You must perform one or two of the four projects described below and submit a written report for each project you select. **If you perform two projects, one of them must be project 2.** The report must be submitted on paper; I will not accept electronic reports.

You may work alone or as a member of a team of four or fewer persons. If you work as a team, only one report per project should be submitted by a team (remember to include everyone’s name on the report!) and every member of the team will receive the same grade. Neither my expectations for nor grading of reports are influenced by the size of the team. **If a report is submitted by a team of two or more members, however, then each member of the team will receive a bonus of one-half point extra credit.**

Please submit legible reports. For many of you, this will mean words typed, and “nonwords” (e.g. tables, figures, formulas, and computations) drawn by hand. Effective use of color and illustrations can greatly enhance a report.

The maximum score for each project is 18 points (plus extra credit, if applicable).

**Project 1A. Due before noon on Monday, June 10.** Perform a balanced completely randomized design on 100 trials with a dichotomous response to investigate some issue. Explain why the issue interests you and describe how you randomized. Present and summarize the data using techniques discussed in the course. Choose an alternative for Fisher’s test and explain your choice. Calculate two P-values for the data and alternative: use the standard normal curve with the continuity correction, and use the “web site” to obtain the exact P-value. Compare your two P-values and comment. Your report should include a summary of what you have learned from your study.

**Project 1B. Due before noon on Monday, June 10.** Perform a balanced completely randomized design on 50 persons with a dichotomous response to investigate some issue. Indicate how you obtained your subjects and why these particular persons are of interest to you. Explain why the issue interests you and describe how you randomized. Present and summarize the data using techniques discussed in the course. Choose an alternative for Fisher’s test and explain your choice. Calculate two P-values for the data and alternative: use the standard normal curve with the continuity correction, and use the “web site” to obtain the exact P-value. Compare your two P-values and comment. Your report should include a summary of what you have learned from your study.

**Project 1C. Due before noon on Monday, June 10.** Perform a balanced completely randomized design with 20 or more trials *with a numerical response* to investigate an issue related to some activity that interests you. (The exercises in Chapter 12 contain numerous examples of possible activities.) Your choice of the number of trials should reflect the difficulty of performing a trial. In particular, if a trial is very time consuming or physically demanding (e.g. bowling one game or running a mile), 20 trials will suffice; if, however, the trial is fast and easy (e.g. hitting a golf ball or a baseball), you should perform many trials.

Before collecting data select an alternative hypothesis (see Section 16.1), and explain your choice. After analyzing the data, discuss whether they support your alternative. This discussion should be informal; i.e. do not calculate a P-value.

The report should present and summarize the data using: one set of pictures (dot plots, histograms, or stem plots), both measures of center (means and medians), and the three measures of spread (ranges, interquartile ranges, and standard deviations) of the response, by treatment. Explain your choice of pictures and briefly discuss what your pictures and numbers reveal about the data. Do these revelations agree? Discuss.
Finally, write a summary of what you have learned from your study.

**Project 2. Due before noon on Monday, June 10.** Perform 100 dichotomous trials under “fixed conditions” related to an activity of interest to you. Exercises 6–14 on pages 177–178 of the text present summaries of studies of this type that were performed by other students. Your report should describe the activity, why it interests you, and why you are interested in the fixed conditions you study. Use the data to investigate the validity of Assumptions 2 and 3 of Bernoulli trials, using the techniques described in Chapter 5.

Note that if a success is extremely difficult or extremely easy to obtain, 100 trials are not likely to reveal much of interest. You will obtain more interesting data if you select conditions that make the probability of success on a trial be a number between 0.25 and 0.75.

(a) On the assumption you have Bernoulli trials, find the 95 percent confidence interval for \( p \).

(b) On the assumption you have Bernoulli trials, find the point prediction and 90 percent prediction interval for the number of successes in 100 future trials.

(c) Perform the 100 additional trials and compare your results to your predictions from part (b).

**Grading of Reports.** A report will not receive full credit simply because it contains no errors. Reports will be graded on creativity, report presentation (primarily clear writing), accuracy and appropriateness of analysis, and interpretation of results.

**Model projects are available at Helen C. White library and on my webpage.** Also click onto Research Papers: > Papers on Statistical Education > Small Student . . . , pp. 3–9 for ideas for project topics.

**Recommended Review Questions from RSSG.** The table below lists the questions from the sections of the RSSG titled Exam Questions that I recommend you attempt when you prepare for the exams. Do not attempt questions not listed; they have been omitted for a reason. The reason is usually that they refer to material that we will not cover; occasionally the reason is that I do not like the question.

I have found one error in the RSSG:

On page 65, question 15, line 8, the word “large” should read “small.”

Let me know if you find other errors; future students and I will be grateful.

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