Part A -- Procedure

Measure the *altitude* (the height of the star from the horizon measured in degrees, remembering that the zenith is at 90°, the horizon at 0°), *azimuth* (the angle along the horizon measured clockwise from the north point, in degrees from 0 to 360), *color* (blue, white, yellow, orange, red) viewed with the eye and through binoculars, and *time* (the time of night you made your observation) .

Hold your hand up at arm's length. Your pinky finger nail covers about 1/2° of the sky, your pinky finger is about 1° wide and the width of your hand with fingers and thumb together spans about 10°. The moon is about 1/2°, and you can cover it with your pinky finger nail. Try it and you'll see just how tiny the moon is compared to how big it seems.

Figure 2-2 Handy Angles

Hand	10°
Finger	1°
Pinky Finger Nail	0.5°

First, find the point on the horizon directly below the star by pointing your finger at the star and dropping your arm down to the horizon. Altitude is just the number of hands (held at arm's length) up from that point on the horizon to the star multiplied by 10. Azimuth is just the number of hands (held at arm's length) rightward around from north to that point on the horizon directly below the star multiplied by 10. Of course, measuring hands all the way around from north can lead to big errors. So why not measure the azimuth distance from due east, due south, or due west (whichever is closest) and just add the azimuth of due east (90), due south (180), or due west (270) to get the answer.

For Example: A star which is 3 hand widths above the horizon in the north-west has an altitude of 30 degrees (3 hand widths times 10°) and is 4 and 1/2 hand widths (45°) around from due west (270°), so it has an azimuth of 315°.

Tricks of the Trade

1) *The stars in Table 1 are the same as in Project 1-2, so you can copy their names, coordinates and visual magnitudes.*

2) *Start with the stars in the west first then work eastward.*

3) *Be sure to hold your star map correctly oriented to the horizon, canted at an angle with the north end of the map pointed towards the north celestial pole.*

4) *Let your star atlas help you use stars you know to find stars you don't know. If two stars point at a third on your star map, they will do so in the sky. If two stars are 30° apart on the star map, they will be 3 hands apart in the sky.*

4) *Compare the altitudes and azimuths of stars in the same constellation to see if your observations make sense. For example, if both Rigel and Betelgeuse are in the South, the azimuth of Rigel will always be greater than the azimuth of Betelgeuse (if observed at the same time), while Betelgeuse will always have the greater altitude.*

5) ***The approved list of colors is:***
Blue, Blueish White, White, Yellowish White, Light Yellow, Deep Yellow, Orange & Red.

03 - The Night Sky Project - Positions & Motions

Table 1: Bright Stars

Observe the stars assigned by your instructor

	Common Name	Bayer-Flamsteed Name	RA H	RA M	DEC °	DEC '	App V Mag	MAP #	Alt	Azi °	Color Eye	Color Bino	Time
1	Alpheratz	α And	0	09	29	02	2.1	2					
2	Achernar	α Eri	1	38	-57	14	0.4	8					
3	Almak	γ And	2	04	42	20	2.2	3					
4	Hamal	α Ari	2	08	23	32	2.2	3					
5	Polaris	α UMi	2	20	89	16	2.0	1					
6	Mira	α Cet	3	02	4	05	2.5	3					
7	Aldebaran	α Tau	4	36	16	31	0.9	3					
8	Rigel	β Ori	5	14	-8	12	0.1	3					
9	Capella	α Aur	5	17	46	00	0.1	3					
10	Bellatrix	γ Ori	5	26	6	21	1.6	3					
11	Elnath	β Tau	5	26	28	36	1.8	3					
12	Betelgeuse	α Ori	5	55	7	24	0.5	3					
13	Canopus	α Car	6	24	-52	42	-0.7	4					
14	Sirius	α CMa	6	45	-16	42	-1.5	4					
15	Adhara	ε CMa	6	59	-28	58	1.5	4					
16	Procyon	α CMi	7	40	5	14	0.4	4					
17	Pollux	β Gem	7	45	28	01	1.1	4					
18	Castor	α Gem	7	35	31	53	1.6	4					
19	Regulus	α Leo	10	09	11	59	1.4	5					
20	Algeiba	γ Leo	10	20	19	52	2.2	5					
21	Acrux	α Cru	12	36	-63	06	0.8	8					
22	Becrux	β Cru	12	47	-59	41	1.3	8					
23	Mizar	ζ UMa	13	24	54	56	2.2	5					
24	Spica	α Vir	13	26	-11	10	1.0	5					
25	Hadar	β Cen	14	04	-60	22	0.6	8					
26	Arcturus	α Boo	14	15	19	12	0.0	6					
27	Rigel Kentaurus	α Cen	14	40	-60	50	-0.3	8					
28	Antares	α Sco	16	29	-26	26	1.0	6					
29	Shaula	λ Sco	17	34	-37	06	1.6	6					
30	Vega	α Lyr	18	37	38	47	0.0	7					
31	Altair	α Aql	19	51	08	52	0.8	7					
32	Deneb	α Cyg	20	42	45	17	1.2	7					
33	Fomalhaut	α PsA	22	58	-29	37	1.1	7					

Questions

1) Explain why starting with the stars in the west and working eastward is a good idea.

Answer

2) Add up the number of stars of each color as judged by eye & with binoculars into Table 2.

Table 2: Colors of Stars

Color	Eye	Binocs
Blue		
Blueish White		
White		
Yellowish White		
Light Yellow		
Deep Yellow		
Orange		
Red		

2) What was the most common star color by EYE? ____________

3) What is the most common star color by BINOCULAR? ____________

4) Looking at Table 2, do you see the same distribution of colors for eye compared to binoculars? What colors dominate for the eye? Which for the binoculars?

Answer

5) Why do you think you got different results for eye compared to binoculars?

   Hint: It has something to do how unsensitive color vision is.

Answer