

Sphinx tutorial

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1 Prerequisite

1. Python ≥ 3.5
2. Pip ≥ 3

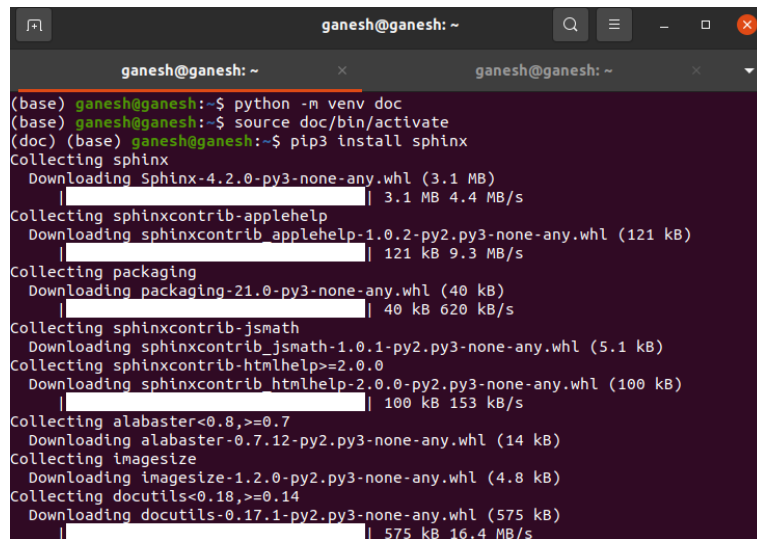
2 Installation

- Its better to create a virtual environment before installing Sphinx.
- Create the virtual environment with the following command

```
$ python3 -m venv env  
$ source env/bin/activate
```

- Virtual environment env (in the screenshot it has named as doc) is created and activated, now install Sphinx as shown in Figure below

```
$ pip install sphinx
```

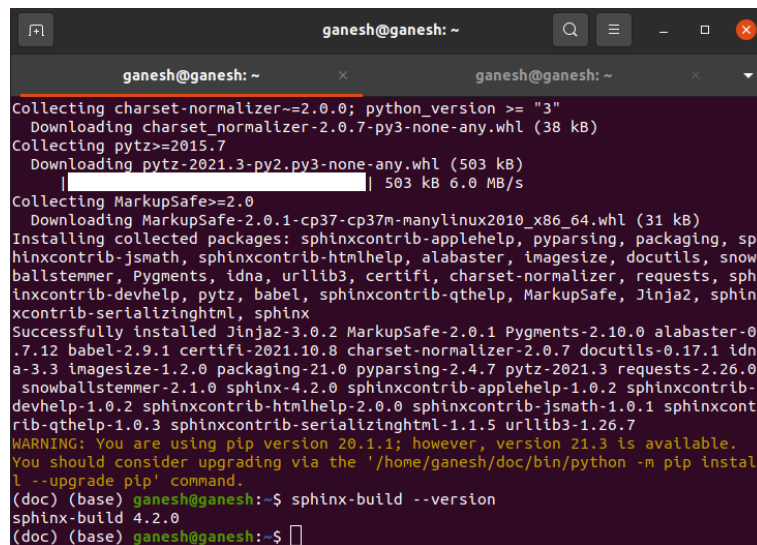


```
ganesh@ganesh: ~  
ganesh@ganesh: ~  
(base) ganesh@ganesh:~$ python -m venv doc  
(base) ganesh@ganesh:~$ source doc/bin/activate  
(doc) (base) ganesh@ganesh:~$ pip3 install sphinx  
Collecting sphinx  
  Downloading Sphinx-4.2.0-py3-none-any.whl (3.1 MB)  
    | 3.1 MB 4.4 MB/s  
Collecting sphinxcontrib-applehelp  
  Downloading sphinxcontrib_applehelp-1.0.2-py2.py3-none-any.whl (121 kB)  
    | 121 kB 9.3 MB/s  
Collecting packaging  
  Downloading packaging-21.0-py3-none-any.whl (40 kB)  
    | 40 kB 620 kB/s  
Collecting sphinxcontrib-jsmath  
  Downloading sphinxcontrib_jsmath-1.0.1-py2.py3-none-any.whl (5.1 kB)  
Collecting sphinxcontrib-htmlhelp>=2.0.0  
  Downloading sphinxcontrib_htmlhelp-2.0.0-py2.py3-none-any.whl (100 kB)  
    | 100 kB 153 kB/s  
Collecting alabaster<0.8,>=0.7  
  Downloading alabaster-0.7.12-py2.py3-none-any.whl (14 kB)  
Collecting imagesize  
  Downloading imagesize-1.2.0-py2.py3-none-any.whl (4.8 kB)  
Collecting docutils<0.18,>=0.14  
  Downloading docutils-0.17.1-py2.py3-none-any.whl (575 kB)  
    | 575 kB 16.4 MB/s
```

