

CELESTIAL COORDINATE SYSTEM – SEXAGESIMAL TO DECIMAL

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1 Background

As we discussed in class, angles are everywhere in astronomy and almost all the objects of interest are a few arcseconds (") to a few arcminutes (') in size. These units are smaller in size in comparison to a degree (°). Remember that,

$$1' = \frac{1^\circ}{60}$$
$$1'' = \frac{1'}{60} = \frac{1^\circ}{3600}$$

This 60-based numbering convention comes from the Babylonians and are still widely used in the astronomy literature. However, they are not always intuitive because we are used to 10-based (decimal) numbering convention. So, nowadays many astronomers resort to convert sexagesimal degrees to decimal degrees. For example, the angular diameter of the Sun

in sexagesimal – 31' 48"

in decimal – 0°.53

1.1 SexatoDec.py

In this exercise, we will write a simple Python script that takes a sexagesimal number as an input and outputs it in decimal form. It should look of the form:

```
1 def sexa2dec(degree, arcminute, arcsecond):
2     """
3     Your code
4     """
5     return decimal_value
```

1.1.1 Algorithm

- Keep the degree value intact
- Divide the arcminute by 60 and save the value
- Divide the arcsecond by appropriate constant and save the value. Hint: Look at the conversion. What do you think is the appropriate constant?

- Add the three values above together and return it as `decimal_value`

1.1.2 Test your code

Now check your code by testing the following sexagesimal numbers and compare it with your classmates:

- $2^{\circ}35' 46''$
- $-0^{\circ}55' 12''$
- $85^{\circ}43' 20.04''$

1.1.3 What's next?

Can you think of a way to reverse the algorithm and convert decimals to sexagesimals?