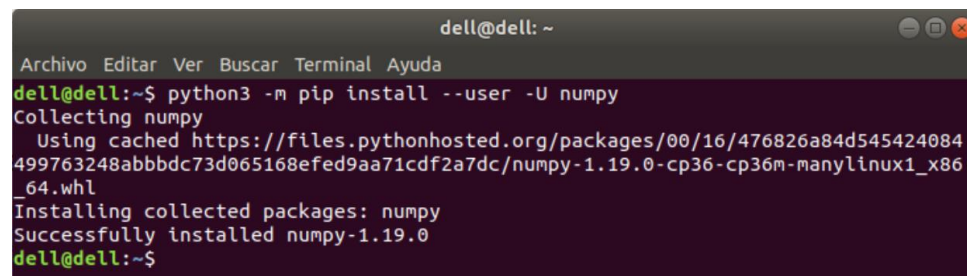




```
dell@dell: ~  
Archivo Editar Ver Buscar Terminal Ayuda  
dell@dell:~$ python3 -m pip install --user -U pandas  
Collecting pandas  
  Using cached https://files.pythonhosted.org/packages/c0/95/cb9820560a2713384ef49060b0087dfa2591c6db6f240215c2bce1f4211c/pandas-1.0.5-cp36-cp36m-manylinux1_x86_64.whl  
Collecting numpy>=1.13.3 (from pandas)  
  Using cached https://files.pythonhosted.org/packages/00/16/476826a84d545424084499763248abbbdc73d065168efed9aa71cdf2a7dc/numpy-1.19.0-cp36-cp36m-manylinux1_x86_64.whl  
Collecting python-dateutil>=2.6.1 (from pandas)  
  Using cached https://files.pythonhosted.org/packages/d4/70/d60450c3dd48ef87586924207ae8907090de0b306af2bce5d134d78615cb/python_dateutil-2.8.1-py2.py3-none-any.whl  
Collecting pytz>=2017.2 (from pandas)  
  Using cached https://files.pythonhosted.org/packages/4f/a4/879454d49688e2fad93e59d7d4efda580b783c745fd2ec2a3adf87b0808d/pytz-2020.1-py2.py3-none-any.whl  
Collecting six>=1.5 (from python-dateutil>=2.6.1->pandas)  
  Using cached https://files.pythonhosted.org/packages/ee/ff/48bde5c0f013094d729fe4b0316ba2a24774b3ff1c52d924a8a4cb04078a/six-1.15.0-py2.py3-none-any.whl  
Installing collected packages: numpy, six, python-dateutil, pytz, pandas  
Successfully installed numpy-1.19.0 pandas-1.0.5 python-dateutil-2.8.1 pytz-2020.1 six-1.15.0  
dell@dell:~$
```

Image 20 - Installation of pandas with the previous command.

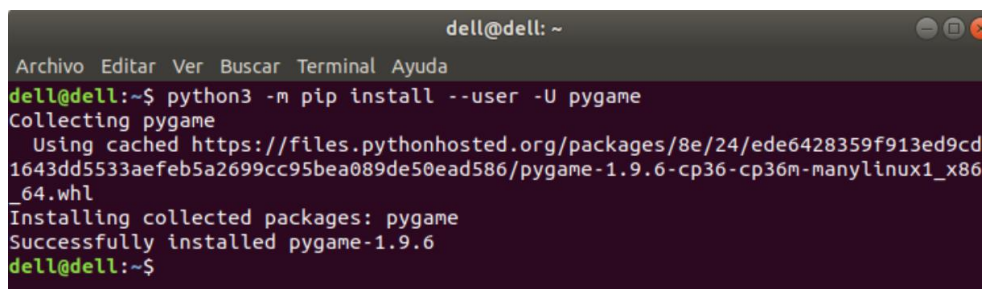
5. Install numpy (Image 21):
  - a. `python3 -m pip install --user -U numpy`



```
dell@dell: ~  
Archivo Editar Ver Buscar Terminal Ayuda  
dell@dell:~$ python3 -m pip install --user -U numpy  
Collecting numpy  
  Using cached https://files.pythonhosted.org/packages/00/16/476826a84d545424084499763248abbbdc73d065168efed9aa71cdf2a7dc/numpy-1.19.0-cp36-cp36m-manylinux1_x86_64.whl  
Installing collected packages: numpy  
Successfully installed numpy-1.19.0  
dell@dell:~$
```

Image 21 - Installation of numpy with the previous command.

