Installation of NumPy

In [3]:
```
pip install jupyterlab
```

Requirement already satisfied: jupyterlab in /opt/anaconda3/lib/python3.1
2/site-packages (4.2.5)
Requirement already satisfied: async-lru>=1.0.0 in /opt/anaconda3/lib/pyth
on3.12/site-packages (from jupyterlab) (2.0.4)
Requirement already satisfied: httpx>=0.25.0 in /opt/anaconda3/lib/python
3.12/site-packages (from jupyterlab) (0.27.0)
Requirement already satisfied: ipykernel>=6.5.0 in /opt/anaconda3/lib/pyth
on3.12/site-packages (from jupyterlab) (6.28.0)
Requirement already satisfied: jinja2>=3.0.3 in /opt/anaconda3/lib/python
3.12/site-packages (from jupyterlab) (3.1.4)
Requirement already satisfied: jupyter-core in /opt/anaconda3/lib/python3.
12/site-packages (from jupyterlab) (5.7.2)
Requirement already satisfied: jupyter-lsp>=2.0.0 in /opt/anaconda3/lib/py
thon3.12/site-packages (from jupyterlab) (2.2.0)
Requirement already satisfied: jupyter-server<3,>=2.4.0 in /opt/anaconda3/
lib/python3.12/site-packages (from jupyterlab) (2.14.1)
Requirement already satisfied: jupyterlab-server<3,>=2.27.1 in /opt/anacon
da3/lib/python3.12/site-packages (from jupyterlab) (2.27.3)
Requirement already satisfied: notebook-shim>=0.2 in /opt/anaconda3/lib/py
thon3.12/site-packages (from jupyterlab) (0.2.3)
Requirement already satisfied: packaging in /opt/anaconda3/lib/python3.12/
site-packages (from jupyterlab) (24.1)
Requirement already satisfied: setuptools>=40.1.0 in /opt/anaconda3/lib/py
thon3.12/site-packages (from jupyterlab) (75.1.0)
Requirement already satisfied: tornado>=6.2.0 in /opt/anaconda3/lib/python
3.12/site-packages (from jupyterlab) (6.4.1)
Requirement already satisfied: traitlets in /opt/anaconda3/lib/python3.12/
site-packages (from jupyterlab) (5.14.3)
Requirement already satisfied: anyio in /opt/anaconda3/lib/python3.12/site
-packages (from httpx>=0.25.0->jupyterlab) (4.2.0)
Requirement already satisfied: certifi in /opt/anaconda3/lib/python3.12/si
te-packages (from httpx>=0.25.0->jupyterlab) (2024.8.30)
Requirement already satisfied: httpcore==1.* in /opt/anaconda3/lib/python
3.12/site-packages (from httpx>=0.25.0->jupyterlab) (1.0.2)
Requirement already satisfied: idna in /opt/anaconda3/lib/python3.12/site-
packages (from httpx>=0.25.0->jupyterlab) (3.7)
Requirement already satisfied: sniffio in /opt/anaconda3/lib/python3.12/si
te-packages (from httpx>=0.25.0->jupyterlab) (1.3.0)
Requirement already satisfied: h11<0.15,>=0.13 in /opt/anaconda3/lib/pytho
n3.12/site-packages (from httpcore==1.*->httpx>=0.25.0->jupyterlab) (0.14.
0)
Requirement already satisfied: appnope in /opt/anaconda3/lib/python3.12/si
te-packages (from ipykernel>=6.5.0->jupyterlab) (0.1.3)
Requirement already satisfied: comm>=0.1.1 in /opt/anaconda3/lib/python3.1
2/site-packages (from ipykernel>=6.5.0->jupyterlab) (0.2.1)
Requirement already satisfied: debugpy>=1.6.5 in /opt/anaconda3/lib/python

3.12/site-packages (from ipykernel>=6.5.0->jupyterlab) (1.6.7)
Requirement already satisfied: ipython>=7.23.1 in /opt/anaconda3/lib/pytho
n3.12/site-packages (from ipykernel>=6.5.0->jupyterlab) (8.27.0)
Requirement already satisfied: jupyter-client>=6.1.12 in /opt/anaconda3/li
b/python3.12/site-packages (from ipykernel>=6.5.0->jupyterlab) (8.6.0)
Requirement already satisfied: matplotlib-inline>=0.1 in /opt/anaconda3/li
b/python3.12/site-packages (from ipykernel>=6.5.0->jupyterlab) (0.1.6)
Requirement already satisfied: nest-asyncio in /opt/anaconda3/lib/python3.
12/site-packages (from ipykernel>=6.5.0->jupyterlab) (1.6.0)
Requirement already satisfied: psutil in /opt/anaconda3/lib/python3.12/sit
e-packages (from ipykernel>=6.5.0->jupyterlab) (5.9.0)
Requirement already satisfied: pyzmq>=24 in /opt/anaconda3/lib/python3.12/
site-packages (from ipykernel>=6.5.0->jupyterlab) (25.1.2)
Requirement already satisfied: MarkupSafe>=2.0 in /opt/anaconda3/lib/pytho
n3.12/site-packages (from jinja2>=3.0.3->jupyterlab) (2.1.3)
Requirement already satisfied: platformdirs>=2.5 in /opt/anaconda3/lib/pyt
hon3.12/site-packages (from jupyter-core->jupyterlab) (3.10.0)
Requirement already satisfied: argon2-cffi>=21.1 in /opt/anaconda3/lib/pyt
hon3.12/site-packages (from jupyter-server<3,>=2.4.0->jupyterlab) (21.3.0)
Requirement already satisfied: jupyter-events>=0.9.0 in /opt/anaconda3/li
b/python3.12/site-packages (from jupyter-server<3,>=2.4.0->jupyterlab) (0.
10.0)
Requirement already satisfied: jupyter-server-terminals>=0.4.4 in /opt/ana
conda3/lib/python3.12/site-packages (from jupyter-server<3,>=2.4.0->jupyte
rlab) (0.4.4)
Requirement already satisfied: nbconvert>=6.4.4 in /opt/anaconda3/lib/pyth
on3.12/site-packages (from jupyter-server<3,>=2.4.0->jupyterlab) (7.16.4)
Requirement already satisfied: nbformat>=5.3.0 in /opt/anaconda3/lib/pytho
n3.12/site-packages (from jupyter-server<3,>=2.4.0->jupyterlab) (5.10.4)
Requirement already satisfied: overrides>=5.0 in /opt/anaconda3/lib/python
3.12/site-packages (from jupyter-server<3,>=2.4.0->jupyterlab) (7.4.0)
Requirement already satisfied: prometheus-client>=0.9 in /opt/anaconda3/li
b/python3.12/site-packages (from jupyter-server<3,>=2.4.0->jupyterlab) (0.
14.1)
Requirement already satisfied: send2trash>=1.8.2 in /opt/anaconda3/lib/pyt
hon3.12/site-packages (from jupyter-server<3,>=2.4.0->jupyterlab) (1.8.2)
Requirement already satisfied: terminado>=0.8.3 in /opt/anaconda3/lib/pyth
on3.12/site-packages (from jupyter-server<3,>=2.4.0->jupyterlab) (0.17.1)
Requirement already satisfied: websocket-client>=1.7 in /opt/anaconda3/li
b/python3.12/site-packages (from jupyter-server<3,>=2.4.0->jupyterlab) (1.
8.0)
Requirement already satisfied: babel>=2.10 in /opt/anaconda3/lib/python3.1
2/site-packages (from jupyterlab-server<3,>=2.27.1->jupyterlab) (2.11.0)
Requirement already satisfied: json5>=0.9.0 in /opt/anaconda3/lib/python3.
12/site-packages (from jupyterlab-server<3,>=2.27.1->jupyterlab) (0.9.6)
Requirement already satisfied: jsonschema>=4.18.0 in /opt/anaconda3/lib/py
thon3.12/site-packages (from jupyterlab-server<3,>=2.27.1->jupyterlab) (4.
23.0)
Requirement already satisfied: requests>=2.31 in /opt/anaconda3/lib/python
3.12/site-packages (from jupyterlab-server<3,>=2.27.1->jupyterlab) (2.32.
3)
Requirement already satisfied: argon2-cffi-bindings in /opt/anaconda3/lib/
python3.12/site-packages (from argon2-cffi>=21.1->jupyter-server<3,>=2.4.0

–>jupyterlab) (21.2.0)
Requirement already satisfied: pytz>=2015.7 in /opt/anaconda3/lib/python3.
12/site–packages (from babel>=2.10–>jupyterlab-server<3,>=2.27.1–>jupyterl
ab) (2024.1)
Requirement already satisfied: decorator in /opt/anaconda3/lib/python3.12/
site–packages (from ipython>=7.23.1–>ipykernel>=6.5.0–>jupyterlab) (5.1.1)
Requirement already satisfied: jedi>=0.16 in /opt/anaconda3/lib/python3.1
2/site–packages (from ipython>=7.23.1–>ipykernel>=6.5.0–>jupyterlab) (0.1
9.1)
Requirement already satisfied: prompt-toolkit<3.1.0,>=3.0.41 in /opt/anaco
nda3/lib/python3.12/site–packages (from ipython>=7.23.1–>ipykernel>=6.5.0–
>jupyterlab) (3.0.43)
Requirement already satisfied: pygments>=2.4.0 in /opt/anaconda3/lib/pytho
n3.12/site–packages (from ipython>=7.23.1–>ipykernel>=6.5.0–>jupyterlab) (
2.15.1)
Requirement already satisfied: stack–data in /opt/anaconda3/lib/python3.1
2/site–packages (from ipython>=7.23.1–>ipykernel>=6.5.0–>jupyterlab) (0.2.
0)
Requirement already satisfied: pexpect>4.3 in /opt/anaconda3/lib/python3.1
2/site–packages (from ipython>=7.23.1–>ipykernel>=6.5.0–>jupyterlab) (4.8.
0)
Requirement already satisfied: attrs>=22.2.0 in /opt/anaconda3/lib/python
3.12/site–packages (from jsonschema>=4.18.0–>jupyterlab-server<3,>=2.27.1–
>jupyterlab) (23.1.0)
Requirement already satisfied: jsonschema–specifications>=2023.03.6 in /op
t/anaconda3/lib/python3.12/site–packages (from jsonschema>=4.18.0–>jupyter
lab-server<3,>=2.27.1–>jupyterlab) (2023.7.1)
Requirement already satisfied: referencing>=0.28.4 in /opt/anaconda3/lib/p
ython3.12/site–packages (from jsonschema>=4.18.0–>jupyterlab-server<3,>=2.
27.1–>jupyterlab) (0.30.2)
Requirement already satisfied: rpds-py>=0.7.1 in /opt/anaconda3/lib/python
3.12/site–packages (from jsonschema>=4.18.0–>jupyterlab-server<3,>=2.27.1–
>jupyterlab) (0.10.6)
Requirement already satisfied: python–dateutil>=2.8.2 in /opt/anaconda3/li
b/python3.12/site–packages (from jupyter-client>=6.1.12–>ipykernel>=6.5.0–
>jupyterlab) (2.9.0.post0)
Requirement already satisfied: python–json–logger>=2.0.4 in /opt/anaconda
3/lib/python3.12/site–packages (from jupyter-events>=0.9.0–>jupyter-server
<3,>=2.4.0–>jupyterlab) (2.0.7)
Requirement already satisfied: pyyaml>=5.3 in /opt/anaconda3/lib/python3.1
2/site–packages (from jupyter-events>=0.9.0–>jupyter-server<3,>=2.4.0–>jup
yterlab) (6.0.1)
Requirement already satisfied: rfc3339–validator in /opt/anaconda3/lib/pyt
hon3.12/site–packages (from jupyter-events>=0.9.0–>jupyter-server<3,>=2.4.
0–>jupyterlab) (0.1.4)
Requirement already satisfied: rfc3986–validator>=0.1.1 in /opt/anaconda3/
lib/python3.12/site–packages (from jupyter-events>=0.9.0–>jupyter-server<
3,>=2.4.0–>jupyterlab) (0.1.1)
Requirement already satisfied: beautifulsoup4 in /opt/anaconda3/lib/python
3.12/site–packages (from nbconvert>=6.4.4–>jupyter-server<3,>=2.4.0–>jupyt
erlab) (4.12.3)
Requirement already satisfied: bleach!=5.0.0 in /opt/anaconda3/lib/python
3.12/site–packages (from nbconvert>=6.4.4–>jupyter-server<3,>=2.4.0–>jupyt

