https://github.com/Cosmodude/Obs_Astronomy_Lab/blob/main/TA_task.md

Task 1

Set 1

1

https://docs.astropy.org/en/stable/io/fits/index.html ### 2 I did

3

WCS - World Coordinate System;

I did

Set 2

Rules:

```
Never use for or while loop.

You should not import any other packages.

Answer to each problem must be a one-line of python code.

For each problem, I gave hints. It is also homework for you to search for those on google.
```

```
# https://github.com/Cosmodude/Obs_Astronomy_Lab/blob/main/TA_task.py
# Used https://docs.astropy.org/en/stable/io/fits/index.html

### Task 1

import numpy as np
from pathlib import Path
from astropy.io import fits
from astropy.nddata import CCDData

np.random.seed(123)  # legacy function
SAVEPATH = Path("./Problem_products")  # <-- You may tune here for your computer
data = np.random.rand(100, 100) * 100 # Creates 100x100 array of random numbers
#print(data)

### Prob 1
hdu = fits.PrimaryHDU(data=data)
### Prob 2
hdu.data = hdu.data.astype(np.float32)
```

```
### Prob 3
hdu.writeto(SAVEPATH / "test.fits", overwrite=True)
### Prob 4
hdul = fits.open(SAVEPATH / "test.fits")
#print(hdul[0].data)

### Prob 5
print("Prob 5:")
hdul.info()  # prints result itself
### Prob 6
print()
print("Prob 6:")
print(np.testing.assert_allclose(hdul[0].data,data)) # rises error if not equal, returns Nor
### Prob 7
hdr_hdu= hdul[0].header
"""
print()
print("Prob 7:")
print(hdr_hdu)  # prints badly in terminal
"""
### Prob 8
ccd = CCDData.read(SAVEPATH / "test.fits",unit="parsec")
### Prob 9
np.testing.assert_allclose(ccd.data, data) # rises error if not equal, returns None
### Prob 10
hdr_ccd = ccd.header
"""
print()
print("Prob 10:")
print(hdr_ccd) # prints badly in terminal
"""
### Prob 11
print()
print("Prob 11:")
print(hdr_ccd)
print(hdr_hdu)
# Prints same structure

```

Task 2

1.1:

videos watched

workspace joined
name set
message sent
Slack workspaces are a collection of public and private channels. Workspace Admins control w

1.2:

At the end of the file

2.1:

A repository contains all of your project's files and each file's revision history. You can
git clone git://git.kernel.org/pub/scm/.../linux.git my-linux

3:

I see the RA/DEC information
The unprocessed images background is gray, not dark,
looking at the values of target pixels, they were less 0, now - more
the inner colour(value) distribution of targets changed

4:

Installed packages
I do not use conda, work in vscode and use python venv
-c means --channel, to download from specific source
conda create creates the new environment
Package versions

```
### Task 2 Software & Tools

print()
print("Task 2")
import numpy
import scipy
import astropy
import pandas
import ccdproc
import photutils
import specutils

import astroscrappy
import matplotlib

print(ccdproc.__version__)
print(matplotlib.__version__)
```

```
print(numpy.__version__)
print(scipy.__version__)
print(astropy.__version__)
print(pandas.__version__)
print(photutils.__version__)
print(specutils.__version__)
print(astroscrappy.__version__)
```

5:

```
1: I did
2: yes
3: yes
4: yes
5: yes
6:
    sum = 818688.04; area(arcsec**2) = 7.71593
7:
    surf_bri = 20277.9; mean = 1955.79; median = 1955.2; stddev = 12.3002;
8: yes
9:
    sky value = 20000, matches with surf_bri
10:
    I = 66.6 * e4
    m_inst = - 14.56
12: oh
13:
    I = 5.3 * e3
    m_inst = - 9.4
14:
    m = m_0 + 2.5log(I_0/I)
```