6. Install pygame (Image 22):
  - a. `python3 -m pip install --user -U pygame`

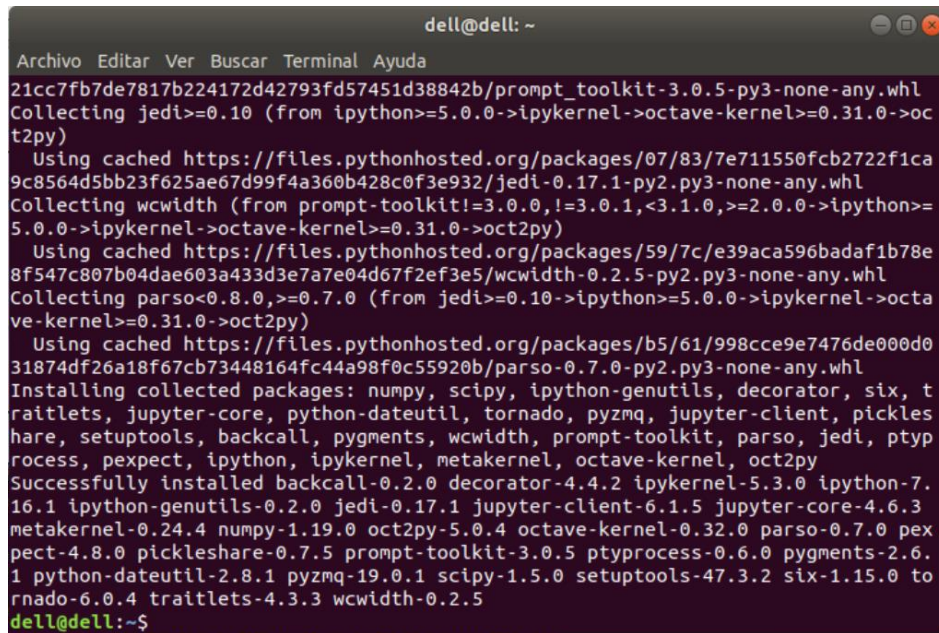


```
dell@dell: ~  
Archivo Editar Ver Buscar Terminal Ayuda  
dell@dell:~$ python3 -m pip install --user -U pygame  
Collecting pygame  
  Using cached https://files.pythonhosted.org/packages/8e/24/ede6428359f913ed9cd1643dd5533aefeb5a2699cc95bea089de50ead586/pygame-1.9.6-cp36-cp36m-manylinux1_x86_64.whl  
Installing collected packages: pygame  
Successfully installed pygame-1.9.6  
dell@dell:~$
```

Image 22 - Installation of pygame with the previous command.