erlab) (4.1.0)
Requirement already satisfied: defusedxml in /opt/anaconda3/lib/python3.1
2/site-packages (from nbconvert>=6.4.4->jupyter-server<3,>=2.4.0->jupyterl
ab) (0.7.1)
Requirement already satisfied: jupyterlab-pygments in /opt/anaconda3/lib/p
ython3.12/site-packages (from nbconvert>=6.4.4->jupyter-server<3,>=2.4.0->
jupyterlab) (0.1.2)
Requirement already satisfied: mistune<4,>=2.0.3 in /opt/anaconda3/lib/pyt
hon3.12/site-packages (from nbconvert>=6.4.4->jupyter-server<3,>=2.4.0->ju
pyterlab) (2.0.4)
Requirement already satisfied: nbclient>=0.5.0 in /opt/anaconda3/lib/pytho
n3.12/site-packages (from nbconvert>=6.4.4->jupyter-server<3,>=2.4.0->jupy
terlab) (0.8.0)
Requirement already satisfied: pandocfilters>=1.4.1 in /opt/anaconda3/lib/
python3.12/site-packages (from nbconvert>=6.4.4->jupyter-server<3,>=2.4.0-
>jupyterlab) (1.5.0)
Requirement already satisfied: tinycss2 in /opt/anaconda3/lib/python3.12/s
ite-packages (from nbconvert>=6.4.4->jupyter-server<3,>=2.4.0->jupyterlab)
(1.2.1)
Requirement already satisfied: fastjsonschema>=2.15 in /opt/anaconda3/lib/
python3.12/site-packages (from nbformat>=5.3.0->jupyter-server<3,>=2.4.0->
jupyterlab) (2.16.2)
Requirement already satisfied: charset-normalizer<4,>=2 in /opt/anaconda3/
lib/python3.12/site-packages (from requests>=2.31->jupyterlab-server<3,>=
2.27.1->jupyterlab) (3.3.2)
Requirement already satisfied: urllib3<3,>=1.21.1 in /opt/anaconda3/lib/py
thon3.12/site-packages (from requests>=2.31->jupyterlab-server<3,>=2.27.1-
>jupyterlab) (2.2.3)
Requirement already satisfied: ptyprocess in /opt/anaconda3/lib/python3.1
2/site-packages (from terminado>=0.8.3->jupyter-server<3,>=2.4.0->jupyterl
ab) (0.7.0)
Requirement already satisfied: six>=1.9.0 in /opt/anaconda3/lib/python3.1
2/site-packages (from bleach!=5.0.0->nbconvert>=6.4.4->jupyter-server<3,>=
2.4.0->jupyterlab) (1.16.0)
Requirement already satisfied: webencodings in /opt/anaconda3/lib/python3.
12/site-packages (from bleach!=5.0.0->nbconvert>=6.4.4->jupyter-server<3,>
=2.4.0->jupyterlab) (0.5.1)
Requirement already satisfied: parso<0.9.0,>=0.8.3 in /opt/anaconda3/lib/p
ython3.12/site-packages (from jedi>=0.16->ipython>=7.23.1->ipykernel>=6.5.
0->jupyterlab) (0.8.3)
Collecting fqdn (from jsonschema[format-nongpl]>=4.18.0->jupyter-events>=
0.9.0->jupyter-server<3,>=2.4.0->jupyterlab)
  Downloading fqdn-1.5.1-py3-none-any.whl.metadata (1.4 kB)
Collecting isoduration (from jsonschema[format-nongpl]>=4.18.0->jupyter-ev
ents>=0.9.0->jupyter-server<3,>=2.4.0->jupyterlab)
  Downloading isoduration-20.11.0-py3-none-any.whl.metadata (5.7 kB)
Requirement already satisfied: jsonpointer>1.13 in /opt/anaconda3/lib/pyth
on3.12/site-packages (from jsonschema[format-nongpl]>=4.18.0->jupyter-even
ts>=0.9.0->jupyter-server<3,>=2.4.0->jupyterlab) (2.1)
Collecting uri-template (from jsonschema[format-nongpl]>=4.18.0->jupyter-e
vents>=0.9.0->jupyter-server<3,>=2.4.0->jupyterlab)
  Downloading uri_template-1.3.0-py3-none-any.whl.metadata (8.8 kB)
Collecting webcolors>=24.6.0 (from jsonschema[format-nongpl]>=4.18.0->jupy

```
ter-events>=0.9.0->jupyter-server<3,>=2.4.0->jupyterlab)
  Downloading webcolors-24.11.1-py3-none-any.whl.metadata (2.2 kB)
Requirement already satisfied: wcwidth in /opt/anaconda3/lib/python3.12/si
te-packages (from prompt-toolkit<3.1.0,>=3.0.41->ipython>=7.23.1->ipykerne
l>=6.5.0->jupyterlab) (0.2.5)
Requirement already satisfied: cffi>=1.0.1 in /opt/anaconda3/lib/python3.1
2/site-packages (from argon2-cffi-bindings->argon2-cffi>=21.1->jupyter-ser
ver<3,>=2.4.0->jupyterlab) (1.17.1)
Requirement already satisfied: soupsieve>1.2 in /opt/anaconda3/lib/python
3.12/site-packages (from beautifulsoup4->nbconvert>=6.4.4->jupyter-server<
3,>=2.4.0->jupyterlab) (2.5)
Requirement already satisfied: executing in /opt/anaconda3/lib/python3.12/
site-packages (from stack-data->ipython>=7.23.1->ipykernel>=6.5.0->jupyter
lab) (0.8.3)
Requirement already satisfied: asttokens in /opt/anaconda3/lib/python3.12/
site-packages (from stack-data->ipython>=7.23.1->ipykernel>=6.5.0->jupyter
lab) (2.0.5)
Requirement already satisfied: pure-eval in /opt/anaconda3/lib/python3.12/
site-packages (from stack-data->ipython>=7.23.1->ipykernel>=6.5.0->jupyter
lab) (0.2.2)
Requirement already satisfied: pycparser in /opt/anaconda3/lib/python3.12/
site-packages (from cffi>=1.0.1->argon2-cffi-bindings->argon2-cffi>=21.1->
jupyter-server<3,>=2.4.0->jupyterlab) (2.21)
Requirement already satisfied: arrow>=0.15.0 in /opt/anaconda3/lib/python
3.12/site-packages (from isoduration->jsonschema[format-nongpl]>=4.18.0->j
upyter-events>=0.9.0->jupyter-server<3,>=2.4.0->jupyterlab) (1.2.3)
Downloading webcolors-24.11.1-py3-none-any.whl (14 kB)
Downloading fqdn-1.5.1-py3-none-any.whl (9.1 kB)
Downloading isoduration-20.11.0-py3-none-any.whl (11 kB)
Downloading uri_template-1.3.0-py3-none-any.whl (11 kB)
Installing collected packages: webcolors, uri-template, fqdn, isoduration
Successfully installed fqdn-1.5.1 isoduration-20.11.0 uri-template-1.3.0 w
ebcolors-24.11.1
Note: you may need to restart the kernel to use updated packages.
```

In [1]:
```
pip -V
```

```
pip 24.2 from /opt/anaconda3/lib/python3.12/site-packages/pip (python 3.1
2)
Note: you may need to restart the kernel to use updated packages.
```

In [1]:
```
!pip install numpy
```

```
Requirement already satisfied: numpy in /opt/anaconda3/lib/python3.12/site
-packages (1.26.4)
```

In [3]:
```
numpy -V
```

```
---------------------------------------------------------------------
-
NameError                                    Traceback (most recent call las
t)
Cell In[3], line 1
----> 1 numpy -V

NameError: name 'numpy' is not defined
```

In [7]: `!pip freeze`

```
aext-assistant @ file:///private/var/folders/c_/qfmhj66j0tn016nkx_th4hxm00
00gp/T/abs_24994515xd/croot/aext-assistant_1717062163042/work
aext-assistant-server @ file:///private/var/folders/sy/f16zz6x50xz3113nwtb
9bvq00000gp/T/abs_4boob09gv8/croot/aext-assistant-server_1717059973985/wor
k
aext-core @ file:///private/var/folders/sy/f16zz6x50xz3113nwtb9bvq00000gp/
T/abs_3etmw5tx6d/croot/aext-core_1717056386167/work
aext-core-server @ file:///private/var/folders/c_/qfmhj66j0tn016nkx_th4hxm
0000gp/T/abs_68sv0mesk_/croot/aext-core-server_1717075032630/work
aext-panels @ file:///private/var/folders/c_/qfmhj66j0tn016nkx_th4hxm0000g
p/T/abs_892vjkdux1/croot/aext-panels_1717062179502/work
aext-panels-server @ file:///private/var/folders/c_/qfmhj66j0tn016nkx_th4h
xm0000gp/T/abs_7cdpxd64im/croot/aext-panels-server_1717060126704/work
aext-share-notebook @ file:///private/var/folders/sy/f16zz6x50xz3113nwtb9b
vq00000gp/T/abs_e5jlgefh0_/croot/aext-share-notebook_1717059291973/work
aext-share-notebook-server @ file:///private/var/folders/sy/f16zz6x50xz311
3nwtb9bvq00000gp/T/abs_9fjepxgus_/croot/aext-share-notebook-server_1717057
945219/work
aext-shared @ file:///private/var/folders/sy/f16zz6x50xz3113nwtb9bvq00000g
p/T/abs_b8kj3d7nes/croot/aext-shared_1716991096609/work
aiobotocore @ file:///private/var/folders/sy/f16zz6x50xz3113nwtb9bvq00000g
p/T/abs_d5vpncfh71/croot/aiobotocore_1714464397445/work
aiohappyeyeballs @ file:///private/var/folders/c_/qfmhj66j0tn016nkx_th4hxm
0000gp/T/abs_15gsua8xj2/croot/aiohappyeyeballs_1725434021301/work
aiohttp @ file:///private/var/folders/sy/f16zz6x50xz3113nwtb9bvq00000gp/T/
abs_09lqy3yoen/croot/aiohttp_1725527765804/work
aioitertools @ file:///tmp/build/80754af9/aioitertools_1607109665762/work
aiosignal @ file:///tmp/build/80754af9/aiosignal_1637843061372/work
alabaster @ file:///private/var/folders/c_/qfmhj66j0tn016nkx_th4hxm0000gp/
T/abs_fadeblw4_u/croot/alabaster_1718201487017/work
altair @ file:///Users/builder/cbouss/perseverance-python-buildout/croot/a
ltair_1699283258090/work
anaconda-anon-usage @ file:///private/var/folders/sy/f16zz6x50xz3113nwtb9b
vq00000gp/T/abs_b9r8fbjsvb/croot/anaconda-anon-usage_1710965086703/work
anaconda-catalogs @ file:///Users/builder/cbouss/perseverance-python-build
out/croot/anaconda-catalogs_1707347535535/work
anaconda-client @ file:///private/var/folders/c_/qfmhj66j0tn016nkx_th4hxm0
000gp/T/abs_4b0movhtkt/croot/anaconda-client_1708643341618/work
anaconda-cloud-auth @ file:///private/var/folders/sy/f16zz6x50xz3113nwtb9b
vq00000gp/T/abs_2fcwl3hx32/croot/anaconda-cloud-auth_1713991390572/work
anaconda-navigator @ file:///private/var/folders/c_/qfmhj66j0tn016nkx_th4h
xm0000gp/T/abs_f16zd04fsw/croot/anaconda-navigator_1727709709743/work
anaconda-project @ file:///private/var/folders/sy/f16zz6x50xz3113nwtb9bvq0
```

```
0000gp/T/abs_12_wppfswu/croot/anaconda-project_1706049206816/work
annotated-types @ file:///private/var/folders/c_/qfmhj66j0tn016nkx_th4hxm0
000gp/T/abs_fbh4enbns2/croot/annotated-types_1709542919423/work
anyio @ file:///private/var/folders/c_/qfmhj66j0tn016nkx_th4hxm0000gp/T/ab
s_646d7rz2z6/croot/anyio_1706220176177/work
appdirs==1.4.4
applaunchservices @ file:///private/var/folders/sy/f16zz6x50xz3113nwtb9bvq
00000gp/T/abs_7cw09cjfjy/croot/applaunchservices_1710249794279/work
appnope @ file:///Users/builder/cbouss/perseverance-python-buildout/croot/
appnope_1699320997592/work
appscript @ file:///private/var/folders/c_/qfmhj66j0tn016nkx_th4hxm0000gp/
T/abs_3ao9zdin6c/croot/appscript_1725388755161/work
archspec @ file:///croot/archspec_1709217642129/work
argon2-cffi @ file:///opt/conda/conda-bld/argon2-cffi_1645000214183/work
argon2-cffi-bindings @ file:///Users/builder/cbouss/perseverance-python-bu
ildout/croot/argon2-cffi-bindings_1699264521425/work
arrow @ file:///Users/builder/cbouss/perseverance-python-buildout/croot/ar
row_1699264564853/work
astroid @ file:///Users/builder/cbouss/perseverance-python-buildout/croot/
astroid_1699245291542/work
astropy @ file:///private/var/folders/c_/qfmhj66j0tn016nkx_th4hxm0000gp/T/
abs_b89rq1k_rm/croot/astropy_1726174615721/work
astropy-iers-data @ file:///private/var/folders/sy/f16zz6x50xz3113nwtb9bvq
00000gp/T/abs_fag9s9no07/croot/astropy-iers-data_1726000544957/work
asttokens @ file:///opt/conda/conda-bld/asttokens_1646925590279/work
async-lru @ file:///Users/builder/cbouss/perseverance-python-buildout/croo
t/async-lru_1701806219228/work
atomicwrites==1.4.0
attrs @ file:///Users/builder/cbouss/perseverance-python-buildout/croot/at
trs_1699282013651/work
Automat @ file:///tmp/build/80754af9/automat_1600298431173/work
autopep8 @ file:///croot/autopep8_1708962882016/work
Babel @ file:///Users/builder/cbouss/perseverance-python-buildout/croot/ba
bel_1699247663878/work
bcrypt @ file:///Users/builder/cbouss/perseverance-python-buildout/croot/b
crypt_1699247772835/work
beautifulsoup4 @ file:///private/var/folders/sy/f16zz6x50xz3113nwtb9bvq000
00gp/T/abs_74rj45rt1p/croot/beautifulsoup4-split_1718029835783/work
binaryornot @ file:///tmp/build/80754af9/binaryornot_1617751525010/work
black @ file:///private/var/folders/sy/f16zz6x50xz3113nwtb9bvq00000gp/T/ab
s_bf0nk5tyan/croot/black_1725573867948/work
bleach @ file:///opt/conda/conda-bld/bleach_1641577558959/work
blinker @ file:///Users/builder/cbouss/perseverance-python-buildout/croot/
blinker_1699240468146/work
bokeh @ file:///private/var/folders/c_/qfmhj66j0tn016nkx_th4hxm0000gp/T/ab
s_7896bxssvv/croot/bokeh_1727914489991/work
boltons @ file:///Users/builder/cbouss/perseverance-python-buildout/croot/
boltons_1699245321609/work
botocore @ file:///private/var/folders/c_/qfmhj66j0tn016nkx_th4hxm0000gp/
T/abs_ffxxgfgg06/croot/botocore_1714460536101/work
Bottleneck @ file:///private/var/folders/c_/qfmhj66j0tn016nkx_th4hxm0000g
p/T/abs_19gnn4b1vz/croot/bottleneck_1709069916591/work
Brotli @ file:///private/var/folders/c_/qfmhj66j0tn016nkx_th4hxm0000gp/T/a
```

bs_67j4p18ie3/croot/brotli-split_1714483158198/work
cachetools @ file:///private/var/folders/c_/qfmhj66j0tn016nkx_th4hxm0000g
p/T/abs_dd5gv9zyno/croot/cachetools_1713977103134/work
certifi @ file:///private/var/folders/sy/f16zz6x50xz3113nwtb9bvq00000gp/T/
abs_c7dh9wvd8f/croot/certifi_1725551679893/work/certifi
cffi @ file:///private/var/folders/sy/f16zz6x50xz3113nwtb9bvq00000gp/T/abs
_a1n4t3qsjy/croot/cffi_1726856449083/work
chardet @ file:///Users/builder/cbouss/perseverance-python-buildout/croot/
chardet_1699252638625/work
charset-normalizer @ file:///croot/charset-normalizer_1721748349566/work
click @ file:///Users/builder/cbouss/perseverance-python-buildout/croot/cl
ick_1699239792454/work
cloudpickle @ file:///private/var/folders/sy/f16zz6x50xz3113nwtb9bvq00000g
p/T/abs_ccg_cjom9o/croot/cloudpickle_1721657358298/work
colorama @ file:///Users/builder/cbouss/perseverance-python-buildout/croo
t/colorama_1699282337864/work
colorcet @ file:///private/var/folders/sy/f16zz6x50xz3113nwtb9bvq00000gp/
T/abs_db11vs0_s8/croot/colorcet_1709758355147/work
comm @ file:///private/var/folders/sy/f16zz6x50xz3113nwtb9bvq00000gp/T/abs
_aef2nlxc2o/croot/comm_1709322866518/work
conda @ file:///private/var/folders/sy/f16zz6x50xz3113nwtb9bvq00000gp/T/ab
s_d12oqipwuh/croot/conda_1729193905986/work
conda-build @ file:///private/var/folders/c_/qfmhj66j0tn016nkx_th4hxm0000g
p/T/abs_63_707h1h3/croot/conda-build_1726839926400/work
conda-content-trust @ file:///private/var/folders/sy/f16zz6x50xz3113nwtb9b
vq00000gp/T/abs_78eyko59n2/croot/conda-content-trust_1714483158098/work
conda-libmamba-solver @ file:///croot/conda-libmamba-solver_1727775630457/
work/src
conda-pack @ file:///private/var/folders/c_/qfmhj66j0tn016nkx_th4hxm0000g
p/T/abs_42kx1rpy5f/croot/conda-pack_1710258029312/work
conda-package-handling @ file:///private/var/folders/c_/qfmhj66j0tn016nkx_
th4hxm0000gp/T/abs_e9wolypncd/croot/conda-package-handling_1718138274564/w
ork
conda-repo-cli @ file:///private/var/folders/c_/qfmhj66j0tn016nkx_th4hxm00
00gp/T/abs_64hfjmrm1x/croot/conda-repo-cli_1727366908212/work
conda-token @ file:///croot/conda-token_1718995751285/work
conda_index @ file:///private/var/folders/sy/f16zz6x50xz3113nwtb9bvq00000g
p/T/abs_1a_659ifgv/croot/conda-index_1719338235019/work
conda_package_streaming @ file:///private/var/folders/c_/qfmhj66j0tn016nkx
_th4hxm0000gp/T/abs_ffn0m80aez/croot/conda-package-streaming_171813609111
9/work
constantly @ file:///private/var/folders/sy/f16zz6x50xz3113nwtb9bvq00000g
p/T/abs_37us04na64/croot/constantly_1703165604710/work
contourpy @ file:///Users/builder/cbouss/perseverance-python-buildout/croo
t/contourpy_1707340536404/work
cookiecutter @ file:///private/var/folders/sy/f16zz6x50xz3113nwtb9bvq00000
gp/T/abs_bepfulf80r/croot/cookiecutter_1711059824667/work
cryptography @ file:///private/var/folders/c_/qfmhj66j0tn016nkx_th4hxm0000
gp/T/abs_252z5r7hox/croot/cryptography_1724940564153/work
cssselect @ file:///private/var/folders/c_/qfmhj66j0tn016nkx_th4hxm0000gp/
T/abs_b5i_2e8lvm/croot/cssselect_1707339893171/work
cycler @ file:///tmp/build/80754af9/cycler_1637851556182/work
cytoolz @ file:///private/var/folders/c_/qfmhj66j0tn016nkx_th4hxm0000gp/T/

