MESA Rapid Problem #2

Today let's make a helium core white dwarf. The simplest way to do this is to use one of the `test_suite` cases in `$MESA_DIR/star/test_suite/`: `make_he_wd`.

1. Either copy this entire directory to a new location and edit the new copy (so as not to mess up the test suite problem) or just edit the inlist in its original location. If you do the latter then subsequent MESA installations will overwrite your changes.

2. For now, the only change we will make to the inlist files is to set `pgstar_flag=.true.` in the `&star_job` section of all 4 inlist files:
   `inlist_wd1, inlist_wd2, inlist_wd3, inlist_wd4`.

3. Now run MESA with the `rn` command. The `rn` script will run MESA on the inlist files consecutively, and after about 2 to 4 minutes it should finish. The inlist files do the following:

   inlist_wd1: This takes a 1.5 $M_\odot$ star from the pre-main sequence to exhaustion of H in the core.

   inlist_wd2: This relaxes the mass of the star from 1.5 $M_\odot$ to a final mass of a 0.15 $M_\odot$. It becomes a white dwarf "overnight".

   inlist_wd3: This relaxes the global average of the He mass fraction, Y, to 0.99.

   inlist_wd4: This evolves the star from about 10,000 K down to about 2500 K.

   For later calculations rename the wd3.mod file as `wd3_0.15Msun.mod`.

4. Make an H-R diagram plot of its last phase of evolution. If you save the `star.log` file under a different name you can plot both this sequence and the one in the next item in the same plot. Otherwise, just make two plots.

5. Next, try to produce a 0.20 $M_\odot$ white dwarf. Do this by editing **inlist_wd2** and setting `relax_mass=.true.` Now either rerun the entire calculation (`rn`) or do the separate parts by hand:

   ```
   cp inlist_wd2 inlist
   rn1
   cp inlist_wd3 inlist
   rn1
   cp inlist_wd4 inlist
   rn1
   ```

   For later calculations rename the wd3.mod file as `wd3_0.20Msun.mod`. Make an H-R diagram for the evolution of this 0.2 $M_\odot$ model.