Figure 1: *Sphinx installation using pip*

- To verify the installation, type the following command this should display the version of the sphinx

```
$ sphinx-build --version
```

A terminal window titled 'ganesh@ganesh: ~' showing the output of a pip install command. The output lists the collection and downloading of various packages including charset-normalizer, pytz, MarkupSafe, Jinja2, and sphinx. It also shows the successful installation of these packages and a list of installed versions. A warning message suggests upgrading pip from 20.1.1 to 21.3. Finally, the command 'sphinx-build --version' is executed, displaying the output 'sphinx-build 4.2.0'.

```
ganesh@ganesh: ~  
Collecting charset-normalizer~=2.0.0; python_version >= "3"  
  Downloading charset_normalizer-2.0.7-py3-none-any.whl (38 kB)  
Collecting pytz>=2015.7  
  Downloading pytz-2021.3-py2.py3-none-any.whl (503 kB)  
    | 503 kB 6.0 MB/s  
Collecting MarkupSafe>=2.0  
  Downloading MarkupSafe-2.0.1-cp37-cp37m-manylinux2010_x86_64.whl (31 kB)  
Installing collected packages: sphinxcontrib-applehelp, pyparsing, packaging, sphinxcontrib-jsmath, sphinxcontrib-htmlhelp, alabaster, imagesize, docutils, snowballstemmer, Pygments, idna, urllib3, certifi, charset-normalizer, requests, sphinxcontrib-devhelp, pytz, babel, sphinxcontrib-qthelp, MarkupSafe, Jinja2, sphinxcontrib-serializinghtml, sphinx  
Successfully installed Jinja2-3.0.2 MarkupSafe-2.0.1 Pygments-2.10.0 alabaster-0.7.12 babel-2.9.1 certifi-2021.10.8 charset-normalizer-2.0.7 docutils-0.17.1 idna-3.3 imagesize-1.2.0 packaging-21.0 pyparsing-2.4.7 pytz-2021.3 requests-2.26.0 snowballstemmer-2.1.0 sphinx-4.2.0 sphinxcontrib-applehelp-1.0.2 sphinxcontrib-devhelp-1.0.2 sphinxcontrib-htmlhelp-2.0.0 sphinxcontrib-jsmath-1.0.1 sphinxcontrib-qthelp-1.0.3 sphinxcontrib-serializinghtml-1.1.5 urllib3-1.26.7  
WARNING: You are using pip version 20.1.1; however, version 21.3 is available.  
You should consider upgrading via the '/home/ganesh/doc/bin/python -m pip install --upgrade pip' command.  
(doc) (base) ganesh@ganesh:~$ sphinx-build --version  
sphinx-build 4.2.0  
(doc) (base) ganesh@ganesh:~$
```

