Physics 10293 Lab #2:
Starry Night Introduction

Introduction

In this lab, we'll learn how to use the Starry Night software to learn about the sky. Starry Night has a large number of features and options, and we will explore some of the most useful ones for our purposes.

Step 1

First, start up the program. You should find a shortcut for Starry Night College on your desktop. When the program first starts up, you may be asked to update data or the software. Just hit "later" for these and ignore them. TCU Technology Resources is responsible for keeping the software updated, so we don't need to worry about it. You will need to tell it where you are viewing from. You can select Fort Worth from the list or (faster) search for it.

Once you have selected your location, the left sidebar will likely be open to the SkyGuide. If it is not, search the tabs on the left-hand side of the screen and select SkyGuide. We are going to use the bottom link in this lab, entitled "Starry Night basics". So click on that link.

Step 2

We are going to go through some (but not all) of the steps to learn the basics of Starry Night. Start with the first link, entitled "Starry Night for the First Time." You can use the scroll bar to scroll down and read this entire window. When you are finished, click on the bottom link, which will take you through the remaining introductory pages in order. As you go through these pages, you will find that you have the tools to answer the more complex questions I will ask on your worksheet.

Answer the questions on your worksheet using Starry Night to help find the information you need. As always, raise your hand and ask for help if you have questions. You may work with a partner for this lab, but each of you should spend an equal amount of time "driving" the software.

Lab #2 Worksheet

Name:
Home TA:

After you have read “Changing your viewing direction” and “Changing the date and time”, answer the following questions:

Look toward the Western horizon and set today’s time to 430pm.

In what constellation is the Sun located? _____

At what time does the Sun set tonight? _____

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After you have read through “Identifying objects in the sky”, answer the following:

Look toward the Northwestern horizon and set the time to 11pm, then turn on labels using the L key on your keyboard.

What type of object is M82? _____

What type of object is M37? _____

How far is the bright star Castor from Earth? _____

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After you have read through “Displaying constellation figures” and “Finding an object”, answer the following:

Set the time to 4am today. Use the “Find” tab on the sidebar to find the planet Saturn, then center on it.

In what constellation is Saturn found? _____

Set the time to 7pm today, then use the “Find” tab to find and center the planet Jupiter.

In what constellation is Jupiter found? _____

If you have used the “Find” sidebar to find and automatically center on Jupiter, then the altitude and azimuth of Jupiter should appear on the top information bar near the right hand side of your screen.

What is the altitude of Jupiter above the horizon? _____

Read through “zooming in on an object” in the SkyGuide sidebar, then zoom in on Jupiter and answer the following.

Which of Jupiter’s moons casts a shadow on Jupiter at this time (7pm)? If none do, you can just say that.

_____

Use the search option in the Find sidebar to find the Pleiades open cluster.

In what constellation is the Pleiades found? _____

Name three of the seven sisters that make up the Pleiades (Atlas and Pleione are the “parents”, they don’t count).

_____, _____, _____

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Now we’re done with the sky guide, but we will still explore a few more features of Starry Night.

Set the time and date to 8pm Feb 14, 2011, then scroll around the sky to locate and center on the Moon (in what general direction should the full moon be just after sunset?) Open the info tab in the sidebar, and use it to answer the following:

In what constellation is the Moon? _____

What is the Moon’s phase? _____

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Use the “Now” button just beneath the clock on the top left information bar to return to today’s date and time. Use the find sidebar to find and center on the Sun, then open up the info tab.

What is the declination of the Sun, to the nearest degree? _____

Click on the “sunset” button below today’s date and time in the top information bar, then just beneath the time flow rate indicator, click the “stop” button. You should now be looking at the Western horizon with the Sun hidden behind the scenery.

For simplicity, let’s remove the trees and scenery. Under the options menu, select Other Options --> Local Horizon. On this screen, select “Flat” for Horizon style. You should now be able to see the Sun as it is setting below the horizon.

What is the Sun’s azimuth, in degrees? _____

If West is 270°, how many degrees South of West is this? _____

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Now set the date to the vernal equinox, March 20 and the time to sunset.

What is the Sun’s azimuth, in degrees? _____

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Now set the date to the summer solstice, June 21 and the time to sunset.

What is the Sun’s azimuth, in degrees? _____

How many degrees North of West is this? _____

Such precise measurements are key to understanding the alignments of ancient skywatching sites such as Stonehenge. Return to today’s date and time and look due North. Now in order to see circumpolar motion, we will increase the rate time flows. On the top information bar, change the time flow rate to 3000x.

Name a bright star in Ursa Major that is circumpolar, which means it always remains above the horizon.

_____

Now use the top information bar under “Viewing Location” to switch your location to Singapore (under “Other...”). You should stop the time flow so we can set the time.

What is the altitude of Polaris above the Northern horizon at 930am on today’s date? Remember, you can get this information in the info tab.

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Now we will track the Sun’s motion. Use the “home” button below “Viewing Location” to return to Fort Worth. This also returns us to today’s date and time. For reference now, we will turn on the meridian on the screen. Under the “View” menu, look for the sub-menu “Alt/Az guides” and select “Meridian” there. Now adjust today’s time until (looking South) you see the Sun cross the meridian.

When then Sun crosses the meridian, it is at its highest point in the sky. When the Sun is on the meridian today, what is its altitude above the Southern horizon?

_____

Based on the rise and set times, what is the day length to the nearest hour?

_____

On March 21, what is the Sun’s altitude when it is crossing the meridian?

_____

On June 21, what is the Sun’s altitude when it is crossing the meridian?

_____

Based on the rise and set times, what is the day length to the nearest hour on June 21?

_____

Let's compare the Sun's motion in Fort Worth with the Sun's motion as seen from Alaska. Set your location to Fairbanks, Alaska. The date should still be June 21.

What is the Sun's altitude when crossing the meridian? _____

Based on rise and set times, what is the day length? _____ hrs

Now set the date to December 21 from Fairbanks. You may need to use the Options --> Other Options --> Local Horizon menu to again block out the scenery so that you can see the Sun.

What is the Sun's altitude when crossing the meridian? _____

Based on rise and set times, what is the day length? _____ hrs

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Finally, let us consider the zodiacal signs. If you read your horoscore in the newspaper, you may find the following "official" dates apply:

Aries (Mar 21 - Apr 19)	Libra (Sep 23 - Oct 22)
Taurus (Apr 20 - May 20)	Scorpio (Oct 23 - Nov 21)
Gemini (May 21 - Jun 20)	Sagittarius (Nov 22 - Dec 21)
Cancer (Jun 21 - Jul 22)	Capricorn (Dec 22 - Jan 19)
Leo (Jul 23 - Aug 22)	Aquarius (Jan 20 - Feb 18)
Virgo (Aug 23 - Sep 22)	Pisces (Feb 19 - Mar 20)

For your essay, address the following questions:

In the first paragraph, state your birth day and then use Starry Night to determine your "correct" astrological sign for the date of your birth. State whether this is different from the sign found using the common, mistaken dates above.

In the second paragraph, explain whether your opinion about the validity of horoscopes has changed. Assuming you have the opportunity in the future to check your horoscope, explain whether you will check your "correct" sign or your sign based on the dates given above? Which would you give preference to and why? If you don't believe horoscopes are valid in the first place, explain why you think this.