(2/3, 15 minutes) Imagine you are observing a binary star system, but where the stars are so close together that you cannot resolve them, and you see them as a single object.

1 If the two stars have magnitudes of 17 and 18 individually, what is the combined observed magnitude?

First, convert each individual magnitude to the corresponding flux, using the flux of Vega at 5500Å ($F_{0,\lambda} = 3.60 \times 10^{-9}$ erg s^{-1} cm^{-2} Å^{-1}) as a reference flux:

$$m = -2.5 \log \frac{F_\lambda}{F_{0,\lambda}}$$

The flux of each star can then be added together to give the total flux being received. This will be a monochromatic flux, but this shouldn't make a difference once it is converted back to magnitude, since magnitudes are nearly independent of bandpass. The total flux converted back to magnitude gives the combined magnitude from both stars:

$$m_{total} = -2.5 \log \frac{F_{total}}{F_{0,\lambda}}$$

2 Write a (short!) software function that takes as input the apparent magnitude of each of two stars, and computes and returns the apparent magnitude of the two stars combined.

The combined magnitude turns out to be about 16.64 mag (see `q9.py`).