7. Install oct2py (Image 23):
  - a. `python3 -m pip install --user -U oct2py`





```
dell@dell: ~
Archivo  Editar  Ver  Buscar  Terminal  Ayuda
21cc7fb7de7817b224172d42793fd57451d38842b/prompt_toolkit-3.0.5-py3-none-any.whl
Collecting jedi>=0.10 (from ipython>=5.0.0->ipykernel->octave-kernel>=0.31.0->oct2py)
  Using cached https://files.pythonhosted.org/packages/07/83/7e711550fcb2722f1ca9c8564d5bb23f625ae67d99f4a360b428c0f3e932/jedi-0.17.1-py2.py3-none-any.whl
Collecting wcwidth (from prompt-toolkit!=3.0.0,!<3.0.1,<3.1.0,>=2.0.0->ipython>=5.0.0->ipykernel->octave-kernel>=0.31.0->oct2py)
  Using cached https://files.pythonhosted.org/packages/59/7c/e39aca596badaf1b78e8f547c807b04dae603a433d3e7a7e04d67f2ef3e5/wcwidth-0.2.5-py2.py3-none-any.whl
Collecting parso<0.8.0,>=0.7.0 (from jedi>=0.10->ipython>=5.0.0->ipykernel->octave-kernel>=0.31.0->oct2py)
  Using cached https://files.pythonhosted.org/packages/b5/61/998cce9e7476de000d031874df26a18f67cb73448164fc44a98f0c55920b/parso-0.7.0-py2.py3-none-any.whl
Installing collected packages: numpy, scipy, ipython-genutils, decorator, six, traitlets, jupyter-core, python-dateutil, tornado, pyzmq, jupyter-client, pickleshare, setuptools, backcall, pygments, wcwidth, prompt-toolkit, parso, jedi, ptyprocess, pexpect, ipython, ipykernel, metakernel, octave-kernel, oct2py
Successfully installed backcall-0.2.0 decorator-4.4.2 ipykernel-5.3.0 ipython-7.16.1 ipython-genutils-0.2.0 jedi-0.17.1 jupyter-client-6.1.5 jupyter-core-4.6.3 metakernel-0.24.4 numpy-1.19.0 oct2py-5.0.4 octave-kernel-0.32.0 parso-0.7.0 pexpect-4.8.0 pickleshare-0.7.5 prompt-toolkit-3.0.5 ptyprocess-0.6.0 pygments-2.6.1 python-dateutil-2.8.1 pyzmq-19.0.1 scipy-1.5.0 setuptools-47.3.2 six-1.15.0 tornado-6.0.4 traitlets-4.3.3 wcwidth-0.2.5
dell@dell:~$
```

Image 23 - Last part of the oct2py installation process, done with the previous command.

**NOTE:** if any of the last libraries (from 2 to 7) is missing, the soft does not run. The installation can take several minutes.

8. Try that 'oct2py' was installed correctly with python on the terminal following the next steps (Image 24):
  - a. Open python on the terminal with the command:
    - i. python3
  - b. Import 'octave' from 'oct2py' library with the command:
    - i. from oct2py import octave
  - c. If 'octave' is imported without problems (Image 25), 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 24) 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/_metaker
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 24 - Shows the library import command and the 'SyntaxError'.

```
dell@dell:~$ python3
Python 3.6.9 (default, Apr 18 2020, 01:56:04)
[GCC 8.4.0] on linux
Type "help", "copyright", "credits" or "license" for more information.
>>> from oct2py import octave
>>> exit()
dell@dell:~$
```

Image 25 - Shows the library importation command without errors.

