Dependencies beyond standard python packages: https://dynesty.readthedocs.io/en/stable/

To run: RhoPop only requires a mass-radius csv file. You will need the following columns:

- 'Planet' – Planet name
- 'mass' – planet mass in Earth masses
- 'mass_err' – planet mass uncertainty in Earth masses
- 'radius' – planet radius in Earth radii
- 'radius_err' – planet radius uncertainty in Earth radii

Save the M-R file in the MR_files directory. There are pre-loaded examples of data files you can use for reference. Change the dfile_root input to your file planet data file name in the single_population.py, two_population.py, or three_population.py files.



**Single population (null hypothesis)**
Find best-fit parameters
Calculate Bayesian model evidence $Z_1$

**2-population model**
Find best-fit parameters
Calculate Bayesian model evidence $Z_2$

**Compare 1- and 2-population models**
Calculate Bayes factor $B_{21} = Z_2/Z_1$
$B_{21} < 1 - 3$: null hypothesis cannot be rejected
$B_{21} = 3 - 12$: null hypothesis refuted with *weak* support
$B_{21} = 12 - 150$: null hypothesis refuted with *moderate* support
$B_{21} > 150$: null hypothesis refuted with *strong* support

If $B_{21} > 150$

**3-population model**
Find best-fit parameters
Calculate Bayesian model evidence $Z_3$

**Compare 2- and 3-population models**
Calculate Bayes factor $B_{32} = Z_3/Z_2$
$B_{32} < 1 - 3$: 2-population model cannot be rejected
$B_{32} = 3 - 12$: 2-populations refuted with *weak* support
$B_{32} = 12 - 150$: 2-populations refuted with *moderate* support
$B_{32} > 150$: 2-populations refuted *strong* support