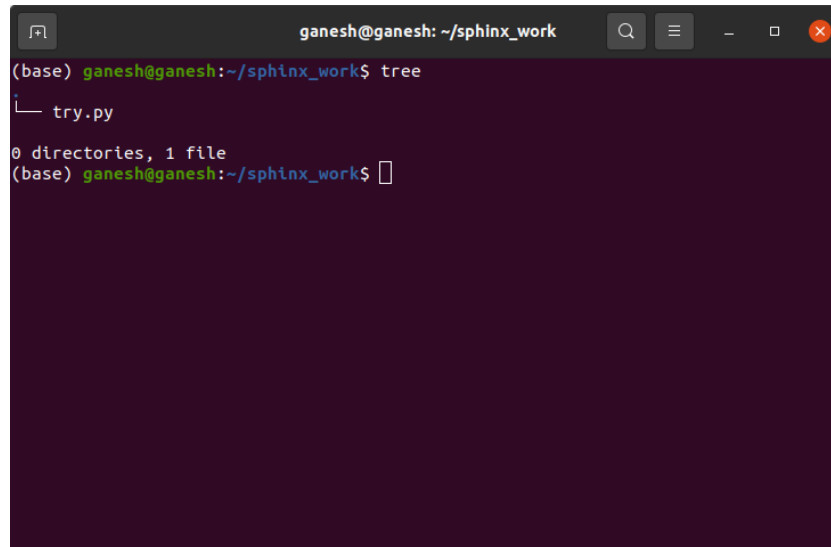
Figure 2: *Sphinx version check*

3 Project creation

- Create a directory or open a directory for which you need to document. In this tutorial will create a new directory named "sphinx_work"

```
$ mkdir sphinx_work
```

- Place the coding files inside the created directory as shown below (one coding file is placed as try.py, can have number of files)

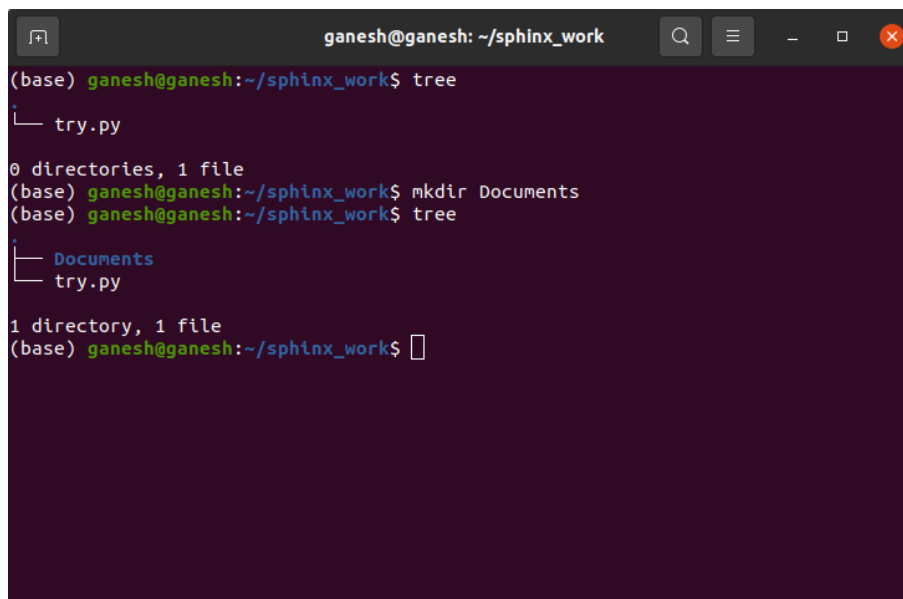
A terminal window titled 'ganesh@ganesh: ~/sphinx_work' with search, menu, and window control icons. The prompt is '(base) ganesh@ganesh:~/sphinx_work\$'. The command 'tree' has been executed, showing a directory tree with a single file 'try.py'. Below the tree, it says '0 directories, 1 file'. The prompt is now '(base) ganesh@ganesh:~/sphinx_work\$' with a cursor.

```
(base) ganesh@ganesh:~/sphinx_work$ tree
├── try.py

0 directories, 1 file
(base) ganesh@ganesh:~/sphinx_work$
```

Figure 3: *Initial directory structure*

- Now create a folder (Documents for example) to keep the documentation files related to the coding files

