

Intro to Python and DS9

ASTRO 101
28 August 2023

 www.astronu.com/cv.html



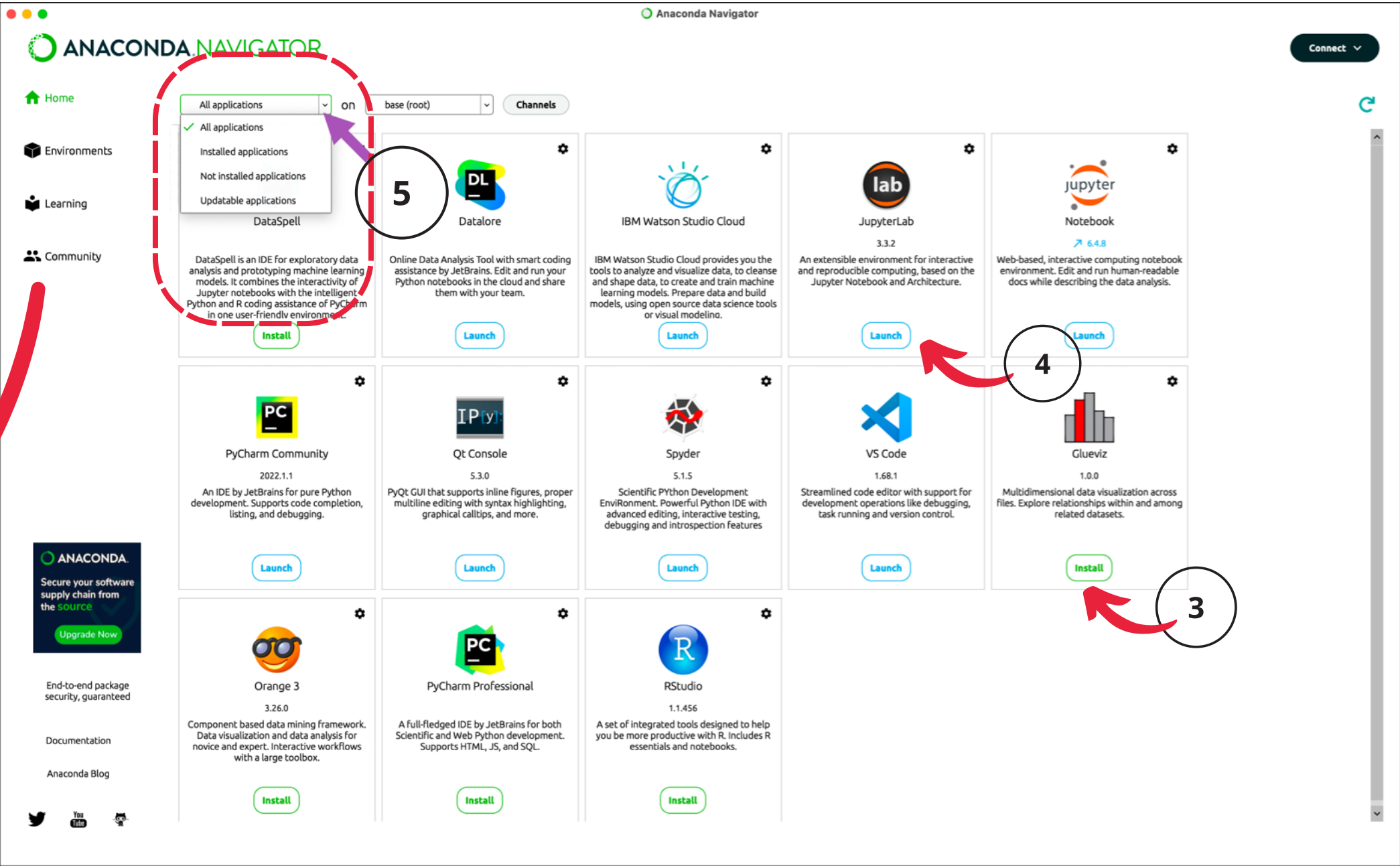
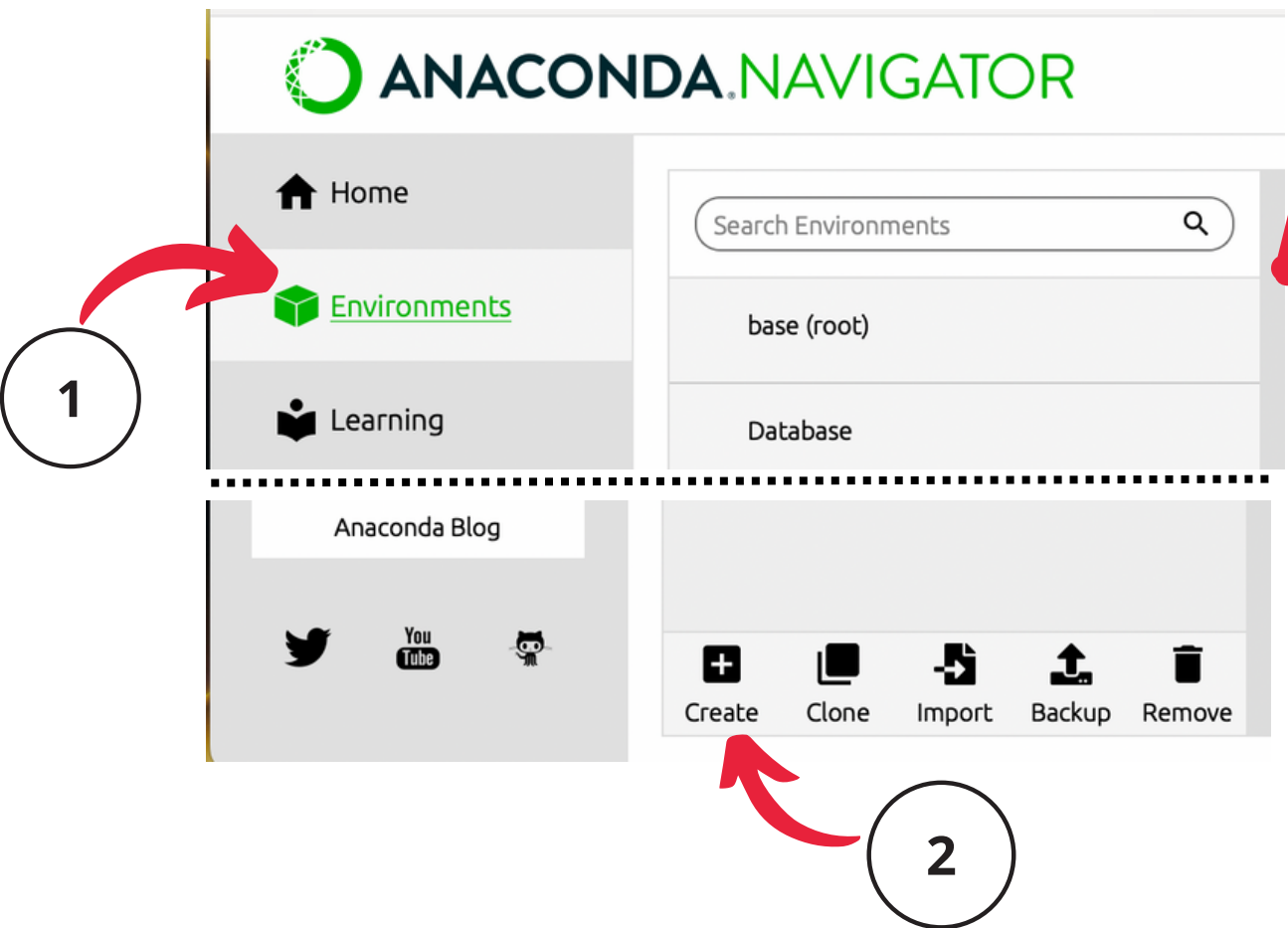
Anaconda Navigator