9. To solve the problem with the oct2py library, you must uninstall tornado with the next command (Image 26):

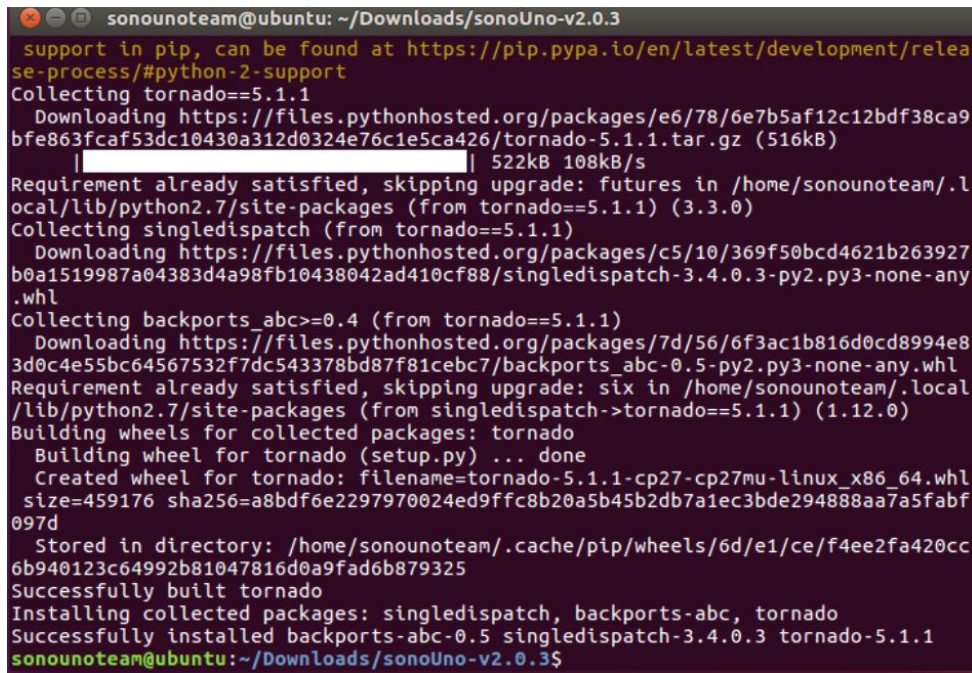
- a. `python3 -m pip uninstall tornado`

```
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. Ple
ase upgrade your Python as Python 2.7 won't be maintained after that date. A fut
ure 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/relea
se-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 26 - Uninstallation of tornado with the previous command.

10. Now you must install a previous version of tornado, in this case the version 5.1.1 works fine (Image 27).

- a. `python3 -m pip install --user -U tornado==5.1.1`

A terminal window with a dark background and light-colored text. The prompt is 'sonounoteam@ubuntu: ~/Downloads/sonoUno-v2.0.3'. The output shows the completion of the tornado installation process, including downloading dependencies like singledispatch and backports-abc, and finally installing tornado-5.1.1. The text is as follows:

```
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 27 - Last part of the tornado installation process, done with the previous command.

11. Finally, we test to import octave from the oct2py library:
  - a. Open python on the terminal with the command:
    - i. python3
  - 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 25) continue with the section 'Run the software':

#### 2.1.5. 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 28). Possible solution, update pip with the next command:
  - a. sudo python3 -m pip install --upgrade pip



```
sonounoteam@ubuntu: ~
Collecting pillow (from wxPython)
  Downloading https://files.pythonhosted.org/packages/cc/a4/79b5f36d1e1a2b426073
bd62217d1530fcd939950c2936651e6b39127a9b/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/00a976f728d0d1fecfe8
98238ce23f502a721c0ac0ecfedb80e0d88c64e9/six-1.12.0-py2.py3-none-any.whl
Collecting numpy (from wxPython)
  Downloading https://files.pythonhosted.org/packages/da/32/1b8f2bb5fb50e4db6854
3eb85ce37b9fa6660cd05b58bddfafafa7ed62da/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-Et
yARr/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 28 - Possible error the first time using pip on Ubuntu.

### 2.1.6. Run the software

1. Unzip the file, if it is compressed. If you want to clone from github use the next line:
  - a. `git clone https://github.com/sonoUnoTeam/sonoUno.git`
2. Open a terminal and go to the software folder. Probably you have more than one folder before you can run SonoUno. To check in which folder is sonoUno, use the command “ls” (Image 29). The sonoUno must be among the files and the manual in the folder.