A terminal window titled 'ganesh@ganesh: ~/sphinx_work' with search, menu, and window control icons. The prompt is '(base) ganesh@ganesh:~/sphinx_work\$'. The command 'tree' is executed, showing the same structure as Figure 3. Then, the command 'mkdir Documents' is entered. The prompt is '(base) ganesh@ganesh:~/sphinx_work\$'. The command 'tree' is executed again, showing a new directory 'Documents' added to the tree. Below the tree, it says '1 directory, 1 file'. The prompt is now '(base) ganesh@ganesh:~/sphinx_work\$' with a cursor.

```
(base) ganesh@ganesh:~/sphinx_work$ tree
├── try.py

0 directories, 1 file
(base) ganesh@ganesh:~/sphinx_work$ mkdir Documents
(base) ganesh@ganesh:~/sphinx_work$ tree
├── Documents
├── try.py

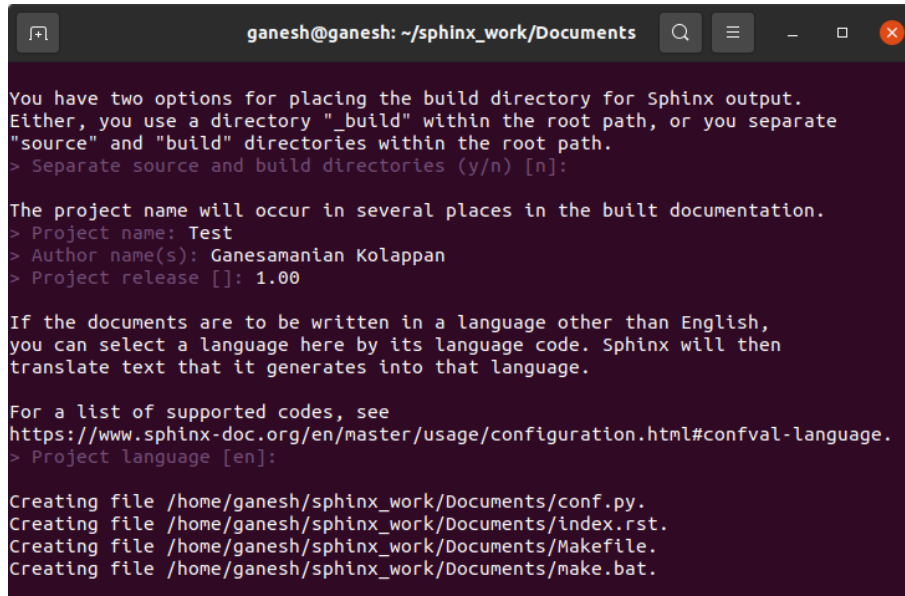
1 directory, 1 file
(base) ganesh@ganesh:~/sphinx_work$
```

Figure 4: *Documents folder creation*

- Once you created the documents navigate to the Documents folder and type the following command to initiate the project

```
$ sphinx-quickstart
```

- After execution of the above command need to enter few details as follows



```
ganesh@ganesh: ~/sphinx_work/Documents

You have two options for placing the build directory for Sphinx output.
Either, you use a directory "_build" within the root path, or you separate
"source" and "build" directories within the root path.
> Separate source and build directories (y/n) [n]:

The project name will occur in several places in the built documentation.
> Project name: Test
> Author name(s): Ganesamanian Kolappan
> Project release []: 1.00

If the documents are to be written in a language other than English,
you can select a language here by its language code. Sphinx will then
translate text that it generates into that language.

For a list of supported codes, see
https://www.sphinx-doc.org/en/master/usage/configuration.html#confval-language.
> Project language [en]:

Creating file /home/ganesh/sphinx_work/Documents/conf.py.
Creating file /home/ganesh/sphinx_work/Documents/index.rst.
Creating file /home/ganesh/sphinx_work/Documents/Makefile.
Creating file /home/ganesh/sphinx_work/Documents/make.bat.
```

Figure 5: *Startup data*

- Separate source and build directories (y/n) [n]: Leave it empty (the default, No) and press Enter
 - Project name: Test (type your project name, for example "Test") and press Enter
 - Author name(s): Ganesamanian Kolappan (Your name, might include more than one) and press Enter.
 - Project release []: 1.00 (your version) and press Enter.
 - Project language [en]: Leave it empty (the default, English) and press Enter.
- Once the details are entered the directory should look as below
 - Now we need to edit conf.py, open the conf.py in the VScode, to do following modification

```
ganesh@ganesh: ~/sphinx_work/Documents
Creating file /home/ganesh/sphinx_work/Documents/index.rst.
Creating file /home/ganesh/sphinx_work/Documents/Makefile.
Creating file /home/ganesh/sphinx_work/Documents/make.bat.

Finished: An initial directory structure has been created.

You should now populate your master file /home/ganesh/sphinx_work/Documents/index.rst and create other documentation source files. Use the Makefile to build the docs, like so:
    make builder
where "builder" is one of the supported builders, e.g. html, latex or linkcheck.

(base) ganesh@ganesh:~/sphinx_work/Documents$ tree
.
├── _build
├── conf.py
├── index.rst
├── make.bat
├── Makefile
├── _static
└── _templates

3 directories, 4 files
(base) ganesh@ganesh:~/sphinx_work/Documents$
```

