Homework Assignment 3

Due: Friday October 3rd, 2014 16:30
Where: In ASTR 310 box outside the tutorial room.

1. [3 points] (easiest to work in groups of 2). Measure the width of your index finger, and then have someone (using a meter stick or a sewing measuring tape) measure the distance from your eye to your finger when you hold it up at arms length (like the prof was showing you in class). Compute (giving your answer to tenths of a degree) the angular diameter of your finder held at arms length. Show your measurements and your work.

2. [7 points] Devious spies have kidnapped you, knocked you out, and taken you via helicopter somewhere on Earth's northern hemisphere. To test your knowledge of astronomy, they have left you some items: a compass, a sextant, a clock showing universal time, a crisp newspaper, along with a sandwich and coffee (they are devious, but not cruel...). Your must discover your position. You awake at sunrise and watch the sky for about 12 hours, amassing the following information:
A. The sun set due West.
B. When the Sun crossed your southern meridian, its altitude was 59°57', and the UT clock read 09:52 at that instant.
C. The Moon is a third quarter but it was too cloudy to see stars before sunrise.
D. The newspaper's date is March 20th.
Using the information above (some of which is extraneous or useless), determine the following, EXPLAINING in point form the logic you use:

a) What is your longitude?
b) What is your latitude?
c) Consult an atlas: what is the nearest large city? Along which compass direction do you need to walk to get there?

3. [5 points] Below is a picture of a Kuiper Belt binary object (two small objects in orbit around each othe)r. The objects were were at a distance of 46.5 AU from Earth when the time the photo was taken, with an angular separation of its two components A and B of 0.61 arcsec. What is the physical distance between components A and B?