

This project will give you the opportunity to apply the analysis methods of inferential statistics to sets of data. You will collect data, analyze data, and write a project report. Spelling, grammar, and the overall quality of your written work will be considered as part of your final grade. This project requires use of Microsoft Word to create the report and Microsoft Excel to perform the analysis. The report must contain the following:

Create a title page for your project. Include your full name and your section number.

Section 1: Binomial Topic Description

You may choose any topic you wish as long as it involves **binomial** (yes/no) random variable.

Before obtaining your data, formulate a hypothesis regarding your population. You must propose a hypothesis about the population proportion for people who will respond “yes” to your binomial question.

e.g. “If I ask 41 students ‘Do you smoke?’ more than 25% will say yes.” Be sure to explain the basis for your claim.

In a paragraph or two describe your first topic and state your hypothesis.

Why did you choose this topic and why is it of interest to you?

What population will your sample represent?

What potential sources of bias could occur due to your sampling method?

Section 2: Binomial Data Collection Methodology

Collect a sample related to your topic. Your sample size (n) must be 41 or more.

You may collect your data by conducting a survey or by observation. Other means of getting data may be used with instructor approval. You will need to ask a yes/no (binomial) question (e.g. “Do you smoke?”) to at least 41 people. In a paragraph or two describe how you obtained your data, including the phrasing of the question you asked and how you conducted your poll (e.g. asked friends, family, or coworkers in person, used social media, etc.).

Section 3: Binomial Data Analysis

a. List the number of “Yes” and “No” answers.

Calculate the proportion who answered “yes” and the proportion who answered “no.”

Round off the proportions to 3 significant digits.

b. Calculate the 95% Confidence Interval for the proportion who answered “yes.”

Round off the margin of error and the limits for the interval to 3 significant digits.

c. Using your survey results test the hypothesis you proposed in Part 1 using the method covered in class.

List the Null and Alternative Hypotheses.

Calculate the value of the test statistic to two decimal places.

Calculate the p-value using the p-value calculator Excel spreadsheet available on Black Board.

Use $\alpha = 0.05$ to make your decision about the Null Hypothesis and be sure to list it.

Write your conclusion about the original claim using the table used in class.

Section 4: Quantitative Topic Description

You may choose any topic you wish as long as it involves **quantitative** random variable.

You may not use age, height, or weight as your variable without prior approval.

Before obtaining your data, formulate two hypotheses regarding your topic. First, propose a hypothesis about the population mean (e.g. “I think the average GPA will be under 3.4.”). Second, propose a hypothesis about the population variance (e.g. “I think the variance will be at least 1.5.”).

Be sure to explain the basis for your claims.

In a paragraph or two describe your quantitative topic and state your hypotheses.

Why did you choose this topic and why is it of interest to you?

What population will your sample represent?

What potential sources of bias could occur due to your sampling method?

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Section 5: Quantitative Data Collection Methodology

Collect a sample where the sample size (n) is 41 or more. You must obtain your data by conducting a survey or by observation. Other means of getting data may be used with instructor approval. In a paragraph or two describe how you obtained your data, including the phrasing of the questions you asked and how you conducted your poll (e.g. asked friends, family, coworkers, etc.).

Section 6: Descriptive Statistical Analysis

- a. List your original data sorted in ascending order. This should be a list of at least 41 numbers.
- b. Calculate the mean, standard deviation, and variance.
Round off the statistics to one more place than the original data.
Use these values for the inferential analysis in Section 7.

Section 7: Inferential Statistical Analysis

- a. Calculate the 95% Confidence Interval for the population mean.
Round off the margin of error and the limits to one more place than the original data.
- b. Test the hypothesis for the mean you proposed in Part 4 using the method covered in class.
List the Null and Alternative Hypotheses
Calculate the value of the test statistic to three decimal places.
Calculate the p-value using the p-value calculator Excel spreadsheet available on Black Board.
Use $\alpha = 0.05$ to make your decision about the Null Hypothesis and be sure to list it.
Write your conclusion about the original claim using the table used in class.
- c. Test the hypothesis for the variance that you proposed in Part 4 using the method covered in class.
List the Null and Alternative Hypotheses
Calculate the value of the test statistic to three decimal places.
Calculate the p-value using the p-value calculator Excel spreadsheet available on Black Board.
Use $\alpha = 0.05$ to make your decision about the Null Hypothesis and be sure to list it.
Write your conclusion about the original claim using the table used in class.

Section 8: Conclusions

In several paragraphs describe any conclusions you could draw based on the analyses you have performed. This should be your interpretation of the results for all three hypothesis tests and the conclusions about the original claims, not just a summary. In other words, what do the confidence intervals and the hypothesis tests tell you about the populations from which you collected the data?

You will submit **two** files through Black Board.

The report must be a Word file, no other formats will be accepted. It should include all but Section 6.

The file name must have the following format *Lastname_Project3Report.docx* .

The analysis must be an Excel file, no other format will be accepted. It should include Section 6.

The file name must have the following format *Lastname_Project3Analysis.xlsx* .

Projects must be submitted by the end of the day on the due date. Sharing data, sharing your Excel file, or working in groups is NOT allowed. Late reports will be penalized 15 points initially, then an additional 10 points each day beyond the due date. Reports that are plagiarized in any way will receive a zero.