```
dell@dell: ~/Descargas/sonoUno-master/sonoUno
Archivo  Editar  Ver  Buscar  Terminal  Ayuda
dell@dell:~$ cd Descargas/
dell@dell:~/Descargas$ ls
Graph_animation.avi  MathTrax1.4.jar  sonoUno-master  xSonify.jar
java.odt             sandbox_beta.jar  sonoUno-master.zip
dell@dell:~/Descargas$ cd sonoUno-master/
dell@dell:~/Descargas/sonoUno-master$ ls
README.md  setup.cfg  setup.py  sonoUno
dell@dell:~/Descargas/sonoUno-master$ cd sonoUno/
dell@dell:~/Descargas/sonoUno-master/sonoUno$ ls
data_export  data_transform  __init__.py  logo.icns  sample_data  sound_module
data_import  gui             LICENSE.txt  logo.ico   sonoUno
dell@dell:~/Descargas/sonoUno-master/sonoUno$ python3 sound_module/
__init__.py  __pycache__/  simple_sound.py
dell@dell:~/Descargas/sonoUno-master/sonoUno$ python3 sonoUno
pygame 1.9.6
Hello from the pygame community. https://www.pygame.org/contribute.html
```

Image 29 - Aspect of the sonoUno folder on the command window.

3. Once you are sure that you are at the right folder, make:
  - a. `python3 sonoUno`

