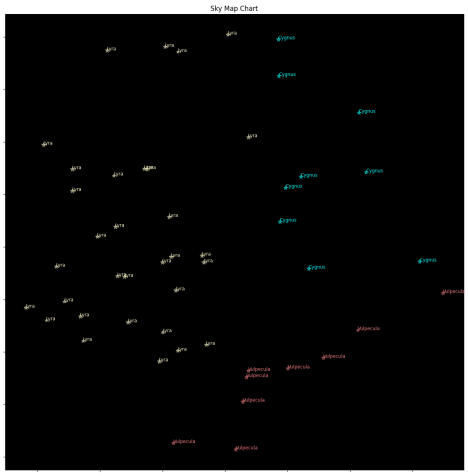
Trombini_Quentin_S16

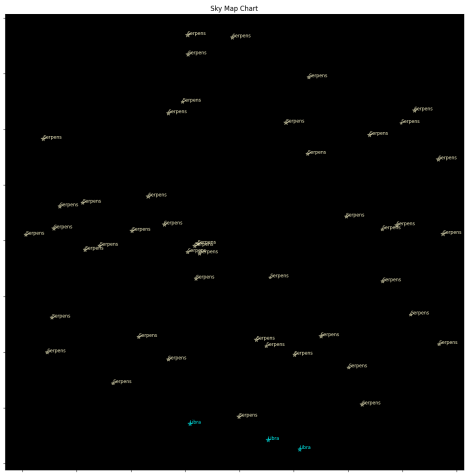
Code

```
from astroquery.vizier import Vizier
import matplotlib.pyplot as plt
import astropy.coordinates as coord
import astropy.units as u


cluster_ra = 181.0
cluster_dec = 0.5
cluster_radius = 0.1

cluster_coords = coord.SkyCoord(ra=cluster_ra, dec=cluster_dec,

vizier = Vizier(columns=["*", "+_r"])
result = vizier.query_region(cluster_coords, radius=cluster_radi


plt.figure(figsize=(15, 15))
ax = plt.axes()
ax.set_facecolor("black")
colors = ["lemonchiffon","aqua","lightcoral","lightsalmon","lime
col = 0
constellation = []
```

```
ra = result[0]['RAJ2000']
dec = result[0]['DEJ2000']
size = result[0]['Jmag']

for i in range(len(ra)):
    name = coord.get_constellation(coord.SkyCoord(ra[i],dec[i],
    if name not in constellation:
        constellation.append(name)
    plt.plot(ra[i], dec[i], markersize =float(size[i])/2, lines
    plt.text(ra[i], dec[i],name,c=colors[constellation.index(na

# with open("./S16/Lyr.txt","r") as f:
#     lines = f.readlines()
# lyr_x = []
# lyr_y = []
# for line in lines:
#     line = line.strip()
#     line = line.split()
#     lyr_x.append(line[0])
#     lyr_y.append(line[1])
# plt.plot(lyr_x, lyr_y, c=colors[constellation.index("Lyra")])

plt.title('Sky Map Chart')
ax.set_yticklabels([])
ax.set_xticklabels([])
plt.savefig("./S16/S16_01.png")
plt.show()
```

Output





here coordinates are ra=181 dec=0.5 and here it’s ra=180 dec=0.0

Explanation

This code can be separated in two distinct part: The query and the plotting

Query

for the query I initialize arbitrary coordinates but the code is made to be flexible and to work with different coordinates so you can change them and try for other part of the sky.

```
cluster_ra = 181.0
cluster_dec = 0.5
cluster_radius = 0.1
```

Then using these coordinate I create an astropy skycoord object so them I can query the surrounding star using Vizier:

```
cluster_coords = coord.SkyCoord(ra=cluster_ra, dec=cluster_dec,
```

```
vizier = Vizier(columns=["*", "+_r"])
result = vizier.query_region(cluster_coords, radius=cluster_radi
```

From this result variable I can extract the position of the different stars and their magnitude into 3 different array:

```
ra = result[0]['RAJ2000']
dec = result[0]['DEJ2000']
size = result[0]['Jmag']
```

Plotting

For the plotting part first I initialize my plot and set my background to black to make it look like a night sky:

```
plt.figure(figsize=(15, 15))
ax = plt.axes()
ax.set_facecolor("black")
```

Then I initialize the colors array: This array contain name of color that can easily be view on a black background. I also initialize an iterator and an array which will later contain the constellation name.

```
colors = ["lemonchiffon","aqua","lightcoral","lightsalmon","lime
col = 0
constellation = []
```

I will now iterate over the array containing each star position and plot each star in the previous background. I'm also adding the constellation name that I get from an astropy query to the name list. After that I can use this name list to plot each star from the same constellation in the same color:

```
for i in range(len(ra)):
    name = coord.get_constellation(coord.SkyCoord(ra[i],dec[i],
    if name not in constellation:
```

```
        constellation.append(name)
    plt.plot(ra[i], dec[i], markersize =float(size[i])/2, lines
    plt.text(ra[i], dec[i],name,c=colors[constellation.index(na
```

To finish I simply add a title and remove the number on the axis to make the render look more like a night sky, print and show the created image:

```
plt.title('Sky Map Chart')
ax.set_yticklabels([])
ax.set_xticklabels([])
plt.savefig("./S16/S16_01.png")
plt.show()
```

Work in progress part

```
with open("./S16/Lyr.txt","r") as f:
    lines = f.readlines()
lyr_x = []
lyr_y = []
for line in lines:
    line = line.strip()
    line = line.split()
    lyr_x.append(line[0])
    lyr_y.append(line[1])
plt.plot(lyr_x, lyr_y, c=colors[constellation.index("Lyra"
```

This part of the code is still commented because it’s not working properly: I got the Ly constellation from the Vizier website in the Lyr.txt file and I’m trying to plot the boundaries of this constellation. The boundaries plot is good but the problem is that it’s not on the same coordinate as the one I use in my code for the star. I didn’t had time to add the right to transform the coordinate of this file.