NativeCAM hypothetical installation procedure
Based on my working installation on Raspberry Pi running LinuxCNC 2.10 beta and "inspired"
by the original procedure written, I suppose, by FernV.
The original procedure indicate the NativeCAM directory in the home directory and maybe
that's the right place to be. (I think so)
My installation place is different, maybe cause it come from a package installation, but i works.
Maybe in future I would change it.
Anyway the important thing is to have the paths adapted to the position where the NativeCAM
folder actually is.

1. Install, if not done yet, python-lxml using the package manager of your Linux.

2. Download NativeCAM from:
`https://github.com/BogdanTheGeek/NativeCAM.git`
(Press the green button "Code" and select "Download ZIP")

3. Expand the archive and move the resulting NativeCAM folder to
`/usr/share/linuxcnc/aux_gladevcp/`
(probably a password is needed)

Now ncam.py shoud be in:
`/usr/share/linuxcnc/aux_gladevcp/NativeCAM/ncam.py`
In the terminal you could type:
`/usr/share/linuxcnc/aux_gladevcp/NativeCAM/`
to verify.

4. To know where python path is, open the terminal and type:

```
pi@raspberrypi:~ $ python3
Python 3.7.3 (default, Mar 23 2024, 16:12:05)
[GCC 8.3.0] on linux
Type "help", "copyright", "credits" or "license" for more information.
>>> import sys
>>> import pprint
>>> pprint.pprint(sys.path)
['',
 '/usr/lib/python37.zip',
 '/usr/lib/python3.7',
 '/usr/lib/python3.7/lib-dynload',
 '/usr/local/lib/python3.7/dist-packages',
 '/usr/lib/python3/dist-packages',
 '/usr/lib/python3/dist-packages/gladevcp']
>>>
```

(type `exit()` to exit python interpreter and return to terminal)
These are the places where python will search for modules.

(Sorry, but I don't know which file establishes that)

5. Now we need to add the NativeCAM folder to the path by creating a symbolic link to the NativeCAM files.

Move in the gladevcp directory:

```
> cd /usr/lib/python3/dist-packages/gladevcp
```

Create symbolic links to the files in the NativeCAM folder:

```
> sudo ln /usr/share/linuxcnc/aux_gladevcp/NativeCAM/ncam.py -s
> sudo ln /usr/share/linuxcnc/aux_gladevcp/NativeCAM/ncam.glade -s
```

6. Modify hal_pythonplugin.py file using a text editor, in example:

```
sudo gedit /usr/lib/python3/dist-packages/gladevcp/hal_pythonplugin.py
```
Add the line, in example, at the top:
```
from ncam import NCam
```

7. Note: *in my pc the following file is not modified, so I don't know if it really needs to be modified. We could keep this step for later.*

Modify hal_python.xml in /usr/share/glade/catalogs (glade can be glade3 or glade 2)
Open a terminal and type:
```
sudo gedit /usr/share/glade/catalogs/hal_python.xml
```

Find (it is in the beginning):
```
<glade-widget-classes>
```

Add after:
```
<glade-widget-class name="Ncam" generic-name="ncam" title="ncam">
    <properties>
        <property id="size" query="False" default="1" visible="False"/>
        <property id="spacing" query="False" default="0" visible="False"/>
        <property id="homogeneous" query="False" default="0" visible="False"/>
    </properties>
</glade-widget-class>
```

Find:
```
<glade-widget-group name="python" title="HAL Python">
```

Add after:
```
<glade-widget-class-ref name="Ncam"/>
```

IMPORTANT NOTE : when linuxcnc updates, it recreates directories and if features do not load you will have to check and redo some steps.

8. Using embedded in LinuxCNC.
Add these lines into your .ini file inside [DISPLAY] section and changing *username* as the yours:

```
[DISPLAY]
# required NativeCAM item :
NCAM_DIR = ncam

# required NativeCAM item :
PROGRAM_PREFIX = ncam/scripts/

# required NativeCAM item :
EMBED_TAB_NAME = NativeCAM
EMBED_TAB_COMMAND = gladevcp -x {XID} -U --catalog=mill
/usr/share/linuxcnc/aux_gladevcp/NativeCAM/ncam.ui

.....

[RS274NGC]
PARAMETER_FILE = linuxcnc.var
SUBROUTINE_PATH = (put here the following line)
  ncam/my-stuff:ncam/lib/mill:ncam/lib/utilities:/home/username/nativecam/lib
```

9. To run NativeCAM standalone from any place we need to add it to the command path.

```
cd /usr/bin/
sudo ln /usr/share/linuxcnc/aux_gladevcp/NativeCAM/ncam.py
sudo mv ncam.py ncam
```

Now, to run the application simply type `ncam`.

To verify the path from which ncam is run:
`which ncam`

It should return: /usr/bin/ncam

10. Last and optional step:
replace ncam.py and pref_edit.py files with updated (and hopefully fixed) versions.

NOTE PER L'INSTALLAZIONE DI NativeCAM

Per visualizzare i percorsi di ricerca dei moduli da importare in un programma python:
(esempio: `from ncam import NCam`)
(in quale file viene stabilito il percorso?)

```
pi@raspberrypi:~ $ python3 -m site
sys.path = [
    '/home/pi',
    '/usr/lib/python37.zip',
    '/usr/lib/python3.7',
    '/usr/lib/python3.7/lib-dynload',
    '/usr/local/lib/python3.7/dist-packages',
    '/usr/lib/python3/dist-packages',
    '/usr/lib/python3/dist-packages/NativeCAM',
]
```

oppure da riga di comando python:
(pprint() fornisce una formattazione migliore dell'output)

```
pi@raspberrypi:~ $ python3
Python 3.7.3 (default, Mar 23 2024, 16:12:05)
[GCC 8.3.0] on linux
Type "help", "copyright", "credits" or "license" for more information.
>>> import sys
>>> import pprint
>>> pprint.pprint(sys.path)
['',
 '/usr/lib/python37.zip',
 '/usr/lib/python3.7',
 '/usr/lib/python3.7/lib-dynload',
 '/usr/local/lib/python3.7/dist-packages',
 '/usr/lib/python3/dist-packages',
 '/usr/lib/python3/dist-packages/NativeCAM']
>>
```