abs_46i_inkrxd/croot/cytoolz_1701729348812/work
dask @ file:///private/var/folders/sy/f16zz6x50xz3113nwtb9bvq00000gp/T/abs
_462kfitsfv/croot/dask-core_1725461365973/work
dask-expr @ file:///private/var/folders/c_/qfmhj66j0tn016nkx_th4hxm0000gp/
T/abs_51fqnzu7il/croot/dask-expr_1725522998501/work
datashader @ file:///private/var/folders/sy/f16zz6x50xz3113nwtb9bvq00000g
p/T/abs_c0enpwzygw/croot/datashader_1720533867716/work
debugpy @ file:///Users/builder/cbouss/perseverance-python-buildout/croot/
debugpy_1699267934478/work
decorator @ file:///opt/conda/conda-bld/decorator_1643638310831/work
defusedxml @ file:///tmp/build/80754af9/defusedxml_1615228127516/work
diff-match-patch @ file:///Users/ktietz/demo/mc3/conda-bld/diff-match-patc
h_1630511840874/work
dill @ file:///private/var/folders/c_/qfmhj66j0tn016nkx_th4hxm0000gp/T/abs
_774m4l3azq/croot/dill_1715094674566/work
distributed @ file:///private/var/folders/c_/qfmhj66j0tn016nkx_th4hxm0000g
p/T/abs_c2f3kpci15/croot/distributed_1725523023216/work
distro @ file:///private/var/folders/c_/qfmhj66j0tn016nkx_th4hxm0000gp/T/a
bs_b5l_bzm_c4/croot/distro_1714488255954/work
dmglib @ file:///private/var/folders/sy/f16zz6x50xz3113nwtb9bvq00000gp/T/a
bs_c274akzxeo/croot/dmglib_1719996269027/work
docstring-to-markdown @ file:///Users/builder/cbouss/perseverance-python-b
uildout/croot/docstring-to-markdown_1699248259185/work
docutils @ file:///Users/builder/cbouss/perseverance-python-buildout/croo
t/docutils_1699240610068/work
et-xmlfile @ file:///Users/builder/cbouss/perseverance-python-buildout/cro
ot/et_xmlfile_1699253278402/work
executing @ file:///opt/conda/conda-bld/executing_1646925071911/work
fastjsonschema @ file:///Users/builder/cbouss/perseverance-python-buildou
t/croot/python-fastjsonschema_1699241084188/work
filelock @ file:///Users/builder/cbouss/perseverance-python-buildout/croo
t/filelock_1701807880662/work
flake8 @ file:///private/var/folders/c_/qfmhj66j0tn016nkx_th4hxm0000gp/T/a
bs_165ba74yi9/croot/flake8_1708965268668/work
Flask @ file:///private/var/folders/sy/f16zz6x50xz3113nwtb9bvq00000gp/T/ab
s_0bn8z9nupr/croot/flask_1716545880759/work
fonttools @ file:///private/var/folders/sy/f16zz6x50xz3113nwtb9bvq00000gp/
T/abs_801fru8lup/croot/fonttools_1713551493489/work
fqdn==1.5.1
frozendict @ file:///private/var/folders/sy/f16zz6x50xz3113nwtb9bvq00000g
p/T/abs_f2kfyv072k/croot/frozendict_1713194840232/work
frozenlist @ file:///Users/builder/cbouss/perseverance-python-buildout/cro
ot/frozenlist_1699270045305/work
fsspec @ file:///private/var/folders/c_/qfmhj66j0tn016nkx_th4hxm0000gp/T/a
bs_4547s6nuzv/croot/fsspec_1724855593592/work
gensim @ file:///private/var/folders/c_/qfmhj66j0tn016nkx_th4hxm0000gp/T/a
bs_b6gb6lpj3r/croot/gensim_1725057958979/work
gitdb @ file:///tmp/build/80754af9/gitdb_1617117951232/work
GitPython @ file:///private/var/folders/sy/f16zz6x50xz3113nwtb9bvq00000gp/
T/abs_f76uw0_f83/croot/gitpython_1720455038091/work
greenlet @ file:///private/var/folders/sy/f16zz6x50xz3113nwtb9bvq00000gp/
T/abs_10cuim1il_/croot/greenlet_1702059962773/work
h11 @ file:///private/var/folders/c_/qfmhj66j0tn016nkx_th4hxm0000gp/T/abs_

```
14h6x3q_k6/croot/h11_1706652288187/work
h5py @ file:///private/var/folders/c_/qfmhj66j0tn016nkx_th4hxm0000gp/T/abs
_3cp9aol8sr/croot/h5py_1715094733268/work
HeapDict @ file:///Users/ktietz/demo/mc3/conda-bld/heapdict_1630598515714/
work
holoviews @ file:///private/var/folders/sy/f16zz6x50xz3113nwtb9bvq00000gp/
T/abs_82wr3h7dd2/croot/holoviews_1720533866606/work
httpcore @ file:///private/var/folders/sy/f16zz6x50xz3113nwtb9bvq00000gp/
T/abs_2ek8c13vuv/croot/httpcore_1706728466947/work
httpx @ file:///private/var/folders/sy/f16zz6x50xz3113nwtb9bvq00000gp/T/ab
s_74uqix89pr/croot/httpx_1723474816711/work
hvplot @ file:///private/var/folders/c_/qfmhj66j0tn016nkx_th4hxm0000gp/T/a
bs_46pz8eg3o1/croot/hvplot_1727775575881/work
hyperlink @ file:///tmp/build/80754af9/hyperlink_1610130746837/work
idna @ file:///private/var/folders/c_/qfmhj66j0tn016nkx_th4hxm0000gp/T/abs
_2b_jn555_n/croot/idna_1714398852258/work
imagecodecs @ file:///Users/builder/cbouss/perseverance-python-buildout/cr
oot/imagecodecs_1699246061276/work
imageio @ file:///private/var/folders/sy/f16zz6x50xz3113nwtb9bvq00000gp/T/
abs_372o7sf2ih/croot/imageio_1707247292144/work
imagesize @ file:///Users/builder/cbouss/perseverance-python-buildout/croo
t/imagesize_1699248453520/work
imbalanced-learn @ file:///private/var/folders/c_/qfmhj66j0tn016nkx_th4hxm
0000gp/T/abs_f7f82plidb/croot/imbalanced-learn_1718132239875/work
importlib-metadata @ file:///private/var/folders/sy/f16zz6x50xz3113nwtb9bv
q00000gp/T/abs_37pdw0fbft/croot/importlib_metadata-suite_1704813531185/wor
k
incremental @ file:///croot/incremental_1708639938299/work
inflection @ file:///Users/builder/cbouss/perseverance-python-buildout/cro
ot/inflection_1699253852576/work
iniconfig @ file:///home/linux1/recipes/ci/iniconfig_1610983019677/work
intake @ file:///private/var/folders/sy/f16zz6x50xz3113nwtb9bvq00000gp/T/a
bs_a67pfhqaxk/croot/intake_1726109586816/work
intervaltree @ file:///Users/ktietz/demo/mc3/conda-bld/intervaltree_163051
1889664/work
ipykernel @ file:///private/var/folders/sy/f16zz6x50xz3113nwtb9bvq00000gp/
T/abs_02wd6dgggf/croot/ipykernel_1705933834674/work
ipython @ file:///private/var/folders/c_/qfmhj66j0tn016nkx_th4hxm0000gp/T/
abs_87xjefcpgk/croot/ipython_1726064241225/work
ipython-genutils @ file:///tmp/build/80754af9/ipython_genutils_16067734398
26/work
ipywidgets @ file:///private/var/folders/sy/f16zz6x50xz3113nwtb9bvq00000g
p/T/abs_96e0a42kgq/croot/ipywidgets_1710961507355/work
isoduration==20.11.0
isort @ file:///private/var/folders/c_/qfmhj66j0tn016nkx_th4hxm0000gp/T/ab
s_fcfm_7m3va/croot/isort_1718290126180/work
itemadapter @ file:///tmp/build/80754af9/itemadapter_1626442940632/work
itemloaders @ file:///private/var/folders/sy/f16zz6x50xz3113nwtb9bvq00000g
p/T/abs_e1nzju_zur/croot/itemloaders_1708642351186/work
itsdangerous @ file:///private/var/folders/c_/qfmhj66j0tn016nkx_th4hxm0000
gp/T/abs_f7bt4rtvu8/croot/itsdangerous_1716533350521/work
jaraco.classes @ file:///tmp/build/80754af9/jaraco.classes_1620983179379/w
ork
```

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jedi @ file:///private/var/folders/sy/f16zz6x50xz3113nwtb9bvq00000gp/T/abs
_dc59flyfgj/croot/jedi_1721058355050/work
jellyfish @ file:///Users/builder/cbouss/perseverance-python-buildout/croo
t/jellyfish_1699271558388/work
Jinja2 @ file:///private/var/folders/sy/f16zz6x50xz3113nwtb9bvq00000gp/T/a
bs_e3k_d_nbx2/croot/jinja2_1716993406587/work
jmespath @ file:///Users/builder/cbouss/perseverance-python-buildout/croo
t/jmespath_1701807918873/work
joblib @ file:///private/var/folders/c_/qfmhj66j0tn016nkx_th4hxm0000gp/T/a
bs_825_m6wwnf/croot/joblib_1718217221510/work
json5 @ file:///tmp/build/80754af9/json5_1624432770122/work
jsonpatch @ file:///private/var/folders/sy/f16zz6x50xz3113nwtb9bvq00000gp/
T/abs_9dcqemvl4v/croot/jsonpatch_1714483445583/work
jsonpointer==2.1
jsonschema @ file:///private/var/folders/sy/f16zz6x50xz3113nwtb9bvq00000g
p/T/abs_20pyq8pymy/croot/jsonschema_1728486714853/work
jsonschema-specifications @ file:///Users/builder/cbouss/perseverance-pyth
on-buildout/croot/jsonschema-specifications_1701805291791/work
jupyter @ file:///private/var/folders/sy/f16zz6x50xz3113nwtb9bvq00000gp/T/
abs_fegm4004xa/croot/jupyter_1709837195369/work
jupyter-console @ file:///Users/builder/cbouss/perseverance-python-buildou
t/croot/jupyter_console_1707339870359/work
jupyter-events @ file:///private/var/folders/sy/f16zz6x50xz3113nwtb9bvq000
00gp/T/abs_0ahkeborfn/croot/jupyter_events_1718738118710/work
jupyter-lsp @ file:///Users/builder/cbouss/perseverance-python-buildout/cr
oot/jupyter-lsp-meta_1707339505175/work
jupyter_client @ file:///Users/builder/cbouss/perseverance-python-buildou
t/croot/jupyter_client_1701805419641/work
jupyter_core @ file:///private/var/folders/c_/qfmhj66j0tn016nkx_th4hxm0000
gp/T/abs_80l8bw91xp/croot/jupyter_core_1718818299834/work
jupyter_server @ file:///private/var/folders/c_/qfmhj66j0tn016nkx_th4hxm00
00gp/T/abs_d76py1hq6i/croot/jupyter_server_1718827088455/work
jupyter_server_terminals @ file:///Users/builder/cbouss/perseverance-pytho
n-buildout/croot/jupyter_server_terminals_1701805810278/work
jupyterlab @ file:///private/var/folders/c_/qfmhj66j0tn016nkx_th4hxm0000g
p/T/abs_9376d80062/croot/jupyterlab_1725895220583/work
jupyterlab-pygments @ file:///tmp/build/80754af9/jupyterlab_pygments_16014
90720602/work
jupyterlab-widgets @ file:///tmp/build/80754af9/jupyterlab_widgets_1609884
341231/work
jupyterlab_server @ file:///private/var/folders/sy/f16zz6x50xz3113nwtb9bvq
00000gp/T/abs_3ak8oma7hk/croot/jupyterlab_server_1725865365518/work
keyring @ file:///private/var/folders/sy/f16zz6x50xz3113nwtb9bvq00000gp/T/
abs_e21nr4004l/croot/keyring_1709632517485/work
kiwisolver @ file:///Users/builder/cbouss/perseverance-python-buildout/cro
ot/kiwisolver_1699242237265/work
lazy-object-proxy @ file:///private/var/folders/sy/f16zz6x50xz3113nwtb9bvq
00000gp/T/abs_38eefecdl_/croot/lazy-object-proxy_1712908716156/work
lazy_loader @ file:///private/var/folders/c_/qfmhj66j0tn016nkx_th4hxm0000g
p/T/abs_a1zssksyo7/croot/lazy_loader_1718176750068/work
lckr_jupyterlab_variableinspector @ file:///Users/builder/cbouss/persevera
nce-python-buildout/croot/jupyterlab-variableinspector_1709227705916/work
libarchive-c @ file:///croot/python-libarchive-c_1726069797193/work
```

