Lesson 12: Inference for Two Means (Paired Data)

Preparation

Directions: Please fill in Part I as you study the Reading Assignment. Once you finish the reading, complete the questions on Part II. You may use your notes, the key, and the help videos. Be sure to take this completed assignment to your group meeting where you can ask and help answer questions on this assignment.

Problems

Part I: Use the information in the reading assignment to complete these questions.

1. What does it mean to have Matched Pair data?

2. What are the differences in the hypothesis tests between a One Sample t (σ unknown) and Matched Pairs t (open-ended)?

Part II :

Matched Paired t Procedure - A manager at a factory feels that the amount of time that his workers spend doing their part in the assembly line is too long. He measures the amount of time (in minutes) 9 of his workers take to complete 100 products. After implementing the new procedure, he again measures the amount of time (in minutes) the same 9 workers take to complete 100 products, and obtains the following data: He wants to know if the mean assembly time is different and used the level of significance of $\alpha = 0.05$. (Use Data link on I-Learn FactoryAssemblyTimes-sim)

3. Design the Study:

    a. What is the research question?

    b. State the null and alternative hypothesis.

4. Collect the Data:
    Describe the data collection procedures.

5. Describe the Data:
    In a short paragraph use summary statistics to describe the data. After the paragraph insert an appropriate and well labeled graph to illustrate the data.

6. Make Inferences:

    a. What type of hypothesis test is appropriate?

    b. What are the requirements for this test?

    c. Compute the differences between the two times and determine if the requirements are met for this test. Explain your answer.

    d. Continue with the test regardless of what you found in part "c." Compute the test statistic.

    e. State the degrees of Freedom.

    f. Compute the P-value to the alpha level. Sketch the t-distribution using the t-distribution applet.

    g. Make a decision.Do you reject the null hypothesis or fail to reject it?

    h. Present your conclusions in the form of an English statement.

    i. Rather than testing a hypothesis, now say you just wanted to estimate the mean difference between wait times at the 95% level. What would you do? Be sure to calculate the margin of error. Do it and paste your results below.

7. Take Action

In a short paragraph describe the action you feel should be taken based on the statistical results above.