Your name: _____

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AST 10: Homework 4

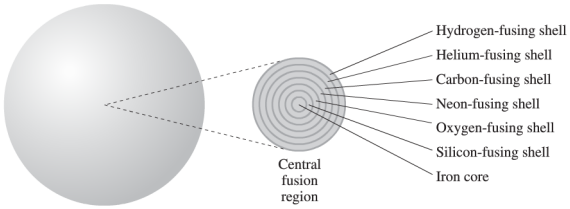
1. What are the three end states of stellar life and what are the *initial* masses and the masses of *the remnants* that lead to these?

2. The lifetime, t, on the "main sequence" (see the Hertzsprung-Russell diagram from Week 3) of a very massive star is

$$t \approx 30 \left(\frac{M}{7M_\odot} \right)^{-3} \text{Myr.}$$

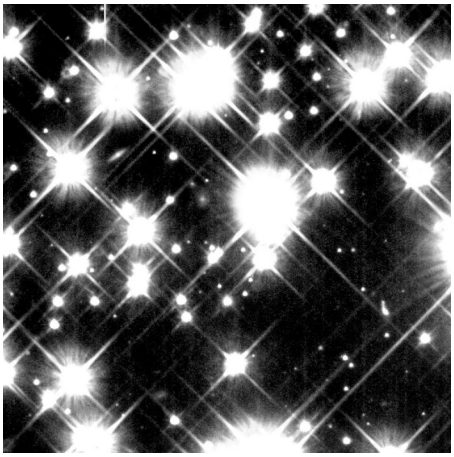
a) What is the lifetime of a star with $M = 7M_\odot$?
b) How does that compare with the lifetime of the sun?
c) What is the lifetime of a star with $M = 14M_\odot$?
d) How does that compare with the lifetime in part a?
e) Based on this as the mass increases, does the lifetime of a massive star go up or down?
f) Can you think of a reason why the answer in part e might be what it is?

3. Here's what goes on in the core of a massive star toward the end of its life



As you go outward, are you fusing lighter or heavier elements? Why might that be the case?

4. Here's a Hubble space telescope image of a globular cluster. The faint images in it are believed to be white dwarfs. How many do you count?



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