```
libmambapy @ file:///private/var/folders/c_/qfmhj66j0tn016nkx_th4hxm0000g
p/T/abs_4a02f84vcu/croot/mamba-split_1725563372100/work/libmambapy
linkify-it-py @ file:///Users/builder/cbouss/perseverance-python-buildout/
croot/linkify-it-py_1699272681612/work
llvmlite @ file:///private/var/folders/sy/f16zz6x50xz3113nwtb9bvq00000gp/
T/abs_bavze7dofs/croot/llvmlite_1720455118375/work
lmdb @ file:///Users/builder/cbouss/perseverance-python-buildout/croot/pyt
hon-lmdb_1699249805759/work
locket @ file:///Users/builder/cbouss/perseverance-python-buildout/croot/l
ocket_1699242317717/work
lxml @ file:///private/var/folders/c_/qfmhj66j0tn016nkx_th4hxm0000gp/T/abs
_71qp4ya1zv/croot/lxml_1722882205284/work
lz4 @ file:///Users/builder/cbouss/perseverance-python-buildout/croot/lz4_
1699277285327/work
Markdown @ file:///Users/builder/cbouss/perseverance-python-buildout/croo
t/markdown_1699258195715/work
markdown-it-py @ file:///Users/builder/cbouss/perseverance-python-buildou
t/croot/markdown-it-py_1699239904229/work
MarkupSafe @ file:///Users/builder/cbouss/perseverance-python-buildout/cro
ot/markupsafe_1707339363573/work
matplotlib==3.9.2
matplotlib-inline @ file:///Users/builder/cbouss/perseverance-python-build
out/croot/matplotlib-inline_1699248719910/work
mccabe @ file:///opt/conda/conda-bld/mccabe_1644221741721/work
mdit-py-plugins @ file:///Users/builder/cbouss/perseverance-python-buildou
t/croot/mdit-py-plugins_1699277479259/work
mdurl @ file:///Users/builder/cbouss/perseverance-python-buildout/croot/md
url_1699239487349/work
menuinst @ file:///private/var/folders/sy/f16zz6x50xz3113nwtb9bvq00000gp/
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mistune @ file:///Users/builder/cbouss/perseverance-python-buildout/croot/
mistune_1699277668306/work
more-itertools @ file:///private/var/folders/c_/qfmhj66j0tn016nkx_th4hxm00
00gp/T/abs_2a3ynnssnf/croot/more-itertools_1727185452190/work
mpmath @ file:///Users/builder/cbouss/perseverance-python-buildout/croot/m
pmath_1699248969763/work
msgpack @ file:///Users/builder/cbouss/perseverance-python-buildout/croot/
msgpack-python_1699240003129/work
multidict @ file:///private/var/folders/sy/f16zz6x50xz3113nwtb9bvq00000gp/
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multipledispatch @ file:///Users/builder/cbouss/perseverance-python-buildo
ut/croot/multipledispatch_1699240038072/work
mypy @ file:///private/var/folders/c_/qfmhj66j0tn016nkx_th4hxm0000gp/T/abs
_fdf9si7ocl/croot/mypy-split_1725573897701/work
mypy-extensions @ file:///Users/builder/cbouss/perseverance-python-buildou
t/croot/mypy_extensions_1699246494818/work
navigator-updater @ file:///private/var/folders/c_/qfmhj66j0tn016nkx_th4hx
m0000gp/T/abs_fbmyiuqlqv/croot/navigator-updater_1718030399532/work
nbclient @ file:///Users/builder/cbouss/perseverance-python-buildout/croo
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nbconvert @ file:///private/var/folders/sy/f16zz6x50xz3113nwtb9bvq00000gp/
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nbformat @ file:///private/var/folders/c_/qfmhj66j0tn016nkx_th4hxm0000gp/
```

T/abs_a83923jn5m/croot/nbformat_1728049884447/work
nest-asyncio @ file:///private/var/folders/c_/qfmhj66j0tn016nkx_th4hxm0000
gp/T/abs_c44_atq5c1/croot/nest-asyncio_1708532677863/work
networkx @ file:///private/var/folders/c_/qfmhj66j0tn016nkx_th4hxm0000gp/
T/abs_a3v8naews9/croot/networkx_1720002488636/work
nltk @ file:///private/var/folders/c_/qfmhj66j0tn016nkx_th4hxm0000gp/T/abs
_aflq6ieo30/croot/nltk_1724427700085/work
notebook @ file:///private/var/folders/c_/qfmhj66j0tn016nkx_th4hxm0000gp/
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notebook_shim @ file:///Users/builder/cbouss/perseverance-python-buildout/
croot/notebook-shim_1707339593183/work
numba @ file:///private/var/folders/c_/qfmhj66j0tn016nkx_th4hxm0000gp/T/ab
s_4f8frhozqf/croot/numba_1720540983760/work
numexpr @ file:///Users/builder/cbouss/perseverance-python-buildout/croot/
numexpr_1699258484110/work
numpy @ file:///private/var/folders/c_/qfmhj66j0tn016nkx_th4hxm0000gp/T/ab
s_b7iptlxgej/croot/numpy_and_numpy_base_1708638622773/work/dist/numpy-1.2
6.4-cp312-cp312-macosx_10_9_x86_64.whl#sha256=17c6374322464ccb505fe098301a
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numpydoc @ file:///private/var/folders/sy/f16zz6x50xz3113nwtb9bvq00000gp/
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openpyxl @ file:///private/var/folders/sy/f16zz6x50xz3113nwtb9bvq00000gp/
T/abs_781kn48vkm/croot/openpyxl_1721752954568/work
overrides @ file:///Users/builder/cbouss/perseverance-python-buildout/croo
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packaging @ file:///private/var/folders/c_/qfmhj66j0tn016nkx_th4hxm0000gp/
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pandas @ file:///private/var/folders/c_/qfmhj66j0tn016nkx_th4hxm0000gp/T/a
bs_f3c5inakly/croot/pandas_1718308972943/work/dist/pandas-2.2.2-cp312-cp31
2-macosx_10_15_x86_64.whl#sha256=9960ca21ae114c52ceef491ebf7c1d9db8ce9c2e8
78bd4abbf0b3eea32ac27c2
pandocfilters @ file:///opt/conda/conda-bld/pandocfilters_1643405455980/wo
rk
panel @ file:///private/var/folders/c_/qfmhj66j0tn016nkx_th4hxm0000gp/T/ab
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param @ file:///private/var/folders/sy/f16zz6x50xz3113nwtb9bvq00000gp/T/ab
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parsel @ file:///private/var/folders/sy/f16zz6x50xz3113nwtb9bvq00000gp/T/a
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parso @ file:///opt/conda/conda-bld/parso_1641458642106/work
partd @ file:///Users/builder/cbouss/perseverance-python-buildout/croot/pa
rtd_1699246520888/work
pathspec @ file:///Users/builder/cbouss/perseverance-python-buildout/croo
t/pathspec_1699238563659/work
patsy @ file:///private/var/folders/c_/qfmhj66j0tn016nkx_th4hxm0000gp/T/ab
s_bf8dencwjq/croot/patsy_1718378180646/work
pexpect @ file:///tmp/build/80754af9/pexpect_1605563209008/work
pickleshare @ file:///tmp/build/80754af9/pickleshare_1606932040724/work
pillow @ file:///private/var/folders/sy/f16zz6x50xz3113nwtb9bvq00000gp/T/a
bs_b6jn17w9_s/croot/pillow_1721059443777/work
pkce @ file:///Users/builder/cbouss/perseverance-python-buildout/croot/pkc
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pkginfo @ file:///private/var/folders/sy/f16zz6x50xz3113nwtb9bvq00000gp/T/

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platformdirs @ file:///Users/builder/cbouss/perseverance-python-buildout/c
root/platformdirs_1701805067573/work
plotly @ file:///private/var/folders/c_/qfmhj66j0tn016nkx_th4hxm0000gp/T/a
bs_c1x0dovyom/croot/plotly_1726245570087/work
pluggy @ file:///Users/builder/cbouss/perseverance-python-buildout/croot/p
luggy_1699238591533/work
ply @ file:///Users/builder/cbouss/perseverance-python-buildout/croot/ply_
1699240091048/work
prometheus-client @ file:///Users/builder/cbouss/perseverance-python-build
out/croot/prometheus_client_1699249452887/work
prompt-toolkit @ file:///private/var/folders/sy/f16zz6x50xz3113nwtb9bvq000
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Protego @ file:///tmp/build/80754af9/protego_1598657180827/work
protobuf==4.25.3
psutil @ file:///Users/builder/cbouss/perseverance-python-buildout/croot/p
sutil_1699246686105/work
ptyprocess @ file:///tmp/build/80754af9/ptyprocess_1609355006118/work/dis
t/ptyprocess-0.7.0-py2.py3-none-any.whl
pure-eval @ file:///opt/conda/conda-bld/pure_eval_1646925070566/work
py-cpuinfo @ file:///Users/builder/cbouss/perseverance-python-buildout/cro
ot/py-cpuinfo_1699249517716/work
pyarrow @ file:///private/var/folders/sy/f16zz6x50xz3113nwtb9bvq00000gp/T/
abs_ccvwkfs7fg/croot/pyarrow_1721664245209/work/python
pyasn1 @ file:///Users/ktietz/demo/mc3/conda-bld/pyasn1_1629708007385/work
pyasn1-modules==0.2.8
pycodestyle @ file:///private/var/folders/sy/f16zz6x50xz3113nwtb9bvq00000g
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pycosat @ file:///private/var/folders/sy/f16zz6x50xz3113nwtb9bvq00000gp/T/
abs_48rgxrmler/croot/pycosat_1714511500164/work
pycparser @ file:///tmp/build/80754af9/pycparser_1636541352034/work
pyct @ file:///Users/builder/cbouss/perseverance-python-buildout/croot/pyc
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pycurl @ file:///private/var/folders/c_/qfmhj66j0tn016nkx_th4hxm0000gp/T/a
bs_92jyejt4ie/croot/pycurl_1725370246813/work
pydantic @ file:///private/var/folders/c_/qfmhj66j0tn016nkx_th4hxm0000gp/
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pydantic_core @ file:///private/var/folders/c_/qfmhj66j0tn016nkx_th4hxm000
0gp/T/abs_cb2wzb2ukd/croot/pydantic-core_1724790371118/work
pydeck @ file:///private/var/folders/c_/qfmhj66j0tn016nkx_th4hxm0000gp/T/a
bs_ebg6znt5un/croot/pydeck_1706194073430/work
PyDispatcher @ file:///Users/builder/cbouss/perseverance-python-buildout/c
root/pydispatcher_1699259231123/work
pydocstyle @ file:///Users/builder/cbouss/perseverance-python-buildout/cro
ot/pydocstyle_1699249544175/work
pyerfa @ file:///private/var/folders/sy/f16zz6x50xz3113nwtb9bvq00000gp/T/a
bs_77j8e9ng06/croot/pyerfa_1717700765964/work
pyflakes @ file:///private/var/folders/c_/qfmhj66j0tn016nkx_th4hxm0000gp/
T/abs_e57cfmjeb3/croot/pyflakes_1708962973874/work
Pygments @ file:///Users/builder/cbouss/perseverance-python-buildout/croo
t/pygments_1699240212223/work
PyJWT @ file:///private/var/folders/c_/qfmhj66j0tn016nkx_th4hxm0000gp/T/ab
s_1do0jad6_m/croot/pyjwt_1715095065795/work

```
pylint @ file:///Users/builder/cbouss/perseverance-python-buildout/croot/p
ylint_1699249600083/work
pylint-venv @ file:///private/var/folders/sy/f16zz6x50xz3113nwtb9bvq00000g
p/T/abs_3dahm2v5f3/croot/pylint-venv_1709837629826/work
pyls-spyder==0.4.0
pyobjc-core @ file:///private/var/folders/sy/f16zz6x50xz3113nwtb9bvq00000g
p/T/abs_36yvgw3oz6/croot/pyobjc-core_1710189033524/work
pyobjc-framework-Cocoa @ file:///private/var/folders/sy/f16zz6x50xz3113nwt
b9bvq00000gp/T/abs_12r73jqs07/croot/pyobjc-framework-cocoa_1710191901366/w
ork
pyobjc-framework-CoreServices @ file:///private/var/folders/c_/qfmhj66j0tn
016nkx_th4hxm0000gp/T/abs_199hfpy51p/croot/pyobjc-framework-coreservices_1
710193933908/work
pyobjc-framework-FSEvents @ file:///private/var/folders/sy/f16zz6x50xz3113
nwtb9bvq00000gp/T/abs_0dab4gnw3c/croot/pyobjc-framework-fsevents_171019320
9160/work
pyodbc @ file:///private/var/folders/sy/f16zz6x50xz3113nwtb9bvq00000gp/T/a
bs_2199ss_azm/croot/pyodbc_1725560243473/work
pyOpenSSL @ file:///private/var/folders/sy/f16zz6x50xz3113nwtb9bvq00000gp/
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pyparsing @ file:///private/var/folders/c_/qfmhj66j0tn016nkx_th4hxm0000gp/
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PyQt5==5.15.10
PyQt5-sip @ file:///Users/builder/cbouss/perseverance-python-buildout/croo
t/pyqt-split_1699242856235/work/pyqt_sip
PyQtWebEngine==5.15.6
PySocks @ file:///Users/builder/cbouss/perseverance-python-buildout/croot/
pysocks_1699239289103/work
pytest @ file:///private/var/folders/sy/f16zz6x50xz3113nwtb9bvq00000gp/T/a
bs_05ocqzv9ck/croot/pytest_1717793248617/work
python-dateutil @ file:///private/var/folders/c_/qfmhj66j0tn016nkx_th4hxm0
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python-dotenv @ file:///Users/builder/cbouss/perseverance-python-buildout/
croot/python-dotenv_1699241055777/work
python-json-logger @ file:///Users/builder/cbouss/perseverance-python-buil
dout/croot/python-json-logger_1699260970759/work
python-lsp-black @ file:///private/var/folders/c_/qfmhj66j0tn016nkx_th4hxm
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python-lsp-jsonrpc @ file:///croot/python-lsp-jsonrpc_1708962872556/work
python-lsp-server @ file:///private/var/folders/sy/f16zz6x50xz3113nwtb9bvq
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python-slugify @ file:///tmp/build/80754af9/python-slugify_1620405669636/w
ork
pytoolconfig @ file:///private/var/folders/sy/f16zz6x50xz3113nwtb9bvq00000
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pytz @ file:///private/var/folders/sy/f16zz6x50xz3113nwtb9bvq00000gp/T/abs
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pyviz_comms @ file:///private/var/folders/sy/f16zz6x50xz3113nwtb9bvq00000g
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PyWavelets @ file:///private/var/folders/c_/qfmhj66j0tn016nkx_th4hxm0000g
p/T/abs_582sjvwfmw/croot/pywavelets_1725657951885/work
PyYAML @ file:///Users/builder/cbouss/perseverance-python-buildout/croot/p
yyaml_1699244222906/work
```

