You must complete one or two of the four projects described below and submit a written report for each project you select. **If you complete 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 two persons. If you work as a team, only one report per project should be submitted by a team (remember to include both names on the report!) and both members of the team will receive the same grade. Neither my expectation for nor grading of a report is influenced by the size of the team.

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. Read the descriptions below carefully. The most common error students make is to neglect to provide all the information I request.

**The maximum score for each project is 18 points.**

**Project 1A. Due before 5:00 pm on Wednesday, March 12.** 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 5:00 pm on Wednesday, March 12.** 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 5:00 pm on Wednesday, March 12.** 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.

After choosing your project topic, but before collecting data, decide which treatment should tend to give larger response values. Your report must present and explain your choice. After collecting data discuss whether the anticipated pattern actually appeared in your data.

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 Finally, write a summary of what you have learned from your study.
Project 2. Due before 5:00 pm on Wednesday, April 23. 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.

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) **Use the data from your 100 trials to investigate the validity of Assumptions 2 and 3 of Bernoulli trials, using the techniques presented in lecture for Chapter 5.** (Note: I put this in bold-face type because, historically, a large proportion of students neglect to do this when told with regular-face type!) Your report must contain the time-order results of your 100 trials so that I can check your analysis.

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

(c) 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.

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

**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.

<table>
<thead>
<tr>
<th>Chapter</th>
<th>Page</th>
<th>Recommended Questions</th>
<th>Chapter</th>
<th>Page</th>
<th>Recommended Questions</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>4</td>
<td>1–5, 7, 8, 11, 14, 15</td>
<td>6</td>
<td>50</td>
<td>1–15</td>
</tr>
<tr>
<td>12</td>
<td>88</td>
<td>1–7, 11–16</td>
<td>7</td>
<td>57</td>
<td>1–8</td>
</tr>
<tr>
<td>2</td>
<td>13</td>
<td>3, 4, 6–11, 15, 16, 18–27</td>
<td>15</td>
<td>107</td>
<td>1, 4–6, 9, 11–22</td>
</tr>
<tr>
<td>3</td>
<td>27</td>
<td>1–19, 21–23</td>
<td>16.2</td>
<td>117</td>
<td>1–3</td>
</tr>
<tr>
<td>5</td>
<td>41</td>
<td>1, 3–15</td>
<td>8</td>
<td>64</td>
<td>12–22</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>13</td>
<td>96</td>
<td>1–8, 10–21</td>
</tr>
</tbody>
</table>