Anaconda interface

1 & 2 Create Environment

3 & 4 install & run main application

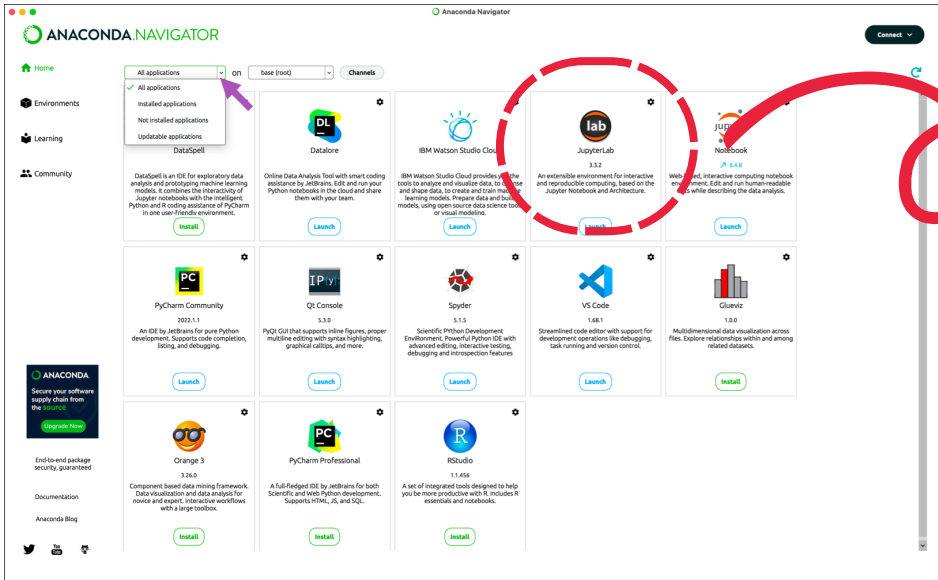
5 install other application