```
pyzmq @ file:///private/var/folders/c_/qfmhj66j0tn016nkx_th4hxm0000gp/T/ab
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QDarkStyle @ file:///croot/qdarkstyle_1709231003551/work
qstylizer @ file:///Users/builder/cbouss/perseverance-python-buildout/croo
t/qstylizer_1699288412558/work/dist/qstylizer-0.2.2-py2.py3-none-any.whl#s
ha256=6214adcabac9d631faf1367e1eb0b352efdd19e27acee735b2be77a48da68ab9
QtAwesome @ file:///private/var/folders/c_/qfmhj66j0tn016nkx_th4hxm0000gp/
T/abs_957r_8iurr/croot/qtawesome_1726169352969/work
qtconsole @ file:///private/var/folders/c_/qfmhj66j0tn016nkx_th4hxm0000gp/
T/abs_78oflnwwtn/croot/qtconsole_1709231162364/work
QtPy @ file:///Users/builder/cbouss/perseverance-python-buildout/croot/qtp
y_1701807229050/work
queuelib @ file:///Users/builder/cbouss/perseverance-python-buildout/croo
t/queuelib_1699261318698/work
referencing @ file:///Users/builder/cbouss/perseverance-python-buildout/cr
oot/referencing_1701805251345/work
regex @ file:///private/var/folders/sy/f16zz6x50xz3113nwtb9bvq00000gp/T/ab
s_a4s602267k/croot/regex_1726650054289/work
requests @ file:///private/var/folders/sy/f16zz6x50xz3113nwtb9bvq00000gp/
T/abs_4f6nxsozkv/croot/requests_1721410884113/work
requests-file @ file:///Users/ktietz/demo/mc3/conda-bld/requests-file_1629
455781986/work
requests-toolbelt @ file:///Users/builder/cbouss/perseverance-python-build
out/croot/requests-toolbelt_1699241266818/work
rfc3339-validator @ file:///Users/builder/cbouss/perseverance-python-build
out/croot/rfc3339-validator_1699261389119/work
rfc3986-validator @ file:///Users/builder/cbouss/perseverance-python-build
out/croot/rfc3986-validator_1699261424790/work
rich @ file:///private/var/folders/c_/qfmhj66j0tn016nkx_th4hxm0000gp/T/abs
_6628g1yx0v/croot/rich_1720637500526/work
rope @ file:///private/var/folders/c_/qfmhj66j0tn016nkx_th4hxm0000gp/T/abs
_92ubl8fal8/croot/rope_1708963177078/work
rpds-py @ file:///Users/builder/cbouss/perseverance-python-buildout/croot/
rpds-py_1699288685310/work
Rtree @ file:///Users/builder/cbouss/perseverance-python-buildout/croot/rt
ree_1699288775164/work
ruamel-yaml-conda @ file:///Users/builder/cbouss/perseverance-python-build
out/croot/ruamel_yaml_1699261459931/work
ruamel.yaml @ file:///private/var/folders/c_/qfmhj66j0tn016nkx_th4hxm0000g
p/T/abs_a0tb7e252p/croot/ruamel.yaml_1727980165152/work
ruamel.yaml.clib @ file:///private/var/folders/c_/qfmhj66j0tn016nkx_th4hxm
0000gp/T/abs_47oq900ogu/croot/ruamel.yaml.clib_1727769824325/work
s3fs @ file:///private/var/folders/c_/qfmhj66j0tn016nkx_th4hxm0000gp/T/abs
_f6ytrzpuz5/croot/s3fs_1724924105768/work
scikit-image @ file:///private/var/folders/sy/f16zz6x50xz3113nwtb9bvq00000
gp/T/abs_5bpirsryxw/croot/scikit-image_1726737416023/work
scikit-learn @ file:///private/var/folders/sy/f16zz6x50xz3113nwtb9bvq00000
gp/T/abs_85eaew31xa/croot/scikit-learn_1721921878410/work
scipy @ file:///private/var/folders/sy/f16zz6x50xz3113nwtb9bvq00000gp/T/ab
s_15kdberrhr/croot/scipy_1717597139640/work/dist/scipy-1.13.1-cp312-cp312-
macosx_10_15_x86_64.whl#sha256=d6eedac036a5adb64ce8a50fe9948f3b329281071aa
8198a2353a83e5bca25f6
Scrapy @ file:///private/var/folders/c_/qfmhj66j0tn016nkx_th4hxm0000gp/T/a
```

bs_18quwz1daa/croot/scrapy_1708714695745/work
seaborn @ file:///private/var/folders/sy/f16zz6x50xz3113nwtb9bvq00000gp/T/
abs_ee_rs2l_8e/croot/seaborn_1718302941172/work
semver @ file:///private/var/folders/c_/qfmhj66j0tn016nkx_th4hxm0000gp/T/a
bs_04zxln5dqm/croot/semver_1709243627150/work
Send2Trash @ file:///Users/builder/cbouss/perseverance-python-buildout/cro
ot/send2trash_1701806045227/work
service-identity @ file:///Users/ktietz/demo/mc3/conda-bld/service_identit
y_1629460757137/work
setuptools==75.1.0
sip @ file:///Users/builder/cbouss/perseverance-python-buildout/croot/sip_
1699241391218/work
six @ file:///tmp/build/80754af9/six_1644875935023/work
smart-open @ file:///Users/builder/cbouss/perseverance-python-buildout/cro
ot/smart_open_1699247078492/work
smmap @ file:///tmp/build/80754af9/smmap_1611694433573/work
sniffio @ file:///private/var/folders/sy/f16zz6x50xz3113nwtb9bvq00000gp/T/
abs_a46njf828g/croot/sniffio_1705431298111/work
snowballstemmer @ file:///tmp/build/80754af9/snowballstemmer_163793708059
5/work
sortedcontainers @ file:///tmp/build/80754af9/sortedcontainers_16239490991
77/work
soupsieve @ file:///Users/builder/cbouss/perseverance-python-buildout/croo
t/soupsieve_1699283107629/work
Sphinx @ file:///private/var/folders/sy/f16zz6x50xz3113nwtb9bvq00000gp/T/a
bs_961l5xr4ah/croot/sphinx_1718275394410/work
sphinxcontrib-applehelp @ file:///home/ktietz/src/ci/sphinxcontrib-applehe
lp_1611920841464/work
sphinxcontrib-devhelp @ file:///home/ktietz/src/ci/sphinxcontrib-devhelp_1
611920923094/work
sphinxcontrib-htmlhelp @ file:///tmp/build/80754af9/sphinxcontrib-htmlhelp
_1623945626792/work
sphinxcontrib-jsmath @ file:///home/ktietz/src/ci/sphinxcontrib-jsmath_161
1920942228/work
sphinxcontrib-qthelp @ file:///home/ktietz/src/ci/sphinxcontrib-qthelp_161
1921055322/work
sphinxcontrib-serializinghtml @ file:///private/var/folders/sy/f16zz6x50xz
3113nwtb9bvq00000gp/T/abs_411tn96s_r/croot/sphinxcontrib-serializinghtml_1
718201499016/work
spyder @ file:///private/var/folders/sy/f16zz6x50xz3113nwtb9bvq00000gp/T/a
bs_2e74_t0sqb/croot/spyder_1727197283857/work
spyder-kernels @ file:///private/var/folders/sy/f16zz6x50xz3113nwtb9bvq000
00gp/T/abs_ffnypxgbj4/croot/spyder-kernels_1707937709341/work
SQLAlchemy @ file:///private/var/folders/c_/qfmhj66j0tn016nkx_th4hxm0000g
p/T/abs_37udwgy09c/croot/sqlalchemy_1725885054122/work
stack-data @ file:///opt/conda/conda-bld/stack_data_1646927590127/work
statsmodels @ file:///private/var/folders/c_/qfmhj66j0tn016nkx_th4hxm0000g
p/T/abs_e7o9t8r4qh/croot/statsmodels_1718381195447/work
streamlit @ file:///private/var/folders/sy/f16zz6x50xz3113nwtb9bvq00000gp/
T/abs_8ayulo48q_/croot/streamlit_1724335168993/work
sympy @ file:///private/var/folders/sy/f16zz6x50xz3113nwtb9bvq00000gp/T/ab
s_4by5rj7_56/croot/sympy_1724938199913/work
tables @ file:///private/var/folders/c_/qfmhj66j0tn016nkx_th4hxm0000gp/T/a

```
bs_de52beu5z4/croot/pytables_1725380787883/work
tabulate @ file:///Users/builder/cbouss/perseverance-python-buildout/croo
t/tabulate_1701814043620/work
tblib @ file:///Users/ktietz/demo/mc3/conda-bld/tblib_1629402031467/work
tenacity @ file:///private/var/folders/sy/f16zz6x50xz3113nwtb9bvq00000gp/
T/abs_29tpjkynmo/croot/tenacity_1721222515217/work
terminado @ file:///Users/builder/cbouss/perseverance-python-buildout/croo
t/terminado_1699284203253/work
text-unidecode @ file:///Users/ktietz/demo/mc3/conda-bld/text-unidecode_16
29401354553/work
textdistance @ file:///tmp/build/80754af9/textdistance_1612461398012/work
threadpoolctl @ file:///private/var/folders/c_/qfmhj66j0tn016nkx_th4hxm000
0gp/T/abs_83z9rmqojb/croot/threadpoolctl_1719407811780/work
three-merge @ file:///tmp/build/80754af9/three-merge_1607553261110/work
tifffile @ file:///Users/builder/cbouss/perseverance-python-buildout/croo
t/tifffile_1699250821262/work
tinycss2 @ file:///Users/builder/cbouss/perseverance-python-buildout/croo
t/tinycss2_1699262458881/work
tldextract @ file:///private/var/folders/c_/qfmhj66j0tn016nkx_th4hxm0000g
p/T/abs_e1yx82kx3f/croot/tldextract_1723064390847/work
toml @ file:///tmp/build/80754af9/toml_1616166611790/work
tomli @ file:///Users/builder/cbouss/perseverance-python-buildout/croot/to
mli_1699238675700/work
tomlkit @ file:///Users/builder/cbouss/perseverance-python-buildout/croot/
tomlkit_1699241429121/work
toolz @ file:///Users/builder/cbouss/perseverance-python-buildout/croot/to
olz_1699240342066/work
tornado @ file:///private/var/folders/c_/qfmhj66j0tn016nkx_th4hxm0000gp/T/
abs_7e0ruwlfee/croot/tornado_1718740118099/work
tqdm @ file:///private/var/folders/c_/qfmhj66j0tn016nkx_th4hxm0000gp/T/abs
_5akmb2c3eu/croot/tqdm_1724853941623/work
traitlets @ file:///private/var/folders/sy/f16zz6x50xz3113nwtb9bvq00000gp/
T/abs_f49losghmg/croot/traitlets_1718227069025/work
truststore @ file:///Users/builder/cbouss/perseverance-python-buildout/cro
ot/truststore_1701811390284/work
Twisted @ file:///private/var/folders/c_/qfmhj66j0tn016nkx_th4hxm0000gp/T/
abs_1ci0_ly4iu/croot/twisted_1708705445231/work
typing_extensions @ file:///private/var/folders/c_/qfmhj66j0tn016nkx_th4hx
m0000gp/T/abs_0b3pj9yhn2/croot/typing_extensions_1715268854415/work
tzdata @ file:///croot/python-tzdata_1690578112552/work
uc-micro-py @ file:///Users/builder/cbouss/perseverance-python-buildout/cr
oot/uc-micro-py_1699262916237/work
ujson @ file:///private/var/folders/c_/qfmhj66j0tn016nkx_th4hxm0000gp/T/ab
s_285w4aewnz/croot/ujson_1717597803207/work
unicodedata2 @ file:///private/var/folders/sy/f16zz6x50xz3113nwtb9bvq00000
gp/T/abs_1anajuo38r/croot/unicodedata2_1713212953928/work
Unidecode @ file:///private/var/folders/sy/f16zz6x50xz3113nwtb9bvq00000gp/
T/abs_aacp17wle0/croot/unidecode_1724790053243/work
uri-template==1.3.0
urllib3 @ file:///private/var/folders/c_/qfmhj66j0tn016nkx_th4hxm0000gp/T/
abs_7dvsr0a5y0/croot/urllib3_1727769823716/work
w3lib @ file:///Users/builder/cbouss/perseverance-python-buildout/croot/w3
lib_1709225391438/work
```

```
watchdog @ file:///Users/builder/cbouss/crwatchdog/watchdog_1717165253549/
work
wcwidth @ file:///Users/ktietz/demo/mc3/conda-bld/wcwidth_1629357192024/wo
rk
webcolors==24.11.1
webencodings @ file:///Users/builder/cbouss/perseverance-python-buildout/c
root/webencodings_1699250987289/work
websocket-client @ file:///private/var/folders/c_/qfmhj66j0tn016nkx_th4hxm
0000gp/T/abs_8c3cjp8r36/croot/websocket-client_1715878317325/work
Werkzeug @ file:///private/var/folders/sy/f16zz6x50xz3113nwtb9bvq00000gp/
T/abs_53yi9ymayw/croot/werkzeug_1716533323400/work
whatthepatch @ file:///Users/builder/cbouss/perseverance-python-buildout/c
root/whatthepatch_1699251044124/work
wheel==0.44.0
widgetsnbextension @ file:///private/var/folders/c_/qfmhj66j0tn016nkx_th4h
xm0000gp/T/abs_55iz0tfo89/croot/widgetsnbextension_1710960056659/work
wrapt @ file:///Users/builder/cbouss/perseverance-python-buildout/croot/wr
apt_1699245094349/work
wurlitzer @ file:///Users/builder/cbouss/perseverance-python-buildout/croo
t/wurlitzer_1699296593258/work
xarray @ file:///Users/builder/cbouss/perseverance-python-buildout/croot/x
array_1699245129880/work
xlwings @ file:///private/var/folders/c_/qfmhj66j0tn016nkx_th4hxm0000gp/T/
abs_838do436jw/croot/xlwings_1725400106901/work
xyzservices @ file:///Users/builder/cbouss/perseverance-python-buildout/cr
oot/xyzservices_1699251070342/work
yapf @ file:///private/var/folders/sy/f16zz6x50xz3113nwtb9bvq00000gp/T/abs
_eaaxlq87mt/croot/yapf_1708964321438/work
yarl @ file:///private/var/folders/sy/f16zz6x50xz3113nwtb9bvq00000gp/T/abs
_e1e9t55odx/croot/yarl_1725976505882/work
zict @ file:///Users/builder/cbouss/perseverance-python-buildout/croot/zic
t_1699263607025/work
zipp @ file:///Users/builder/cbouss/perseverance-python-buildout/croot/zip
p_1707361439201/work
zope.interface @ file:///Users/builder/cbouss/perseverance-python-buildou
t/croot/zope.interface_1699251096669/work
zstandard @ file:///private/var/folders/sy/f16zz6x50xz3113nwtb9bvq00000gp/
T/abs_2bqnms2ngq/croot/zstandard_1728569218033/work
```

In [9]:
```python
import numpy
```

In [11]:
```python
arr = numpy.array([1,2,3,4,5])
print(arr)
```

```
[1 2 3 4 5]
```

NumPy as np

In [14]:
```python
import numpy as np
```

In [16]:
```python
arr = np.array([1,2,3,4,5])
```

```
print(arr)
```

```
[1 2 3 4 5]
```

In [20]:
```
np.__version__
```

Out[20]: `'1.26.4'`

Create a NumPy ndarray Object

In [23]:
```python
arr = np.array([1,2,3,4,5])
print(arr)
print(type(arr))
```

```
[1 2 3 4 5]
<class 'numpy.ndarray'>
```

we can pass a list, tuple or any array-like object into the array()

In [26]:
```python
arr = np.array((1,2,3,4))
print(arr)
```

```
[1 2 3 4]
```

In [28]:
```python
print(type(arr))
```

```
<class 'numpy.ndarray'>
```

0-D Arrays

In [31]:
```python
arr = np.array(42)
print(arr)
```

```
42
```

1-D Arrays

In [37]:
```python
arr = np.array([1,2,3,4,5])
print(arr)
```

```
[1 2 3 4 5]
```

2-D Arrays

In [42]:
```python
arr = np.array([[1,2,3],[4,5,6]])
print(arr)
```