Figure 6: *Directory structure after quickstart command*

- Uncomment the line 13, 14, 15
- Modify the line 15 as (we include double dot since the code file is in previous directory)

```
sys.path.insert(0, os.path.abspath('.'))
```

- Modify the line 33 as below to document the code file as well as to view it

```
extensions = ['sphinx.ext.autodoc',
              'sphinx.ext.viewcode',]
```

- The overall conf.py should look as below (for simplicity comments are removed)

```

1  #
2  #
3  #
4  #
5  #
6
7  ##Path setup-----
8
9  #
10 #
11 #
12 #
13 import os
14 import sys
15 sys.path.insert(0, os.path.abspath('.'))
16
17
18 # -- Project information -----
19
20 project = 'Test'
21 copyright = '2021, Ganesamanian Kolappan'
22 author = 'Ganesamanian Kolappan'
23
24 #
25 release = '1.00'
26
27
28 # -- General configuration -----
29
30 #
31 #
32 #
33 extensions = ['sphinx.ext.autodoc',
34               'sphinx.ext.viewcode',
35 ]
36
37 #
38
39 #
40 #

```

```

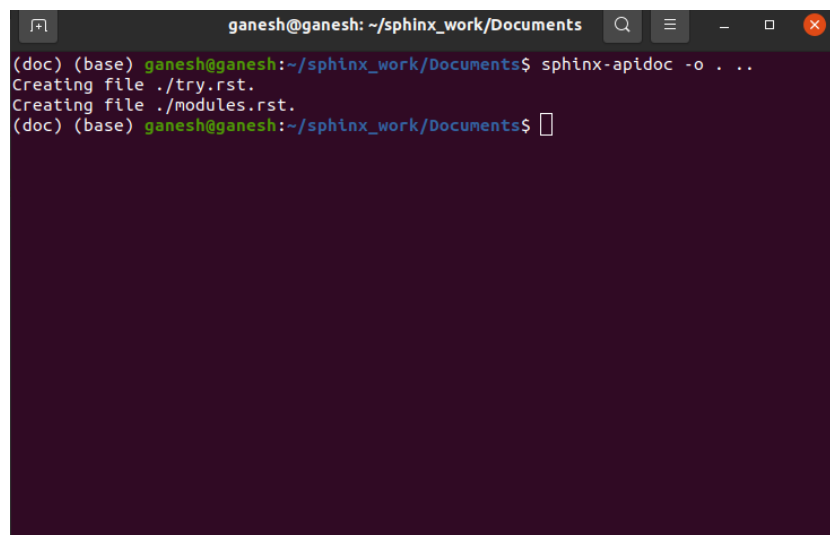
41 #
42
43
44 # -- Options for HTML output -----
45
46 #
47 #
48 #
49 html_theme = 'alabaster'
50
51 #
52 #
53 #

```

- After editing the conf.py, create the object file as follows (sphinx-apidoc -o target folder source folder)

```
$ sphinx-apidoc -o . ..
```

- This command creates "N" rst files (N is number of python files) + modules.rst (Combines all the python files hyperlink as one file)



```

ganesh@ganesh: ~/sphinx_work/Documents
(doc) (base) ganesh@ganesh:~/sphinx_work/Documents$ sphinx-apidoc -o . ..
Creating file ./try.rst.
Creating file ./modules.rst.
(doc) (base) ganesh@ganesh:~/sphinx_work/Documents$ 

```

Figure 7: *rst file creation*

- Open index.rst from Documents directory and edit as shown below, to include the coding file in documentation.

```

1 .. Test documentation master file, created by
2   sphinx-quickstart on Wed Nov  3 16:42:07 2021.
3   You can adapt this file completely to your liking, but it should at least
4   contain the root 'toctree' directive.
5
6 Welcome to Test's documentation!
7 =====
8
9 .. toctree::
10    :maxdepth: 2
11    :caption: Contents:
12
13 modules
14
15
16
17 Indices and tables
18 =====
19
20 * :ref:`genindex`
21 * :ref:`modindex`
22 * :ref:`search`