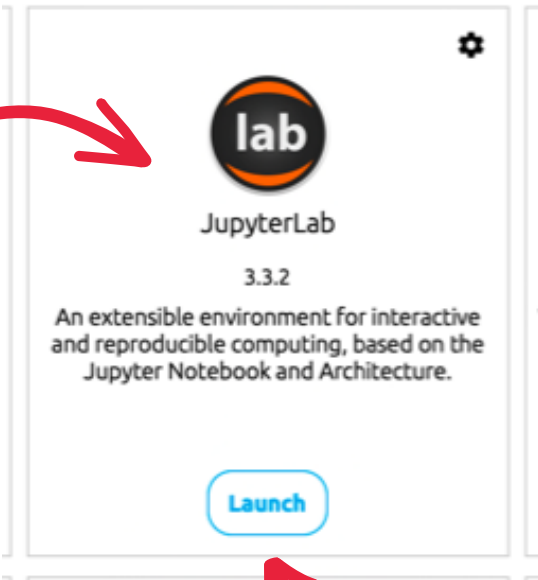


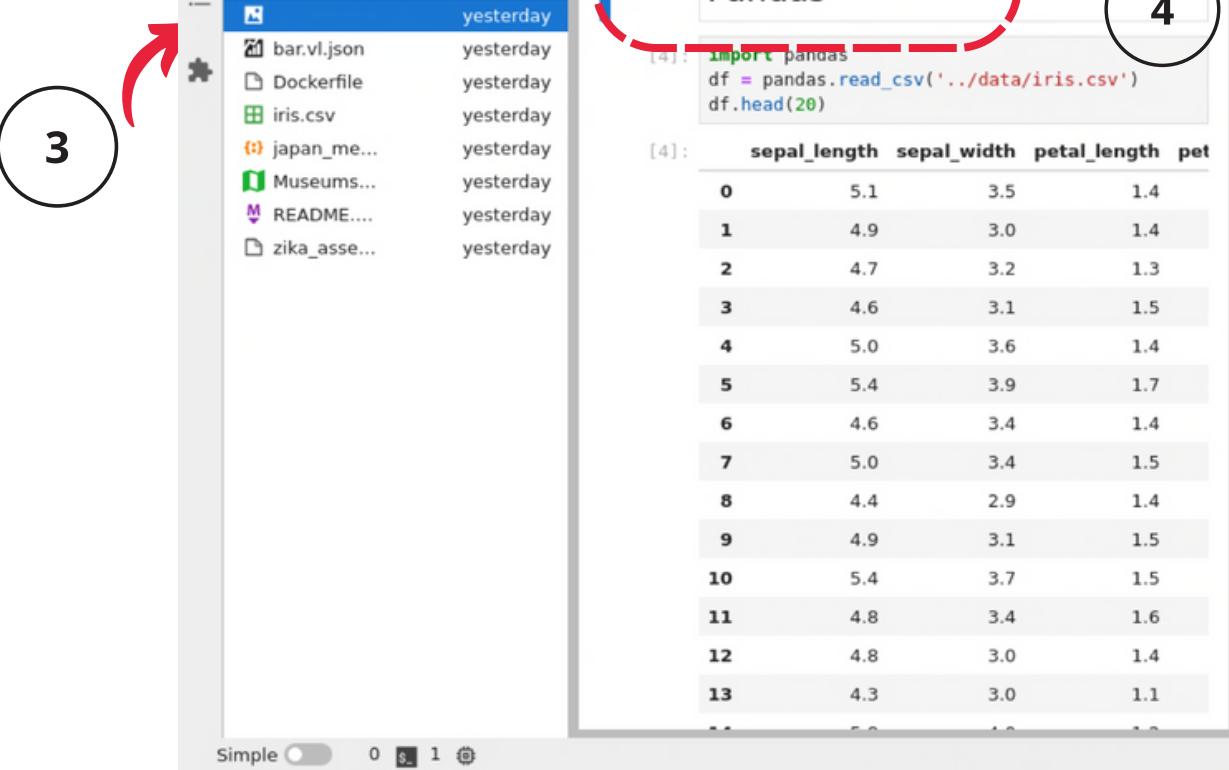
JupyterLab

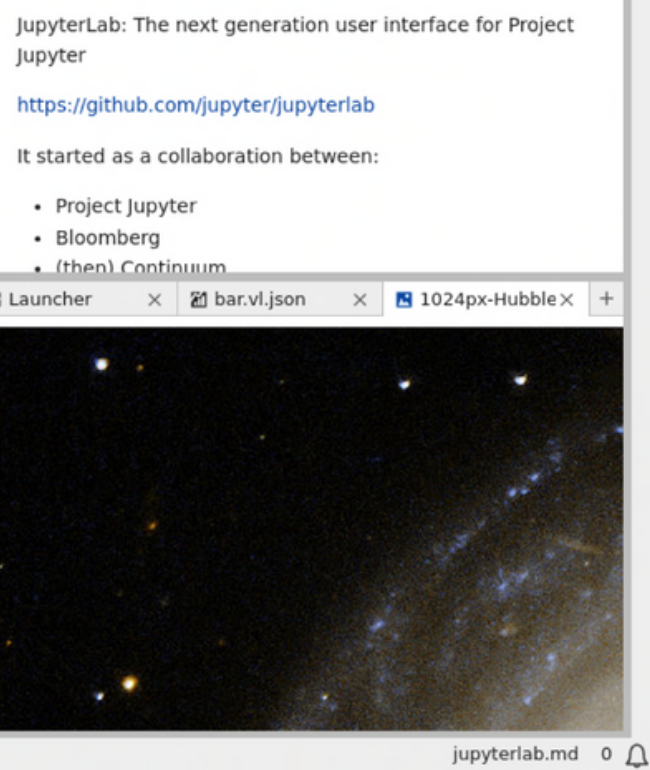
JupyterLab for coding

