STAT 145 - MINI PROJECT II (OPTIONAL)

Your objective in this project is to do a mini experiment or study, and do some very simple analysis on it using t-procedures.

1. **Choose a Problem & Collect Data**

Below are some examples you can choose for your project, but I highly recommend that you come up with something creative which is interesting to you.

(1) Buy a pack of chocolate chip cookies, randomly select a sample, and count the number of chocolate chips in each cookie.
(2) Get a dollars worth of pennies, record the year they were coined.
(3) Select a random sample of games from the past NBA season, record the number of 3 pointers made by the winning team in each team. *For bonus points, conduct the two sample t-test and compare this to a random sample of games from 1986.*

Before you collect the data, you should choose what you want to test. You can decide to do a Confidence Interval, or you can choose a Hypothesis to test. This is the most important part of the process, be thoughtful about what you want to test. For example, in (2) above, you may want to test the Alternative Hypothesis which says *On average, pennies are younger than me.* **After you have chosen the problem**, you should collect your data. Choose your own confidence or significance level (C or α).

2. **Check the Assumptions** (30 PTS)

For 1-sample t-procedures, we have two important assumptions. First, you should check that you have a *perfect SRS*. To do this, you should explain to me why you are certain that there is no bias in your sample (10 pts).

The second assumption depends on your sample size. Remember these rules:

(1) If $n < 15$, t-procedures can be used if the data is symmetric with no outliers.
(2) If $15 \leq n < 40$, t-procedures can be used if data is mostly symmetric, with no major outliers.
(3) If $n \geq 40$, t-procedures are safe to use.

To check this assumption (20 pts), create a Stemplot or a Histogram of your data (If your data is big, you can use Excel). Explain to me why the t-procedures are safe to use. *Note: If the t-procedures cannot be used for your data, you will need to collect more data. Include this in your report.*

3. **Statistical Inference** (60 PTS)

First, you should calculate the sample mean and sample standard deviation (20 pts). Feel free to use Excel or a calculator if your data is large.

Next you should use the formulas we learned in class to preform the inference you decided on in section 1. This must be done correctly for credit (40 pts)

4. **Conclusion** (10 PTS)

Write a paragraph explaining your results in terms of the problem you chose. Be sure to include your level of C or α that you used in your discussion.