PROJECT #1:

For this first project, you will write a brief paper (approximately 4 pages) on the role of Ethics in Statistics. Students are encouraged to focus on one specific aspect of ethics – e.g. the role of ethics in medical statistics.

To help you get started, I have posted some articles on the subject in Course Documents.

The paper is due either in class or in Blackboard by Thursday, Oct. 1.

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PROJECT #2: In this thread, we will examine a very interesting and very challenging problem called the "Monty Hall Problem", named after the host of the popular television game show called "Let's Make a Deal." The host, Monty Hall, would randomly select contestants from the audience and, as the title suggests, he would make deals for prizes.

Suppose you have been chosen as a contestant on this show. Monty would then offer you the chance to win a large prize by selecting one of three curtains, A, B, and C. Behind one of the curtains is a brand new car worth $45,000. Behind the other two curtains, the stage is empty (or else contains something silly, like a donkey).

You must now select one of the curtains. Suppose you select Curtain A - before showing you (the contestant) what is behind this curtain, Monty decides to make things more interesting. He exposes an empty stage by opening Curtain C (he knows that there is nothing behind Curtain C), and then asks you if you want to keep Curtain A, or switch to Curtain B. What would you do – switch, or stay with your initial choice?

PART 1: In the first part of this assignment, you should answer the following questions, with an explanation of your thinking:
-- What is the probability of winning the car prior to opening Curtain C?
-- What is the probability of winning the car after Curtain C is opened?
-- What is your best strategy – switching or staying with your initial choice?

PART 2: For the second part of the assignment, the class will do a collective simulation to empirically estimate the probability of winning the car under each strategy – switching or not switching. Our first stop will be to the website:

http://www.stat.sc.edu/~west/javahtml/LetsMakeaDeal.html

This website contains a really cool applet for simulating the switching strategy. The site also gives a very good explanation of the probability of winning the car under each strategy. Each student will do the following:

Complete 50 trials with the applet, and on each play will stay with the original choice. Record the number of trials and number of wins in your post (make sure that you clearly label whether or not you switched). Complete 50 more trials, but this time will SWITCH each time.
Record the number of trials and number of wins in your post (make sure that you clearly label whether or not you switched).

Based on the explanation given in the website, your own experimental results, and the collective results of the class, would you revise your probabilities for Part 1?

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PROJECT #3:
For this project, we will conduct a public opinion poll and use techniques from Chapters 6 and 7 to analyze the data.
Students will work in small groups (3 or 4 per group), and conduct a poll. Each group will select an appropriate size sample, and ask respondents their opinion on a current political issue. The question should be a Yes/No or Approve/Disapprove type question. Care should be taken to choose a representative sample, and reduce bias due to wording of the question.

Once the data is collected, the project consists of three parts:

Part 1: The group will calculate a confidence interval to estimate the proportion \( p \) for the target population.

Part 2: The group will research online sources to find an estimate of the same proportion for the U.S. population. A conjecture about how the target population proportion compares to the population proportion will be formulated and tested using significance level of \( \alpha = .05 \).

Part 3: The group will give a 5-10 minute presentation on their findings to the class.

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PROJECT #4: In class, as well as in the text, we discussed briefly how a hypothesis test is similar to a criminal trial.

For this project, you will write a 4-5 page paper comparing and contrasting the two procedures.
-- How is a hypothesis test similar to a criminal proceeding?
-- How do the specific components of a hypothesis test relate to the components of a criminal trial?
-- How is a hypothesis test different from a criminal proceeding?