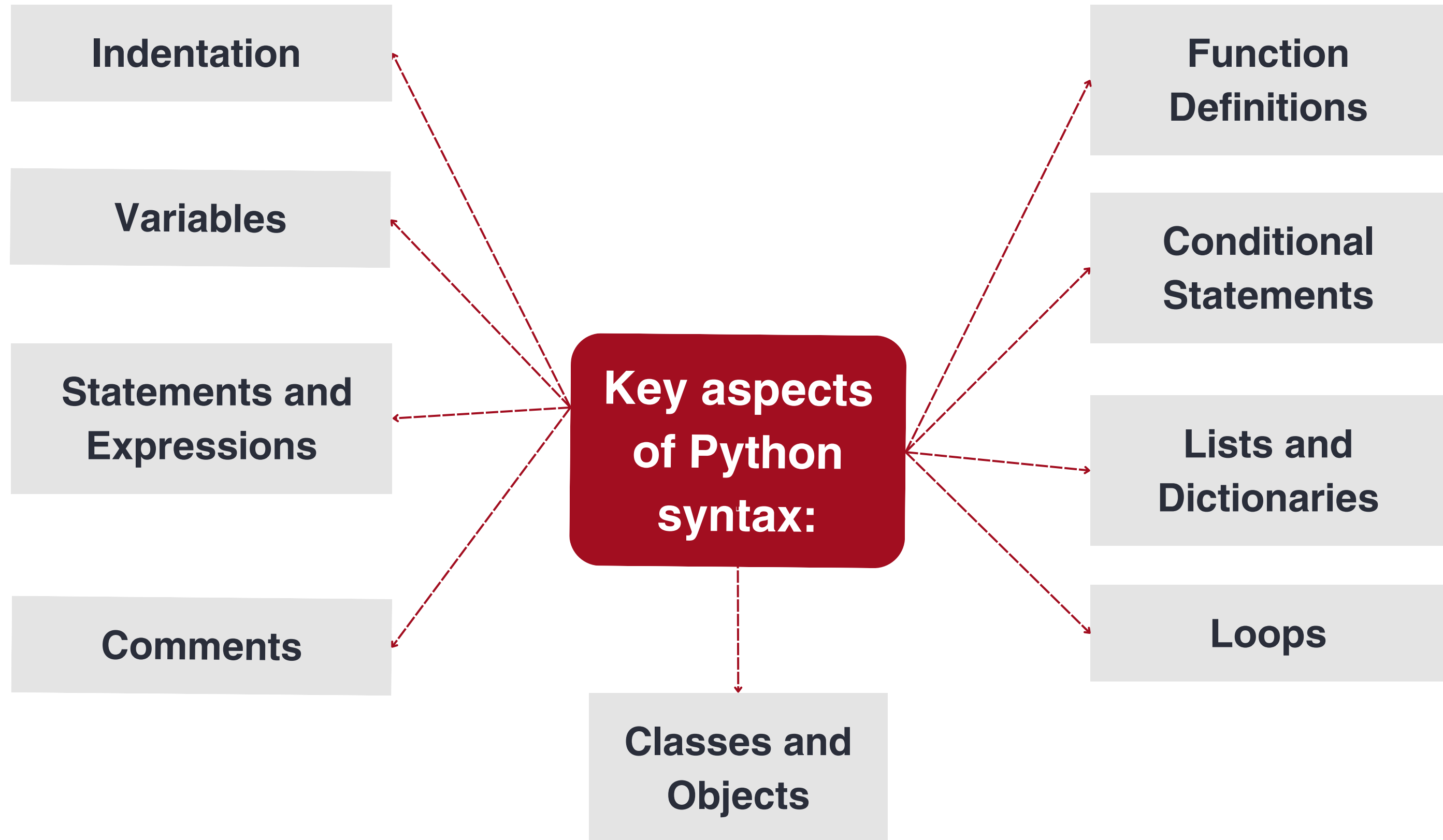
- 1 run JupyterLab
- 2 working space and menu
- 3 Browser, terminal, table, extension
- 4 Cell on Notebook where we will work



