Homework #1 - Due on Aug 31st in Class

Useful Resources:

- For looking up general information: http://www.wikipedia.org/
- Quick info on sources and sky maps: http://www.wolframalpha.com/
- Free planetarium program: http://www.stellarium.org/
- Professional resource of objects: http://simbad.u-strasbg.fr/simbad/
- Access to research papers. Need to be in Illinois network to download papers for free: http://adsabs.harvard.edu/abstract_service.html

1. What is RA (Right Ascension) and Dec (Declination)?
2. What is the Local Sidereal Time?
3. What is hour angle? What is the relationship between hour angle, RA, and LST?
4. Describe the motion of Polaris over 1 night (assume 1" resolution).
5. What is a pc? A light year?
6. What is the RA and Dec of the Ring Nebula in J2000?
7. What is the RA and Dec of the Ring Nebula on September 1, 2016?
8. Why are those two numbers different?
9. What time will the Ring Nebula set on Sept 1, 2016?
10. What time does the Ring Nebula rise for that setting?
11. At what time that day does the Ring Nebula reach its highest elevation and what elevation is it?
12. A new object is detected at RA 18 53 38 and Dec 33 02 05 (J2000). How far away (in arcseconds) is that object from the Ring nebula (J2000)?
13. If the object is at the same distance as the Ring Nebula (~700 pc), then how far away is it from the nebula in AU and pc?
14. What is the apparent magnitude of the Ring Nebula (visual)?
15. What is the absolute magnitude of the Ring Nebula?

16. Briefly explain how a CCD mono camera works.
17. Why are astronomical CCD cameras mono instead of color?
18. Briefly explain the CCD data reduction terms of Darks and Flat Fielding.
19. Briefly explain how to make a color image (RGB) of a source using a mono camera.
20. What is the typical technique to observe optical spectra and how is it measured on a 2D mono CCD camera? Use slit technique for the discussion.