```
[[1 2 3]
 [4 5 6]]
```

3-D arrays

In [51]:
```python
arr = np.array([[[1,2,3],[4,5,6]],[[7,8,9],[11,12,13]]])
print(arr)
```

```
[[[ 1  2  3]
  [ 4  5  6]]

 [[ 7  8  9]
  [11 12 13]]]
```

Check Number of Dimensions?

In [80]:
```python
arr0 = np.array(42)
arr1 = np.array([1,2,3])
arr2 = np.array([[1,2,3],[4,5,6]])
arr3 = np.array([[[1,2,3],[4,5,6]],[[7,8,9],[10,11,12]]])
arr4 = np.array([[[[1,2][3,4]],[[5,6],[7,8]]],[[[1,2][3,4]],[[5,6],[7,8]]
print(arr0.ndim)
print(arr1.ndim)
print(arr2.ndim)
print(arr3.ndim)
print(arr4.ndim)
```

```
<>:5: SyntaxWarning: list indices must be integers or slices, not tuple; p
erhaps you missed a comma?
<>:5: SyntaxWarning: list indices must be integers or slices, not tuple; p
erhaps you missed a comma?
<>:5: SyntaxWarning: list indices must be integers or slices, not tuple; p
erhaps you missed a comma?
<>:5: SyntaxWarning: list indices must be integers or slices, not tuple; p
erhaps you missed a comma?
/var/folders/n4/9fb88mxd4g56nzmtw5s0l00c0000gn/T/ipykernel_1006/881659054.
py:5: SyntaxWarning: list indices must be integers or slices, not tuple; p
erhaps you missed a comma?
  arr4 = np.array([[[[1,2][3,4]],[[5,6],[7,8]]],[[[1,2][3,4]],[[5,6],[7,
8]]]])
/var/folders/n4/9fb88mxd4g56nzmtw5s0l00c0000gn/T/ipykernel_1006/881659054.
py:5: SyntaxWarning: list indices must be integers or slices, not tuple; p
erhaps you missed a comma?
  arr4 = np.array([[[[1,2][3,4]],[[5,6],[7,8]]],[[[1,2][3,4]],[[5,6],[7,
8]]]])
/var/folders/n4/9fb88mxd4g56nzmtw5s0l00c0000gn/T/ipykernel_1006/881659054.
py:5: SyntaxWarning: list indices must be integers or slices, not tuple; p
```

```
erhaps you missed a comma?
  arr4 = np.array([[[[1,2][3,4]],[[5,6],[7,8]]],[[[1,2][3,4]],[[5,6],[7,
8]]]])
/var/folders/n4/9fb88mxd4g56nzmtw5s0l00c0000gn/T/ipykernel_1006/881659054.
py:5: SyntaxWarning: list indices must be integers or slices, not tuple; p
erhaps you missed a comma?
  arr4 = np.array([[[[1,2][3,4]],[[5,6],[7,8]]],[[[1,2][3,4]],[[5,6],[7,
8]]]])
/var/folders/n4/9fb88mxd4g56nzmtw5s0l00c0000gn/T/ipykernel_1006/881659054.
py:5: SyntaxWarning: list indices must be integers or slices, not tuple; p
erhaps you missed a comma?
  arr4 = np.array([[[[1,2][3,4]],[[5,6],[7,8]]],[[[1,2][3,4]],[[5,6],[7,
8]]]])
/var/folders/n4/9fb88mxd4g56nzmtw5s0l00c0000gn/T/ipykernel_1006/881659054.
py:5: SyntaxWarning: list indices must be integers or slices, not tuple; p
erhaps you missed a comma?
  arr4 = np.array([[[[1,2][3,4]],[[5,6],[7,8]]],[[[1,2][3,4]],[[5,6],[7,
8]]]])
/var/folders/n4/9fb88mxd4g56nzmtw5s0l00c0000gn/T/ipykernel_1006/881659054.
py:5: SyntaxWarning: list indices must be integers or slices, not tuple; p
erhaps you missed a comma?
  arr4 = np.array([[[[1,2][3,4]],[[5,6],[7,8]]],[[[1,2][3,4]],[[5,6],[7,
8]]]])
/var/folders/n4/9fb88mxd4g56nzmtw5s0l00c0000gn/T/ipykernel_1006/881659054.
py:5: SyntaxWarning: list indices must be integers or slices, not tuple; p
erhaps you missed a comma?
  arr4 = np.array([[[[1,2][3,4]],[[5,6],[7,8]]],[[[1,2][3,4]],[[5,6],[7,
8]]]])
/var/folders/n4/9fb88mxd4g56nzmtw5s0l00c0000gn/T/ipykernel_1006/881659054.
py:5: SyntaxWarning: list indices must be integers or slices, not tuple; p
erhaps you missed a comma?
  arr4 = np.array([[[[1,2][3,4]],[[5,6],[7,8]]],[[[1,2][3,4]],[[5,6],[7,
8]]]])
/var/folders/n4/9fb88mxd4g56nzmtw5s0l00c0000gn/T/ipykernel_1006/881659054.
py:5: SyntaxWarning: list indices must be integers or slices, not tuple; p
erhaps you missed a comma?
  arr4 = np.array([[[[1,2][3,4]],[[5,6],[7,8]]],[[[1,2][3,4]],[[5,6],[7,
8]]]])
/var/folders/n4/9fb88mxd4g56nzmtw5s0l00c0000gn/T/ipykernel_1006/881659054.
py:5: SyntaxWarning: list indices must be integers or slices, not tuple; p
erhaps you missed a comma?
  arr4 = np.array([[[[1,2][3,4]],[[5,6],[7,8]]],[[[1,2][3,4]],[[5,6],[7,
8]]]])
/var/folders/n4/9fb88mxd4g56nzmtw5s0l00c0000gn/T/ipykernel_1006/881659054.
py:5: SyntaxWarning: list indices must be integers or slices, not tuple; p
erhaps you missed a comma?
  arr4 = np.array([[[[1,2][3,4]],[[5,6],[7,8]]],[[[1,2][3,4]],[[5,6],[7,
8]]]])
/var/folders/n4/9fb88mxd4g56nzmtw5s0l00c0000gn/T/ipykernel_1006/881659054.
py:5: SyntaxWarning: list indices must be integers or slices, not tuple; p
erhaps you missed a comma?
  arr4 = np.array([[[[1,2][3,4]],[[5,6],[7,8]]],[[[1,2][3,4]],[[5,6],[7,
8]]]])
```

```
/var/folders/n4/9fb88mxd4g56nzmtw5s0l00c0000gn/T/ipykernel_1006/881659054.
py:5: SyntaxWarning: list indices must be integers or slices, not tuple; p
erhaps you missed a comma?
  arr4 = np.array([[[[1,2][3,4]],[[5,6],[7,8]]],[[[1,2][3,4]],[[5,6],[7,
8]]]])
--------------------------------------------------------------------------
-
TypeError                                 Traceback (most recent call las
t)
Cell In[80], line 5
      3 arr2 = np.array([[1,2,3],[4,5,6]])
      4 arr3 = np.array([[[1,2,3],[4,5,6]],[[7,8,9],[10,11,12]]])
----> 5 arr4 = np.array([[[[1,2][3,4]],[[5,6],[7,8]]],[[[1,2][3,4]],[[5,
6],[7,8]]]])
      6 print(arr0.ndim)
      7 print(arr1.ndim)

TypeError: list indices must be integers or slices, not tuple
```

In [ ]:

In [95]:
```python
arr4d = np.zeros((2,3,4,5))
print(arr4d)
```

```
[[[[0. 0. 0. 0. 0.]
   [0. 0. 0. 0. 0.]
   [0. 0. 0. 0. 0.]
   [0. 0. 0. 0. 0.]]

  [[0. 0. 0. 0. 0.]
   [0. 0. 0. 0. 0.]
   [0. 0. 0. 0. 0.]
   [0. 0. 0. 0. 0.]]

  [[0. 0. 0. 0. 0.]
   [0. 0. 0. 0. 0.]
   [0. 0. 0. 0. 0.]
   [0. 0. 0. 0. 0.]]]


 [[[0. 0. 0. 0. 0.]
   [0. 0. 0. 0. 0.]
   [0. 0. 0. 0. 0.]
   [0. 0. 0. 0. 0.]]

  [[0. 0. 0. 0. 0.]
   [0. 0. 0. 0. 0.]
   [0. 0. 0. 0. 0.]
   [0. 0. 0. 0. 0.]]

  [[0. 0. 0. 0. 0.]
   [0. 0. 0. 0. 0.]
   [0. 0. 0. 0. 0.]
   [0. 0. 0. 0. 0.]]]]
```

In [ ]:

In [97]:
```python
arr4d = np.ones((2,3,4,5))
print(arr4d)
```

```
[[[[1. 1. 1. 1. 1.]
   [1. 1. 1. 1. 1.]
   [1. 1. 1. 1. 1.]
   [1. 1. 1. 1. 1.]]

  [[1. 1. 1. 1. 1.]
   [1. 1. 1. 1. 1.]
   [1. 1. 1. 1. 1.]
   [1. 1. 1. 1. 1.]]

  [[1. 1. 1. 1. 1.]
   [1. 1. 1. 1. 1.]
   [1. 1. 1. 1. 1.]
   [1. 1. 1. 1. 1.]]]


 [[[1. 1. 1. 1. 1.]
   [1. 1. 1. 1. 1.]
   [1. 1. 1. 1. 1.]
   [1. 1. 1. 1. 1.]]

  [[1. 1. 1. 1. 1.]
   [1. 1. 1. 1. 1.]
   [1. 1. 1. 1. 1.]
   [1. 1. 1. 1. 1.]]

  [[1. 1. 1. 1. 1.]
   [1. 1. 1. 1. 1.]
   [1. 1. 1. 1. 1.]
   [1. 1. 1. 1. 1.]]]]
```

In [99]:
```python
arr4d = np.twos((2,3,4,5))
print(arr4d)
```

```
---------------------------------------------------------------------------
AttributeError                            Traceback (most recent call las
t)
Cell In[99], line 1
----> 1 arr4d = np.twos((2,3,4,5))
      2 print(arr4d)

File /opt/anaconda3/lib/python3.12/site-packages/numpy/__init__.py:333, in
__getattr__(attr)
    330     "Removed in NumPy 1.25.0"
    331     raise RuntimeError("Tester was removed in NumPy 1.25.")
--> 333 raise AttributeError("module {!r} has no attribute "
    334                      "{!r}".format(__name__, attr))

AttributeError: module 'numpy' has no attribute 'twos'
```

data-type for the array

In [103…
```python
arr = np.array([1,2,3,4], dtype=float)
print(arr)
```
```
[1. 2. 3. 4.]
```

In [ ]:

In [105…
```python
arr = np.array([1,2,3,4], dtype=complex)
print(arr)
```
```
[1.+0.j 2.+0.j 3.+0.j 4.+0.j]
```

In [107…
```python
arr = np.array([1,2,3,4], dtype=bool)
print(arr)
```
```
[ True  True  True  True]
```

arange

In [ ]:

In [111…
```python
arr = np.arange(1,25)
print(arr)
```
```
[ 1  2  3  4  5  6  7  8  9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24]
```

In [115…
```python
arr = np.arange(1,25,2)
print(arr)
```
```
[ 1  3  5  7  9 11 13 15 17 19 21 23]
```

In [7]:
```python
import numpy as np
arr = np.arange(1,25,3)
print(arr)
```
```
[ 1  4  7 10 13 16 19 22]
```

In [44]:
```python
np.arange(1,25,3).reshape(2,4)
```
Out[44]:
```
array([[ 1,  4,  7, 10],
       [13, 16, 19, 22]])
```

In [26]:
```python
arr = np.arange(1,2).reshape(1,1)
print(arr)
```
```
[[1]]
```

In [ ]:

Rand function

```
In [ ]:
```

```
In [ ]:
```

```
In [29]: # Syntax random.rand(rows,columns) by default the outout in float values

         rand(3,2)
```

```
---------------------------------------------------------------------------
NameError                                 Traceback (most recent call las
t)
Cell In[29], line 1
----> 1 rand(3,2)

NameError: name 'rand' is not defined
```

```
In [ ]:
```

```
In [ ]:
```

```
In [32]: random.rand(3)
```

```
---------------------------------------------------------------------------
NameError                                 Traceback (most recent call las
t)
Cell In[32], line 1
----> 1 random.rand(3)

NameError: name 'random' is not defined
```

```
In [34]: np.random.rand(3)
```

```
Out[34]: array([0.30787145, 0.54317946, 0.48935212])
```

```
In [46]: np.random.rand(3,3)
```

```
Out[46]: array([[0.87561034, 0.99637785, 0.09846492],
                [0.41724173, 0.15573575, 0.06569074],
                [0.58817686, 0.75942215, 0.51765751]])
```

```
In [54]: np.random.randint(3,100)
```

```
Out[54]: 81
```

```
In [56]: np.random.rand(3,100)
```

```
Out[56]: array([[3.87250659e-02, 9.23603269e-01, 3.33150328e-01, 2.38116609e-01,
                7.61064587e-01, 9.75389343e-01, 1.89573322e-01, 5.34993270e-01,
                1.62264958e-02, 9.49671340e-01, 2.62018761e-01, 6.98325728e-01,
                9.06658215e-01, 3.64684504e-01, 2.16629291e-01, 2.14570750e-01,
```