**NOTE:** if you have the error “ImportError: libSDL-1.2.so.0: cannot open shared object file: No such file or directory” (Image 30); 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 30 - libSDL possible error when you try to run the software the first time on Ubuntu.

4. A window must be open (Image 31), if that is the case, the soft is ready to be used.

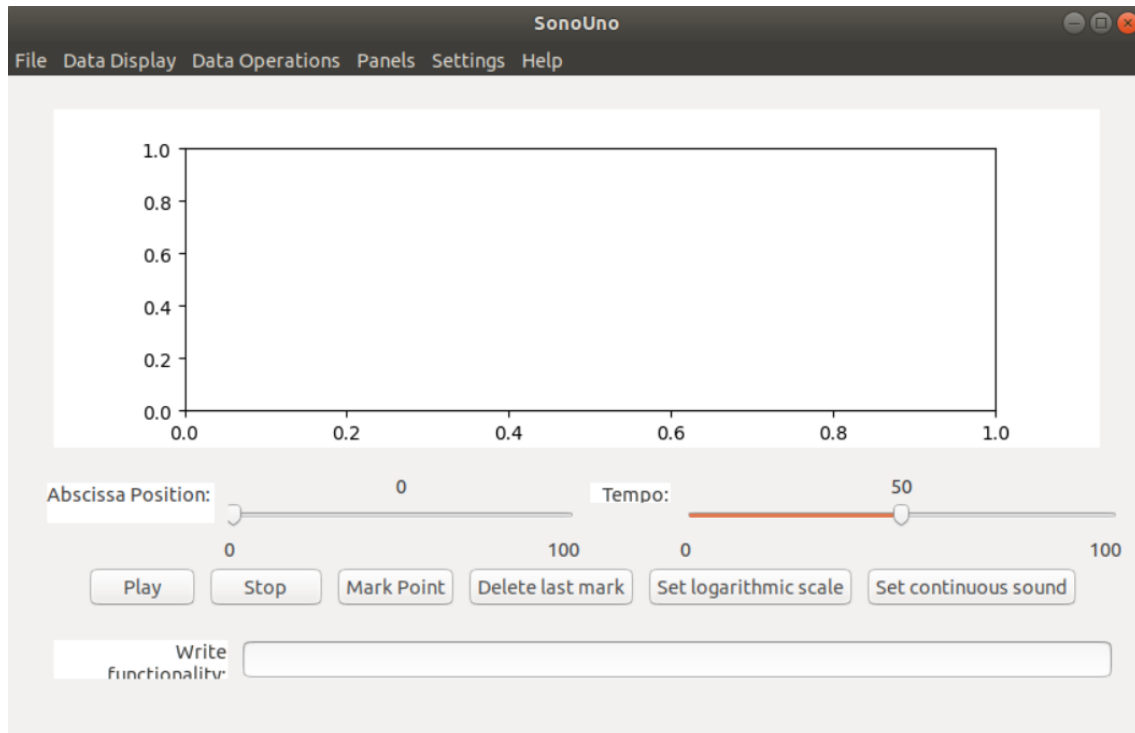


Image 31 - SonoUno main window on Ubuntu.

### 3. Import a file to the software

Once the software is installed, and you can open it, you are ready to try your first dataset. The initial window of the software only shows the plot and the reproduction options of the data (Image 31), the other functionalities are hidden and were shown in the user manual. This design was based on a user cases study and ISO standards.

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 or you can download this folder from github.

The first step to open a data file, is to select the item Open on the menu File. 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 32).

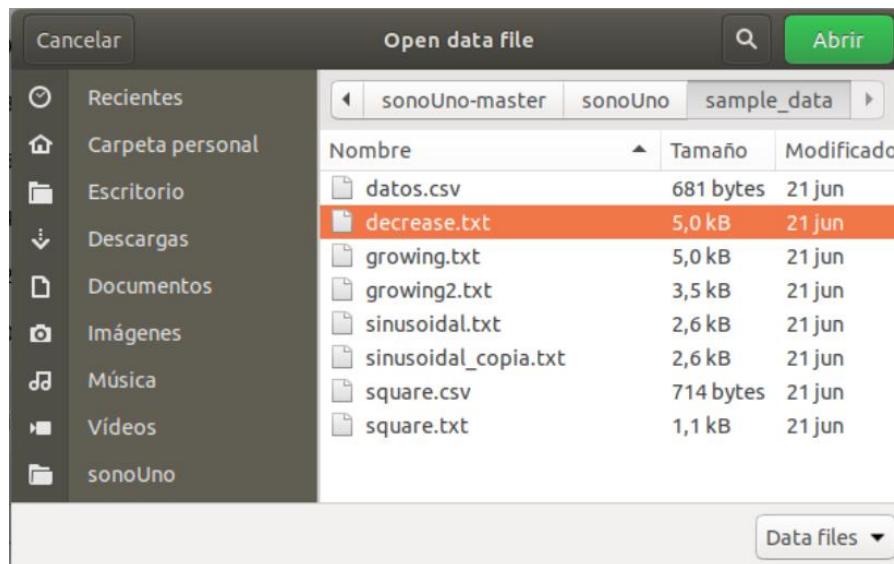


Image 32 - New window of the file system of the computer.

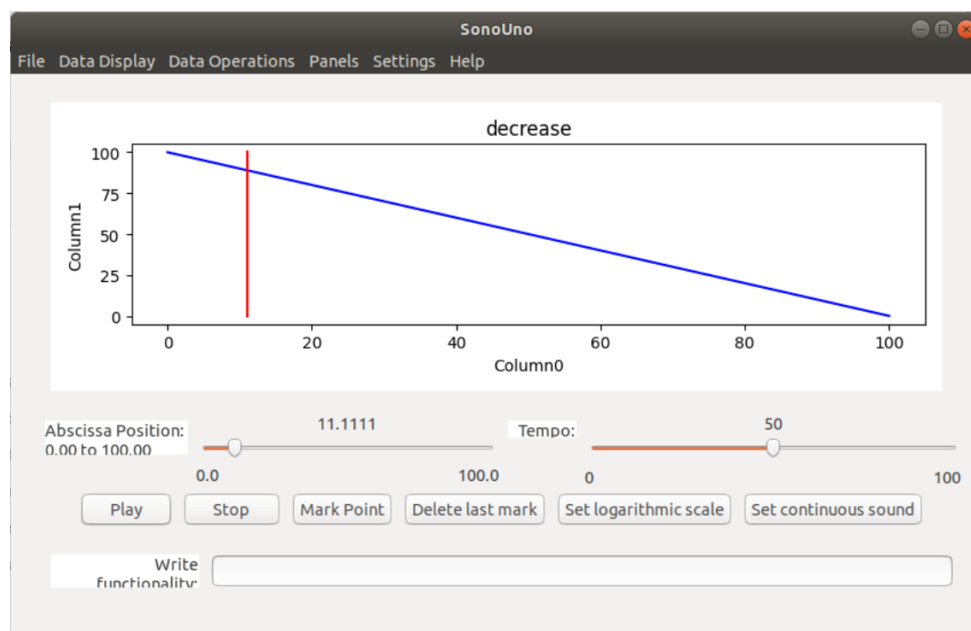


Image 33 - Reproduction of the data file after press the button Play.

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 33). 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.