```

Figure 8: *Index only with modules*

- This index can include markdown files as well as supporting text files as shown below

```

1 .. Test documentation master file, created by
2   sphinx-quickstart on Fri Oct 22 16:19:02 2021.
3   You can adapt this file completely to your liking, but it should at least
4   contain the root 'toctree' directive.
5
6 Welcome to Test's documentation!
7 =====
8
9 .. _INTRODUCTION:
10 .. toctree::
11    :maxdepth: 2
12    :caption: RST File:
13
14    introduction
15
16 .. _MARKDOWN:
17 .. toctree::
18    :maxdepth: 2
19    :caption: Markdown File:
20
21    makr
22
23 .. _ADDITION:
24 .. toctree::
25    :maxdepth: 2
26    :caption: Python File:
27
28    modules
29
30
31 Indices and tables
32 =====
33
34 * :ref:`genindex`
35 * :ref:`modindex`
36 * :ref:`search`

```

Figure 9: *Index with markdown files and modules*

- To include markdown files, need to have additional two steps

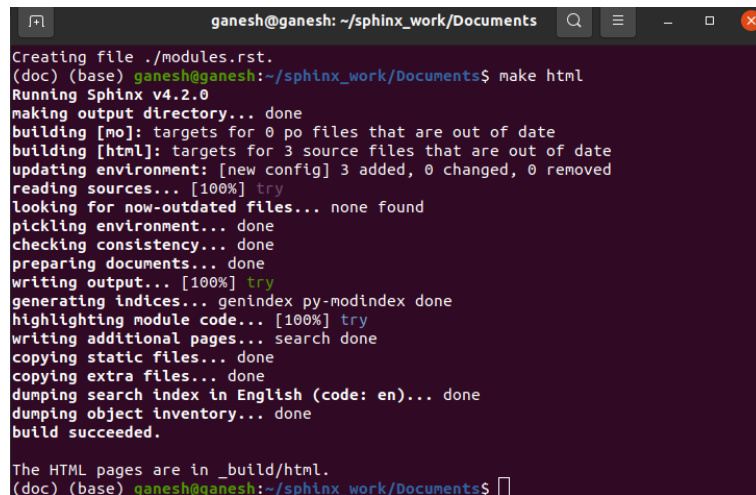
- Install parser for markdown

```
$ pip install myst-parser
```

- Then in your conf.py: in Extensions add ['myst-parser'] along with other two parameters.

- After edited index.rst make the html as below

```
$ make html
```

A terminal window titled 'ganesh@ganesh: ~/sphinx_work/Documents' showing the execution of 'make html'. The output displays the Sphinx build process, including creating modules.rst, making the output directory, building [mo] and [html] targets, updating the environment, reading sources, looking for now-outdated files, pickling the environment, checking consistency, preparing documents, writing output, generating indices, highlighting module code, writing additional pages, copying static and extra files, dumping the search index, and finally dumping the object inventory. The build is successful, and the HTML pages are located in '_build/html'.

```
ganesh@ganesh: ~/sphinx_work/Documents
Creating file ./modules.rst.
(doc) (base) ganesh@ganesh:~/sphinx_work/Documents$ make html
Running Sphinx v4.2.0
making output directory... done
building [mo]: targets for 0 po files that are out of date
building [html]: targets for 3 source files that are out of date
updating environment: [new config] 3 added, 0 changed, 0 removed
reading sources... [100%] try
looking for now-outdated files... none found
pickling environment... done
checking consistency... done
preparing documents... done
writing output... [100%] try
generating indices... genindex py-modindex done
highlighting module code... [100%] try
writing additional pages... search done
copying static files... done
copying extra files... done
dumping search index in English (code: en)... done
dumping object inventory... done
build succeeded.

The HTML pages are in _build/html.
(doc) (base) ganesh@ganesh:~/sphinx_work/Documents$
```

Figure 10: *Making html*

- This could have created index.html files at Documents/_build/html location.
- Open index.html file to view the documentation for the coding file.



Figure 11: *Final output of the tutorial*

- To have a very descriptive documentation for coding files, there should be reasonable comments and doc strings for each functions.