```
       9.51679943e-01, 9.59495107e-01, 6.54097081e-02, 6.08722878e-01,
       8.69012809e-02, 7.92379597e-01, 6.95143286e-01, 4.43008407e-01,
       1.80669840e-02, 4.95330400e-01, 7.10729686e-01, 5.07090854e-02,
       9.30468485e-01, 6.39708159e-01, 2.03842413e-01, 2.83127012e-01,
       8.90685941e-01, 4.74840581e-01, 3.12922989e-01, 1.92438164e-01,
       6.21314823e-01, 4.93195720e-01, 2.01166473e-01, 7.32873818e-01,
       3.96971236e-01, 5.22494911e-01, 9.33861508e-01, 8.58945007e-01,
       6.81004002e-01, 8.48386366e-01, 7.33651906e-01, 5.18331595e-01,
       7.56725433e-01, 1.17173272e-01, 2.94911731e-01, 3.15853336e-01,
       2.31081490e-01, 3.11630052e-02, 6.84864221e-01, 1.93715728e-01,
       2.67084234e-01, 3.86871166e-01, 8.18106516e-01, 2.72615356e-01,
       5.25235293e-01, 1.48230859e-01, 5.14001343e-01, 5.78329316e-01,
       4.26499487e-01, 9.68492771e-01, 5.45279486e-01, 5.27283074e-01,
       4.19444530e-01, 3.72274849e-01, 6.91841695e-01, 9.02172261e-01,
       4.24892567e-01, 6.58163013e-01, 7.85889908e-01, 9.77721968e-01,
       2.47332357e-01, 4.03483683e-01, 8.69817340e-01, 2.63061659e-01,
       2.50472206e-01, 7.49181262e-01, 4.95208625e-01, 1.68027061e-01,
       9.27657836e-01, 4.45903572e-01, 1.35160524e-01, 6.26289813e-01,
       8.17140344e-01, 9.39598660e-01, 7.76494726e-01, 4.32597906e-01,
       3.70317974e-01, 8.62353160e-01, 6.43844451e-02, 5.07916514e-01,
       1.27243058e-01, 3.20391326e-02, 2.62188180e-01, 3.48560366e-02],
      [4.43606074e-01, 6.42472933e-01, 6.78162889e-01, 7.66019930e-01,
       1.49251172e-01, 6.75474764e-01, 9.18736150e-01, 6.45893343e-01,
       9.26396914e-01, 5.06681249e-01, 9.56136108e-01, 1.99390176e-01,
       1.72681169e-01, 6.93223533e-01, 4.79285665e-01, 7.89399811e-02,
       2.40835475e-01, 2.50794086e-01, 1.99526609e-02, 4.52356599e-01,
       3.33102029e-01, 6.24597904e-01, 9.64473324e-02, 1.42591516e-02,
       6.89041987e-01, 3.94712771e-01, 9.32562117e-01, 4.82406325e-01,
       4.45114601e-01, 6.20959808e-01, 4.38824474e-01, 8.26194159e-01,
       3.86626242e-01, 8.94386245e-01, 5.39471338e-02, 8.28909356e-01,
       3.92434644e-01, 6.81933033e-01, 6.72082676e-01, 7.00374935e-02,
       6.78789084e-01, 3.52522313e-01, 4.50096636e-01, 9.63403130e-01,
       5.26234135e-01, 8.56530781e-01, 7.42839171e-01, 6.81829824e-03,
       8.13797937e-01, 2.00037597e-01, 9.32584258e-01, 9.76488155e-01,
       5.27128492e-01, 5.77171099e-01, 6.85949383e-01, 3.21915749e-01,
       7.32587715e-01, 7.06962706e-02, 8.57409052e-01, 1.12760898e-01,
       8.76771644e-01, 7.68915353e-01, 8.16538068e-01, 1.23857241e-01,
       9.46837410e-01, 5.30725521e-01, 4.15088603e-01, 4.37220934e-01,
       1.34123751e-01, 5.62347768e-01, 1.66623650e-01, 5.12312030e-01,
       1.12149662e-02, 9.20188266e-01, 3.51433770e-01, 2.38146019e-01,
       3.88575994e-01, 8.87986126e-02, 5.35304213e-01, 8.89473425e-01,
       8.21731058e-01, 5.48097770e-01, 6.60875088e-02, 6.07457982e-01,
       5.31280743e-01, 6.82828265e-01, 7.98103101e-01, 5.04614402e-02,
       1.61882782e-01, 4.06869244e-01, 8.85258037e-01, 9.90724921e-01,
       1.56351698e-01, 7.71699333e-01, 5.39705046e-01, 9.97947160e-01,
       1.49331366e-01, 8.43132128e-01, 6.34231727e-01, 1.99611148e-01],
      [3.72698508e-01, 3.54696031e-01, 4.32716156e-01, 3.55223170e-01,
       1.43446209e-01, 3.46898493e-02, 5.60150248e-01, 5.69170680e-01,
       8.24338012e-01, 2.12456283e-03, 1.09022399e-01, 3.13171065e-01,
       3.09182230e-01, 1.25977132e-02, 2.08766051e-01, 6.63224605e-01,
       1.27437345e-01, 6.74346715e-01, 8.17219753e-01, 4.23069174e-01,
       2.28947880e-01, 7.52161589e-01, 8.91934983e-01, 2.38308026e-01,
       4.71339667e-02, 6.19895567e-01, 2.44445870e-02, 7.75784105e-01,
```

```
          9.47808170e-01, 1.08986693e-01, 7.75405949e-01, 5.90700285e-01,
          9.59789187e-01, 4.51418340e-01, 5.44399368e-01, 3.18237338e-01,
          6.72812894e-01, 7.01887529e-02, 4.45902731e-01, 1.85406071e-01,
          6.27513489e-01, 6.17784725e-02, 3.77340496e-01, 3.14826478e-02,
          2.72729925e-01, 7.66145126e-01, 3.02147128e-01, 7.95434118e-01,
          9.69847542e-01, 7.04802701e-02, 5.25275335e-01, 2.64010835e-01,
          6.27375737e-02, 2.40906149e-01, 2.80064763e-01, 5.53832874e-01,
          3.96258659e-01, 9.08530279e-01, 5.29721986e-01, 1.71443258e-01,
          8.02282989e-01, 6.74011688e-02, 7.53912417e-01, 5.50340112e-01,
          2.59866302e-01, 9.69521772e-01, 7.49269968e-02, 8.48206886e-01,
          2.05098051e-01, 6.71415981e-01, 5.36126221e-01, 2.80662655e-01,
          6.88833102e-01, 9.91311092e-02, 9.41507430e-01, 3.44217096e-01,
          4.46737739e-01, 5.56698912e-04, 7.28018535e-01, 1.75470322e-01,
          1.15912811e-01, 6.69750482e-01, 2.78605069e-01, 4.81464980e-01,
          4.24620049e-01, 4.34096069e-01, 2.97222282e-01, 9.51588872e-01,
          3.33894992e-01, 8.03346964e-01, 8.97584151e-01, 3.23690161e-01,
          7.06087458e-01, 8.57029253e-01, 9.16782641e-01, 2.77426233e-01,
          6.90037565e-01, 2.92842182e-01, 8.98602021e-01, 3.65191662e-0
   1]])
```

In [58]:
```python
np.random.randint(0,1)
```

Out[58]: 0

In [255…
```python
b = np.random.rand(2,2)
type(b)
```

Out[255… numpy.ndarray

In [64]:
```python
np.random.rand(2,1)
```

Out[64]:
```
array([[0.28242956],
       [0.32477229]])
```

In [68]:
```python
np.random.rand(1,1)
```

Out[68]: array([[0.90167643]])

In [72]:
```python
np.random.randint(2,1)
```

```
---------------------------------------------------------------------------
ValueError                                Traceback (most recent call last)
Cell In[72], line 1
----> 1 np.random.randint(2,1)

File numpy/random/mtrand.pyx:782, in numpy.random.mtrand.RandomState.randint()

File numpy/random/_bounded_integers.pyx:1334, in numpy.random._bounded_integers._rand_int64()

ValueError: low >= high
```

In [78]: `np.random.randint(2,2)`

```
---------------------------------------------------------------------------
ValueError                                Traceback (most recent call last)
Cell In[78], line 1
----> 1 np.random.randint(2,2)

File numpy/random/mtrand.pyx:782, in numpy.random.mtrand.RandomState.randint()

File numpy/random/_bounded_integers.pyx:1334, in numpy.random._bounded_integers._rand_int64()

ValueError: low >= high
```

In [ ]:

In [85]: `np.random.randint(10,20,3)`

Out[85]: `array([12, 17, 13])`

In [140… `np.random.randint(1,11,11)`

Out[140… `array([ 4,  6,  6,  4,  2,  9,  4,  8,  9, 10,  3])`

In [146… `np.random.randint(0)`

```
---------------------------------------------------------------------------
ValueError                                Traceback (most recent call last)
Cell In[146], line 1
----> 1 np.random.randint(0)

File numpy/random/mtrand.pyx:782, in numpy.random.mtrand.RandomState.randint()

File numpy/random/_bounded_integers.pyx:1334, in numpy.random._bounded_integers._rand_int64()

ValueError: high <= 0
```

In [152… `np.random.randint(30,20,10)`

```
---------------------------------------------------------------------------
ValueError                                Traceback (most recent call last)
Cell In[152], line 1
----> 1 np.random.randint(30,20,10)

File numpy/random/mtrand.pyx:782, in numpy.random.mtrand.RandomState.randint()

File numpy/random/_bounded_integers.pyx:1334, in numpy.random._bounded_integers._rand_int64()

ValueError: low >= high
```

In [158… `np.random.rand(30,20,10)`

Out[158…
```
array([[[3.93631281e-01, 6.53657541e-01, 6.88466527e-02, ...,
         2.59689240e-01, 7.19444227e-01, 4.81770250e-01],
        [3.56585580e-01, 4.77950740e-01, 2.01500380e-01, ...,
         8.40080173e-01, 1.64151805e-01, 3.06096786e-01],
        [7.20336351e-01, 4.24618446e-01, 5.06619222e-02, ...,
         7.77741463e-01, 5.21613846e-01, 9.02578022e-01],
        ...,
        [7.00259942e-01, 5.24866383e-01, 5.44167527e-01, ...,
         5.23500385e-02, 6.02799392e-01, 8.42156549e-02],
        [6.05855718e-02, 8.41838604e-01, 1.56236527e-01, ...,
         6.77715523e-01, 8.54438779e-01, 9.65027947e-01],
        [5.01818733e-01, 5.38523182e-01, 2.46176023e-01, ...,
         6.48924946e-01, 1.35580750e-01, 4.40744922e-01]],

       [[1.36749800e-01, 1.60738509e-01, 6.99090138e-01, ...,
         2.09785202e-01, 1.85347988e-01, 8.91204345e-01],
        [1.80754916e-01, 7.74505166e-01, 6.22041867e-02, ...,
         2.65614155e-01, 7.51884006e-01, 6.53000833e-01],
        [2.00262027e-01, 3.26582378e-01, 7.10442080e-01, ...,
```

```
        9.66676897e-01, 7.16006366e-01, 6.77269771e-02],
      ...,
      [4.24830162e-01, 5.12738064e-01, 5.66869599e-01, ...,
        9.00074203e-02, 2.26618871e-01, 7.58859895e-01],
      [8.03057434e-01, 1.04084831e-01, 1.57858425e-01, ...,
        7.75457901e-01, 5.21864585e-01, 1.52856596e-02],
      [9.93715835e-01, 7.94362815e-01, 9.95159712e-01, ...,
        7.00305919e-01, 6.68770277e-01, 4.92286378e-01]],

     [[8.55182839e-01, 4.36430508e-01, 1.43929239e-01, ...,
        8.10723966e-01, 1.11990450e-01, 7.20554865e-01],
      [3.64560079e-01, 2.45262051e-01, 4.52529548e-01, ...,
        7.07869781e-03, 5.52327115e-01, 8.01777197e-01],
      [2.74135800e-01, 6.37469393e-01, 5.91602547e-01, ...,
        2.84392063e-01, 3.73863111e-01, 1.16990524e-01],
      ...,
      [9.03544273e-01, 7.40432129e-01, 5.15199330e-01, ...,
        7.99840953e-02, 4.77428740e-01, 7.79406825e-01],
      [2.35912672e-01, 9.52477689e-01, 5.01854674e-01, ...,
        5.62780097e-01, 8.76554796e-01, 4.42740146e-01],
      [8.71807202e-02, 9.05430960e-01, 7.63925702e-01, ...,
        6.63712320e-02, 6.98776879e-01, 9.22345080e-01]],

      ...,

     [[3.84630729e-01, 3.51198423e-03, 5.58423533e-01, ...,
        6.23989027e-01, 3.55986321e-01, 9.67194555e-01],
      [5.17733726e-01, 6.38174053e-02, 3.81564275e-01, ...,
        3.92226366e-01, 3.82263033e-01, 6.03405968e-01],
      [2.38438581e-01, 8.97640220e-01, 6.25043776e-01, ...,
        8.13091865e-01, 2.85427334e-01, 2.79449946e-01],
      ...,
      [5.34017417e-01, 5.58325702e-01, 7.40129479e-01, ...,
        6.13270950e-01, 7.53977224e-01, 4.56757799e-01],
      [1.51452498e-01, 4.51228218e-01, 8.58903456e-01, ...,
        4.34136524e-01, 8.17567028e-02, 6.98135731e-02],
      [7.18920291e-01, 2.11250938e-01, 6.28601912e-01, ...,
        9.97772209e-01, 5.99068764e-01, 6.14258762e-01]],

     [[9.51140901e-01, 4.32660204e-01, 5.46042961e-01, ...,
        9.79633616e-01, 5.74815609e-01, 1.71644031e-01],
      [2.61555520e-01, 1.32164058e-01, 5.78426662e-01, ...,
        1.33399416e-02, 2.19260959e-01, 1.97816244e-01],
      [6.87489903e-02, 2.43972279e-01, 1.27753334e-01, ...,
        6.59377307e-01, 9.55349591e-01, 9.44641889e-01],
      ...,
      [3.87439521e-04, 9.39599342e-01, 6.41727442e-01, ...,
        3.72347371e-01, 4.59754045e-01, 6.89383959e-01],
      [9.39251768e-01, 8.48190933e-01, 7.89080348e-01, ...,
        3.45802557e-01, 9.82013015e-01, 2.22202649e-01],
      [8.33792011e-01, 2.25790218e-01, 5.35251228e-01, ...,
        7.64686326e-01, 5.69517212e-01, 7.35476013e-01]],
```

```
        [[4.63556243e-01, 6.43415696e-01, 4.58026773e-01, ...,
          1.09224229e-02, 6.08092809e-01, 3.44640256e-01],
         [2.21510413e-01, 4.95809463e-01, 5.06919659e-01, ...,
          7.62303721e-01, 6.98677008e-01, 1.66491075e-01],
         [8.08282093e-01, 7.73373583e-01, 4.53457934e-01, ...,
          3.81264334e-01, 7.63629185e-01, 1.70239173e-02],
         ...,
         [7.78723144e-01, 6.97467990e-01, 9.42459181e-01, ...,
          6.73393002e-01, 7.85738823e-01, 4.25374770e-01],
         [1.28076716e-01, 4.04509083e-01, 4.40210790e-01, ...,
          1.50099634e-01, 8.41802334e-03, 9.86472912e-01],
         [1.49303896e-01, 3.77804095e-01, 3.29425893e-01, ...,
          9.43890312e-01, 3.94359958e-01, 7.51394558e-01]]])
```

In [160…   `np.random.randint(-30,20,10)`

Out[160…   `array([  4,  13, -13, -23, -20,  -5,  -2,   2,  13,   5])`

In [166…   `np.random.randint(1,50,(10,10))  # np.random.randint(start value, end val`

Out[166…   ```
            array([[2, 20, 31, 23, 16, 45, 45, 12, 29, 31],
                   [39, 24, 21, 34, 32, 27, 37, 29, 16, 38],
                   [49, 44, 28, 10, 7, 2, 47, 16, 4, 5],
                   [22, 42, 37, 17, 27, 5, 18, 38, 31, 32],
                   [21, 43, 14, 36, 5, 39, 20, 15, 19, 48],
                   [20, 47, 20, 20, 37, 34, 37, 13, 15, 27],
                   [9, 47, 6, 4, 32, 21, 9, 6, 37, 31],
                   [49, 10, 16, 44, 34, 46, 6, 43, 17, 11],
                   [8, 11, 36, 44, 46, 25, 31, 18, 10, 47],
                   [49, 45, 6, 33, 43, 32, 8, 30, 41, 48]])
           ```

In [168…    `np.random.randint(1,100,(12,12))`

Out[168…   ```
            array([[78, 35, 56, 77, 15, 13, 91, 96, 16,  1, 23, 34],
                   [63,  8, 51,  7, 81,  5, 86, 98, 93, 38, 96, 70],
                   [80, 74, 62, 62,  8, 73,  1, 60, 79, 30, 60, 94],
                   [67, 92, 81, 15, 45, 99, 75,  2,  2, 38, 30, 94],
                   [14, 23, 16,  1, 81, 21, 96, 44, 81, 96, 11, 54],
                   [86, 49, 22, 19, 34,  1, 32,  6, 87, 10, 31, 46],
                   [93, 75, 74, 17, 77, 32, 71, 84, 30, 28, 79, 30],
                   [68, 74, 79, 92, 59, 27, 25, 94, 33, 38, 77, 59],
                   [ 8, 14, 17, 58, 18, 12,  3, 12, 40, 67, 40, 82],
                   [31, 60, 25, 33, 11, 21, 82, 37, 76, 39, 50, 67],
                   [43, 81, 57, 81, 43, 20, 60, 82, 77, 20, 33, 64],
                   [49, 79, 88, 62, 22, 80, 76, 45, 82,  2, 46, 78]])
           ```

In [178…   `np.random.rand(1,100,5)`

Out[178…   ```
            array([[[0.83951013, 0.2301151 , 0.74489519, 0.9741447 , 0.22267015],
                    [0.28743231, 0.98749236, 0.45557363, 0.62216925, 0.40667618],
                    [0.06717621, 0.9271113 , 0.74857258, 0.64987126, 0.1661515],
                    [0.74007588, 0.26773876, 0.82305258, 0.30372641, 0.66376917],
                    [0.87415042, 0.62767925, 0.23142106, 0.98494459, 0.38568156],
           ```

