GSC116: Homework 2: Observing the Moon

Due Monday October 17th
Total maximum number of points: 100

This assignment consists of two parts: first, you will carry out observations of the Moon's phases, then, after completing this first part, you will interpret your observations by answering a series of questions.

Part I: Observations (50 pts):

You will observe the phases of the Moon on at least four evenings/nights over the next two weeks, at the same time, which should be sometime in the early evening (between 17:30 and 19:30). The first and last observation should be at least 9 days apart in time.

Minimum Requirements: All observation reports must contain at least the following information:

1. Your name.
2. Your location where the observation was made, in latitude (to the nearest tenth of a degree) and longitude (to the nearest tenth of a degree) and the source of that information (such as a map, for example or the web site: http://jan.ucc.nau.edu/~cvm/latlon_find_location.html).
3. Drawing (please turn over for description).
4. Table (please turn over for description).

Grading for Part I:

- *30 pts: Being There:* You actually looked at sky objects in an organized way. Note: You can lose these points by reporting things that were not actually visible.
- *5 pts: Minimum requirements:* Your report contains the minimum information listed above.
- *5 pts: Follow project directions:* You followed the observation directions, given below.
- *5 pts: Consistent, accurate record:* Your report records what was observed in an informative way.
- *5 pts: Beyond requirements:* Exceptional in some respect such as writing, presentation, or added material. Note the general advice below.

General Advice

Compass Directions: You should know which directions are North, East, South, and West. One way to do that is to go to your observing location at sunset. Note the distant object (house, tree, etc.) that the Sun is setting behind. That object is West of you. When you face that object, South is to your left, North is to your right, and East is directly behind you. Pick out distant horizon objects that correspond to those directions. Alternatively, use a map (website) or a compass.

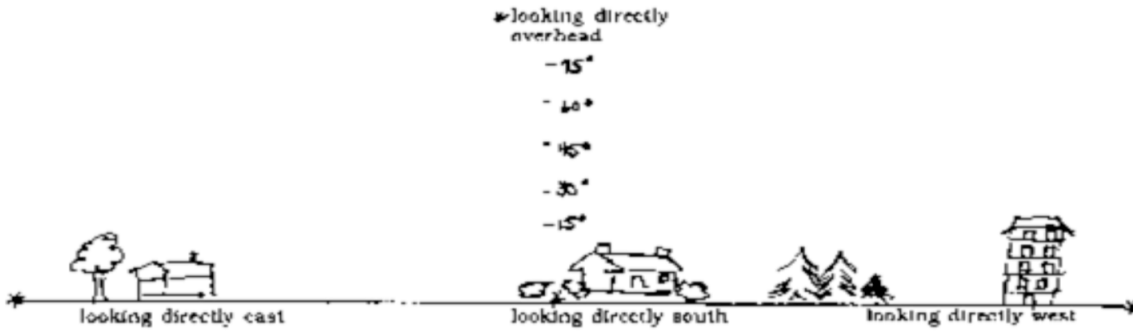
Beyond requirements: Credit will be given for additional material that makes your observations easier to understand. A short narrative paragraph describing your experience would add credit. Exceptional presentation in an observing report would correspond to well-organized tables, a well-written narrative, or pictures of the instruments used or the objects observed. Please note that purely artistic presentation efforts do not usually count.

Moon Watching Directions: Pick a safe location (or go in groups, but hand in your own work!) where you can see the sky toward the east, south, and west (i.e., few tall trees, buildings, etc. to block your view of the sky). Choose four convenient evenings to make observations of the Moon from this location at the same time of night/evening. The first and last observation should be at least 9 nights apart.

Drawing: Using a single 8.5x11 inch piece of white paper (long-side horizontal), sketch the major objects along the horizon from your observing site, stretching from the east on the left side of the paper to south in the middle of the page and west on the right side. Mark the directions of East, South and West on the bottom of your plot. Keep the horizon objects within the lower third of the page so that there is ample space to draw the sky above them. Your zenith should be at the top of the page. An example background drawing is given at the bottom of the page.

Each night at the same time go to your observing location and look carefully for the Moon. Draw the Moon (always on the same sheet of paper) such that the shape (phase) of the Moon shows and the orientation of the phase can be seen. Your sketch must be carefully done showing not only the accurate **position** of the Moon but also its **shape and orientation**. Carefully position each image of the moon on your drawing based on which buildings, trees, etc. it appears above and how high above those objects the moon appears. If you recognize any particular stars or star formations, you can include them in your drawing (*Beyond Requirements*). Be sure to write the date next to each moon image. Estimate the altitude of the Moon, by using your outstretched hand, as in Figure 2.9 of your book. Estimate the angular size of the Moon using the same method. Note that observations are by their very nature imperfect and you are only expected to be reasonably accurate.

Table: Make a table of observations that lists: <u>date, time, direction the Moon appears, its angular size and its altitude</u>.



Example drawing background

Part II: Interpretation (50 pts):

<u>After</u> completing all four observations, answer the following questions:

1. (10 pts) Determine the name of the Moon's phase for each of the four nights.
2. (30 pts) Make 4 drawings showing the relative position of the Moon, the Earth, the Sun and you (an observer on Earth) for the date and time of each of your four observations. The drawings should be cartoon-style and similar to the tutorial animation demonstrated in class.
3. (10 pts) Based on these drawings, estimate the time of Moonrise for each of the four nights of your observations. Explain(!) how you came to your estimates.