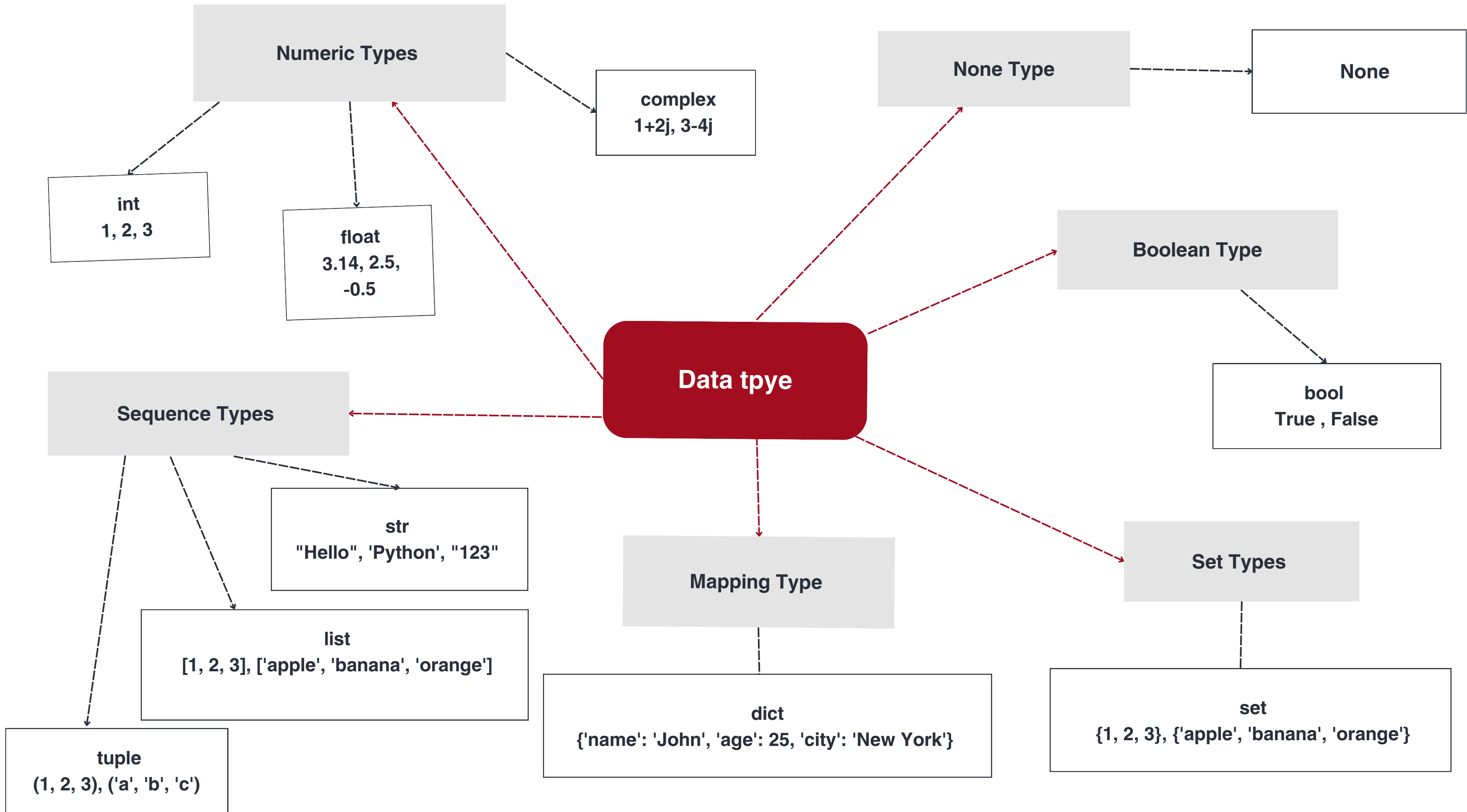








Can't use reserved words
There are built-in functions



Read and Write

```
# Writing to a text file
with open('example.txt', 'w') as file:
    file.write("Hello, this is some text that we're writing to the file.\n")
    file.write("Writing multiple lines.\n")
    file.write("Goodbye!")

# Reading from a text file
with open('example.txt', 'r') as file:
    content = file.read()
    print(content)

# Reading line by line
with open('example.txt', 'r') as file:
    lines = file.readlines()
    for line in lines:
        print(line.strip()) # Using strip() to remove newline characters
```

"r" - Read - Default value. Opens a file for reading, error if the file does not exist