```
[0.36029118, 0.09609361, 0.08089425, 0.42713813, 0.72745361],
[0.65011917, 0.37779611, 0.22427861, 0.13436031, 0.68162443],
[0.25629194, 0.85956895, 0.0122628 , 0.0628961 , 0.49409568],
[0.55096247, 0.24107618, 0.80183067, 0.75081107, 0.13779388],
[0.87798039, 0.41278759, 0.15884845, 0.79954245, 0.26804829],
[0.195866  , 0.45793368, 0.05062471, 0.48892924, 0.38194352],
[0.56092529, 0.27138825, 0.99367757, 0.04124825, 0.8874987 ],
[0.37254045, 0.10154076, 0.76732342, 0.92979769, 0.21370603],
[0.61999796, 0.7671576 , 0.40911806, 0.56383211, 0.17041573],
[0.83735175, 0.98009367, 0.77372477, 0.08890014, 0.29330776],
[0.06198995, 0.90384498, 0.80486256, 0.57590378, 0.37797439],
[0.84017072, 0.38911193, 0.0855942 , 0.3137269 , 0.61565601],
[0.01484661, 0.05895908, 0.83153784, 0.44515887, 0.31267785],
[0.11258343, 0.27114872, 0.6020162 , 0.16139984, 0.3667466 ],
[0.45972193, 0.26821483, 0.60659383, 0.75049913, 0.81127607],
[0.73679336, 0.74360678, 0.89694936, 0.80089694, 0.35850687],
[0.54678565, 0.40836892, 0.54934383, 0.91543507, 0.53260575],
[0.94371863, 0.16128278, 0.19786396, 0.95274793, 0.79006433],
[0.45752922, 0.44089168, 0.3527025 , 0.12999004, 0.28860452],
[0.10254869, 0.46225583, 0.20333845, 0.64776223, 0.85389888],
[0.65113851, 0.95612734, 0.89577055, 0.22024272, 0.2308439 ],
[0.92580974, 0.71089459, 0.14292968, 0.97754039, 0.67976532],
[0.47985336, 0.70451982, 0.38610748, 0.07277108, 0.32466049],
[0.65462671, 0.82231288, 0.69818724, 0.55116214, 0.44611632],
[0.08168944, 0.16227865, 0.03344807, 0.92817497, 0.3832127 ],
[0.39102177, 0.38230463, 0.30273471, 0.67618089, 0.39416581],
[0.41817449, 0.45570349, 0.06532062, 0.77214868, 0.61025377],
[0.76040409, 0.17560666, 0.25453604, 0.46714516, 0.38275425],
[0.03275101, 0.46941541, 0.76780802, 0.61532073, 0.24346066],
[0.82297924, 0.83811458, 0.2349827 , 0.352622  , 0.35565279],
[0.23338412, 0.72478968, 0.42582367, 0.41843464, 0.65845674],
[0.57936956, 0.95411667, 0.12117963, 0.32426458, 0.42655618],
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[0.53591602, 0.98079423, 0.46136193, 0.87382646, 0.40703522],
[0.89130456, 0.95360324, 0.45262907, 0.34798555, 0.02731837],
[0.81141805, 0.16422011, 0.46752764, 0.73319932, 0.03459015],
```

```
       [0.92581672, 0.76439501, 0.77599345, 0.94416496, 0.77101945],
       [0.94348549, 0.55567072, 0.69971454, 0.45733996, 0.87104735],
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       [0.77473787, 0.75804637, 0.97792377, 0.91507207, 0.66622507],
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       [0.23794668, 0.83456383, 0.56151705, 0.68495825, 0.64934741],
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       [0.09116572, 0.90729358, 0.31317124, 0.39873675, 0.35335072],
       [0.97400872, 0.93113632, 0.37589882, 0.24822037, 0.05911027],
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       [0.00862865, 0.3899349 , 0.92308859, 0.98039815, 0.93401399],
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       [0.9262119 , 0.89048074, 0.67321563, 0.13112098, 0.90745016],
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       [0.0540582 , 0.23673622, 0.48650917, 0.65415592, 0.38686584],
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       [0.22367162, 0.31830163, 0.67208483, 0.55927548, 0.31058805],
       [0.38562378, 0.44763719, 0.30055501, 0.20854688, 0.01412336],
       [0.44659122, 0.3580795 , 0.11069073, 0.64495093, 0.55789168],
       [0.85803509, 0.94703658, 0.19332386, 0.28520115, 0.9334176 ],
       [0.9849886 , 0.05484776, 0.03571982, 0.14226234, 0.28055179],
       [0.15020981, 0.10286801, 0.52816296, 0.66843995, 0.05863095],
       [0.73934136, 0.97243085, 0.64575501, 0.50121571, 0.71396317],
       [0.55429456, 0.85312382, 0.93732189, 0.92905476, 0.08141255],
       [0.83907626, 0.0297406 , 0.3485837 , 0.86949957, 0.54688022],
       [0.82700828, 0.89065028, 0.19623928, 0.24556088, 0.65520285],
       [0.44752236, 0.52923495, 0.61296077, 0.02100333, 0.02500365],
       [0.19517507, 0.79211472, 0.53003239, 0.09309416, 0.7031364 ],
       [0.62436003, 0.75842601, 0.06592473, 0.37944239, 0.69983818]]])
```

Reshape function

```
In [183…   np.arange(1,10)
```

```
Out[183…   array([1, 2, 3, 4, 5, 6, 7, 8, 9])
```

```
In [187…   np.arange(1,10).reshape(3,3)
```

```
Out[187…  array([[1, 2, 3],
                 [4, 5, 6],
                 [7, 8, 9]])
```

```
In [209…  np.arange(1,11).reshape(2,5)
```

```
Out[209…  array([[ 1,  2,  3,  4,  5],
                 [ 6,  7,  8,  9, 10]])
```

```
In [213…  np.arange(1,12).reshape(1,11)
```

```
Out[213…  array([[ 1,  2,  3,  4,  5,  6,  7,  8,  9, 10, 11]])
```

```
In [221…  np.arange(1,25).reshape(6,4)
```

```
Out[221…  array([[ 1,  2,  3,  4],
                 [ 5,  6,  7,  8],
                 [ 9, 10, 11, 12],
                 [13, 14, 15, 16],
                 [17, 18, 19, 20],
                 [21, 22, 23, 24]])
```

```
In [241…  np.arange(2,2).reshape(1,1)
```

```
---------------------------------------------------------------------------
ValueError                                Traceback (most recent call last)
Cell In[241], line 1
----> 1 np.arange(2,2).reshape(1,1)

ValueError: cannot reshape array of size 0 into shape (1,1)
```

```
In [247…  np.arange(10,20).reshape(5,2)
```

```
Out[247…  array([[10, 11],
                 [12, 13],
                 [14, 15],
                 [16, 17],
                 [18, 19]])
```

```
In [262…  b1 = np.random.randint(10,20,(5,4))
          print(b1)
          type(b1)
```

```
[[19 18 12 16]
 [19 11 12 10]
 [10 19 18 12]
 [11 11 19 17]
 [19 10 15 13]]
```

```
Out[262…  numpy.ndarray
```

Slicing & Indexing in Numpy

In [ ]:

In [ ]:

In [269…   `print(b1)`

```
[[19 18 12 16]
 [19 11 12 10]
 [10 19 18 12]
 [11 11 19 17]
 [19 10 15 13]]
```

In [ ]:

In [271…   `b1[:]`

Out[271…
```
array([[19, 18, 12, 16],
       [19, 11, 12, 10],
       [10, 19, 18, 12],
       [11, 11, 19, 17],
       [19, 10, 15, 13]])
```

In [275…   `b1[::]`

Out[275…
```
array([[19, 18, 12, 16],
       [19, 11, 12, 10],
       [10, 19, 18, 12],
       [11, 11, 19, 17],
       [19, 10, 15, 13]])
```

In [281…   `b1[::3]`

Out[281…
```
array([[19, 18, 12, 16],
       [11, 11, 19, 17]])
```

In [285…   `b1[1:3]`

Out[285…
```
array([[19, 11, 12, 10],
       [10, 19, 18, 12]])
```

In [289…   `b1[1,2]`

Out[289…   `12`

In [293…   `b1[1,3]`

Out[293…   `10`

In [297…   `b1[0:1]`

Out[297…   array([[19, 18, 12, 16]])

In [300…   b1[0:-2]

Out[300…   array([[19, 18, 12, 16],
                   [19, 11, 12, 10],
                   [10, 19, 18, 12]])

In [304…   b1[0,-2]

Out[304…   12

In [308…   b1[::]

Out[308…   array([[19, 18, 12, 16],
                   [19, 11, 12, 10],
                   [10, 19, 18, 12],
                   [11, 11, 19, 17],
                   [19, 10, 15, 13]])

In [311…   b1[-4:2]

Out[311…   array([[19, 11, 12, 10]])

In [336…   b2 = np.arange(1,100).reshape(11,9)
             print(b2)

```
[[ 1  2  3  4  5  6  7  8  9]
 [10 11 12 13 14 15 16 17 18]
 [19 20 21 22 23 24 25 26 27]
 [28 29 30 31 32 33 34 35 36]
 [37 38 39 40 41 42 43 44 45]
 [46 47 48 49 50 51 52 53 54]
 [55 56 57 58 59 60 61 62 63]
 [64 65 66 67 68 69 70 71 72]
 [73 74 75 76 77 78 79 80 81]
 [82 83 84 85 86 87 88 89 90]
 [91 92 93 94 95 96 97 98 99]]
```

In [325…   b2[0:5]

Out[325…   array([[1, 2, 3, 4, 5, 6, 7, 8, 9],
                   [10, 11, 12, 13, 14, 15, 16, 17, 18],
                   [19, 20, 21, 22, 23, 24, 25, 26, 27],
                   [28, 29, 30, 31, 32, 33, 34, 35, 36],
                   [37, 38, 39, 40, 41, 42, 43, 44, 45]])

In [332…   arr = np.random.randint(1,100,(10,10))
             print(arr)

```
[[ 1 74 63 45  9 82 70 61 88  9]
 [61 47  1 64 67 38 25 85 55 59]
 [27 53 42 46 63 11 23 33 99 57]
 [69 20 21 97 90 69 29 20 80 29]
 [ 9 85 57 33 68 87 41  3 63 39]
 [26 93 21 63 64 35 45 84 99 44]
 [92 57 68 31  3 90 37  3 86 92]
 [81 21 50 13 92 16 82 20  8 87]
 [69 59 16 56 81 54 40 22 59 72]
 [77 13 84 58 27 91 90 15 86 33]]
```

In [338… `arr[1,4]`

Out[338… 67

In [344…
```
b2[1,4]
b2[1:4]
```

Out[344…
```
array([[10, 11, 12, 13, 14, 15, 16, 17, 18],
       [19, 20, 21, 22, 23, 24, 25, 26, 27],
       [28, 29, 30, 31, 32, 33, 34, 35, 36]])
```

In [348… `arr.max()`

Out[348… 99

In [350… `arr.min()`

Out[350… 1

In [352…
```
arr1 = np.array([1,2,3,3,4])
print(arr1)
print(type(arr1))
```

```
[1 2 3 3 4]
<class 'numpy.ndarray'>
```

In [354… `arr1.mean()`

Out[354… 2.6

In [359… `np.median(arr1)`

Out[359… 3.0

In [361…
```
mat = np.arange(0,100).reshape(10,10)
print(mat)
```

```
[[ 0  1  2  3  4  5  6  7  8  9]
 [10 11 12 13 14 15 16 17 18 19]
 [20 21 22 23 24 25 26 27 28 29]
 [30 31 32 33 34 35 36 37 38 39]
 [40 41 42 43 44 45 46 47 48 49]
 [50 51 52 53 54 55 56 57 58 59]
 [60 61 62 63 64 65 66 67 68 69]
 [70 71 72 73 74 75 76 77 78 79]
 [80 81 82 83 84 85 86 87 88 89]
 [90 91 92 93 94 95 96 97 98 99]]
```

In [ ]:

In [363… `mat[4,5]`

Out[363…   45

In [367… `mat[4]`

Out[367…   `array([40, 41, 42, 43, 44, 45, 46, 47, 48, 49])`

In [373… `mat[:,5]`

Out[373…   `array([ 5, 15, 25, 35, 45, 55, 65, 75, 85, 95])`

In [ ]:

In [375… `mat[6,:]`

Out[375…   `array([60, 61, 62, 63, 64, 65, 66, 67, 68, 69])`

In [377… `mat[6]`

Out[377…   `array([60, 61, 62, 63, 64, 65, 66, 67, 68, 69])`

In [381… `mat[2:6,2:4]`

Out[381…   `array([[22, 23],`
            `[32, 33],`
            `[42, 43],`
            `[52, 53]])`

In [387… `print(mat)`

```
[[ 0  1  2  3  4  5  6  7  8  9]
 [10 11 12 13 14 15 16 17 18 19]
 [20 21 22 23 24 25 26 27 28 29]
 [30 31 32 33 34 35 36 37 38 39]
 [40 41 42 43 44 45 46 47 48 49]
 [50 51 52 53 54 55 56 57 58 59]
 [60 61 62 63 64 65 66 67 68 69]
 [70 71 72 73 74 75 76 77 78 79]
 [80 81 82 83 84 85 86 87 88 89]
 [90 91 92 93 94 95 96 97 98 99]]
```

In [ ]:

In [401… `mat[2:3, 2:3]`

Out[401… `array([[22]])`

In [ ]:

In [413… `mat[3:5,2:4]`

Out[413… `array([[32, 33],`
`        [42, 43]])`

In [ ]:

In [417… `mat[4:7,4:6]`

Out[417… `array([[44, 45],`
`        [54, 55],`
`        [64, 65]])`

In [423… `mat [2:5, 4:5]`

Out[423… `array([[24],`
`        [34],`
`        [44]])`

In [ ]:

In [ ]:

In [ ]:

In [ ]:

In [ ]:

In [ ]:

In [ ]:

In [ ]:

In [ ]:

In [ ]:

In [ ]:

In [ ]:

In [ ]:

In [ ]: