*Part 3: Inferential Statistics*

Option 1: Manufacturing Database

1. The National Association of Manufacturers (NAM) contracts with your consulting company to determine the estimate of mean number of production workers. Construct a 95% confidence interval for the population mean number of production workers. What is the point estimate? How much is the margin of error in the estimate?
2. Suppose the average number of employees per industry group in the manufacturing database is believed to be less than 150 (1000s). Test this belief as the alternative hypothesis by using the 140 SIC Code industries given in the database as the sample. Let α = .10. Assume that the number of employees per industry group are normally distributed in the population.
3. You are also required to determine whether there is a significant difference between mean Value Added by the Manufacturer and the mean Cost of Materials in manufacturing using alpha of 0.01.
4. You are requested to determine whether there is a significantly greater variance among values of Cost of Materials than of End-of-Year Inventories.

Option 2: Hospital Database

1. As a consultant, you need to use the Hospital database and construct a 90% confidence interval to estimate the average census for hospitals. Change the level of confidence to 99%. What happened to the interval? Did the point estimate change?
2. Determine the sample proportion of the Hospital database under the variable “service” that are “general medical” (category 1). From this statistic, construct a 95% confidence interval to estimate the population proportion of hospitals that are “general medical.” What is the point estimate? How much error is there in the interval?
3. Suppose you want to “prove” that the average hospital in the United States averages more than 700 births per year. Use the hospital database as your sample and test this hypothesis. Let alpha be 0.01.
4. On average, do hospitals in the United States employ fewer than 900 personnel? Use the hospital database as your sample and an alpha of 0.10 to test this figure as the alternative hypothesis. Assume that the number of births and number of employees in the hospitals are normally distributed in the population.

Option 3: Consumer Food

1. Suppose you want to test to determine if the average annual food spending for a household in the Midwest region of the U.S. is more than $8,000. Use the Midwest region data and a 1% level of significance to test this hypothesis. Assume that annual food spending is normally distributed in the population.
2. Test to determine if there is a significant difference between households in a metro area and households outside metro areas in annual food spending. Let α = 0.01.
3. The Consumer Food database contains data on Annual Food Spending, Annual Household Income, and Non-Mortgage Household Debt broken down by Region and Location. Using Region as an independent variable with four classification levels (four regions of the U.S.), perform three different one-way ANOVA's—one for each of the three dependent variables (Annual Food Spending, Annual Household Income, Non-Mortgage Household Debt). Did you find any significant differences by region?

Option 4: Financial Database

1. Use this database as a sample and estimate the earnings per share for all corporations from these data. Select several levels of confidence and compare the results.
2. Are the average earnings per share for companies in the stock market less than $2.50? Use the sample of companies represented by this database to test that hypothesis. Let α = .05.
3. Test to determine whether the average return on equity for all companies is equal to 21. Use this database as the sample and α = .10. Assume that the earnings per share and return on equity are normally distributed in the population.
4. Do various financial indicators differ significantly according to type of company? Use a one-way ANOVA and the financial database to answer this question. Let Type of Company be the independent variable with seven levels (Apparel, Chemical, Electric Power, Grocery, Healthcare Products, Insurance, and Petroleum). Compute three one-way ANOVAs, one for each of the following dependent variables: Earnings Per Share, Dividends Per Share, and Average P/E Ratio.