"a" - Append - Opens a file for appending, creates the file if it does not exist

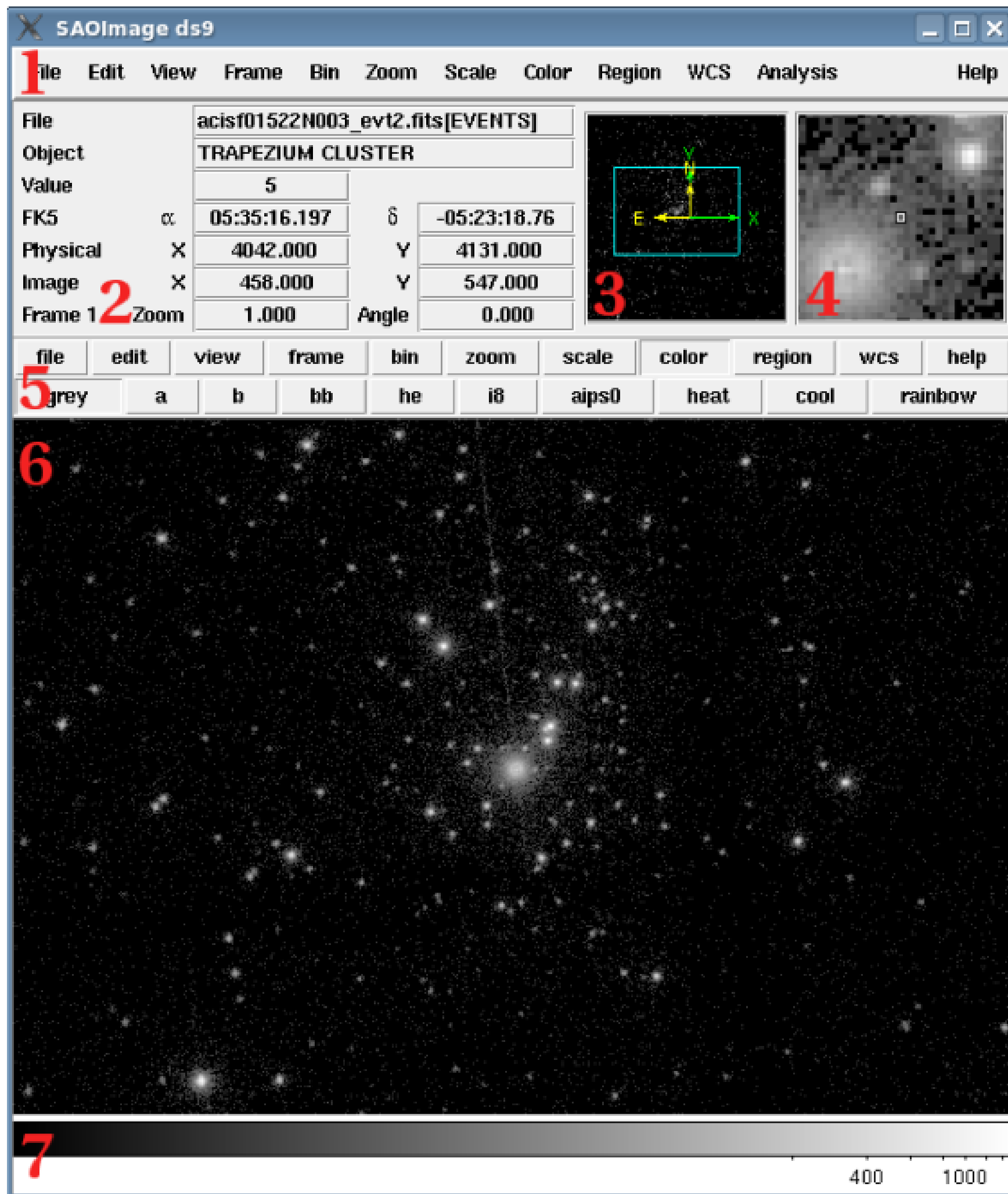
"w" - Write - Opens a file for writing, creates the file if it does not exist

"x" - Create - Creates the specified file, returns an error if the file exists

memory

```
cls(job_dir)

request_seen(self, req
fp = self.request_fir
if fp in self.fingerp
```

1. Menu bar
2. Information panel
3. Panner
4. Magnifier
5. Buttons
6. Display frame
7. Colorbar

DS9

SAOImageDS9 is an astronomical imaging and data visualization application. DS9 supports FITS images and binary tables, multiple frame buffers, region manipulation, and many scale algorithms and colormaps.

<https://ds9.si.edu/doc/user/index.html>

<https://www.jb.man.ac.uk/~gbendo/Sci/Pict/DS9guide.pdf>

Header

```

SIMPLE =                               T / Written by IDL:  Mon Jul 16 15:06:45 2012
BITPIX =                              -32 / IEEE single precision floating point
NAXIS  =                               2 /Number of data axes
NAXIS1 =                              1080 /Length of data axis 1
NAXIS2 =                              2040 /Length of data axis 2
DATE   = '2012-03-21'                  /File creation date (yyyy-mm-dd)
OBJECT = 'NGC 3031'                    /Title of the dataset
TELESCOP= 'Spitzer '                   /Telescope name
INSTRUME= 'MIPS '                      /Instrument name
CHNLNUM =                              1 /MIPS channel number (1=24um,2=70um,3=160um)
WAVELEN =          2.36800E-05 /Wavelength of the observation (m)
FREQ    =          1.26689E+13 /Frequency of the observations (Hz)
AORKEY1 = '5554688 '                   /Spitzer AOR key 1
AORKEY2 = '5554944 '                   /Spitzer AOR key 2
AORKEY3 = '7864576 '                   /Spitzer AOR key 3
RA      = '09:55:33.1'                  /Right ascension (hh:mm:ss)
DEC     = '+69:03:55.0'                  /Declination (dd:mm:ss)
EQUINOX =          2000.00 /Equinox of RA and DEC

```

CENTER FOR

ASTROPHYSICS

HARVARD & SMITHSONIAN

THANKS

JupyterLab Interface

main work area
containing tabs of
documents and
activities

Menu bar and Tabs

Left sidebar

1. File browser
2. List of tabs: running kernels and terminals
3. Table of contents
4. Extension manager.

The screenshot shows the JupyterLab interface with the following components:

- Menu bar and Tabs:** Located at the top, containing menus for File, Edit, View, Run, Kernel, Tabs, Settings, and Help. Below the menu bar is a toolbar with icons for file operations and a tab bar showing 'Data.ipynb' and 'jupyterlab.md'.
- Left sidebar:** Contains a file browser showing a directory structure with files like 'bar.vl.json', 'Dockerfile', 'iris.csv', 'japan_me...', 'Museums...', 'README....', and 'zika_asse...'. It also includes a table of contents and an extension manager.
- Main work area:** The central area containing tabs for documents and activities. The 'Data.ipynb' tab is active, showing a code cell with the following code:

```
[4]: import pandas
df = pandas.read_csv('../data/iris.csv')
df.head(20)
```

Below the code is a table of the first 20 rows of the 'iris.csv' file.

	sepal_length	sepal_width	petal_length	pet
0	5.1	3.5	1.4	
1	4.9	3.0	1.4	
2	4.7	3.2	1.3	
3	4.6	3.1	1.5	
4	5.0	3.6	1.4	
5	5.4	3.9	1.7	
6	4.6	3.4	1.4	
7	5.0	3.4	1.5	
8	4.4	2.9	1.4	
9	4.9	3.1	1.5	
10	5.4	3.7	1.5	
11	4.8	3.4	1.6	
12	4.8	3.0	1.4	
13	4.3	3.0	1.1	

The 'jupyterlab.md' tab is also visible, showing a 'JupyterLab Demo' page with a list of collaborators: Project Jupyter, Bloomberg, and (then) Continuum.
- Notebook cell tools inspector:** Located on the right side of the interface, it provides tools for inspecting and editing notebook cells.

List is a collection which is ordered and changeable. Allows duplicate members.

Tuple is a collection which is ordered and unchangeable. Allows duplicate members.

Set is a collection which is unordered, unchangeable*, and unindexed. No duplicate members.

Dictionary is a collection which is ordered** and changeable. No duplicate members.