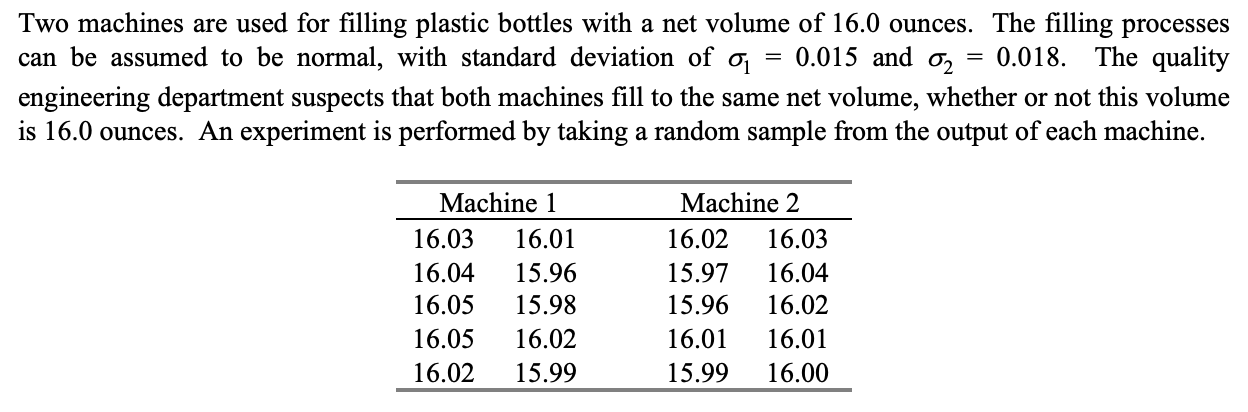
Here are the two homework problems for which you should submit your answers:

1. Look at the data that are presented in the problem below. However, note the questions I am asking you to answer are different than those presented in the text. Here is where you will find this problem background and data (depending on the edition of the course text you have).



1. We want to determine if these two machines are producing the same average volume of soft drink. We have no prior expectation that one will be higher than the other. How should we state statistical hypotheses to be tested? Explain why you stated the hypotheses in this manner.
2. If an engineer handed you this data with no explanation, what questions would you want to ask him or her to determine the quality of the data? You should provide at least 3 logical questions, and an explanation of why you would want to know the answer to each.
3. Copy the data into JMP. It is best to put all data in one column, and put a label for machine (M1 or M2) in a second column. The label should be text versus a continuous number.
4. Plot the data in a way that will help determine if there is a difference in the means. Include at least one plot in the homework that you turn in. What does this plot indicate to you about the averages? Why?
5. Suppose the data produced are totally inconsistent with your null hypothesis in Question a. What would be the conclusion of a hypothesis test? How would you explain your conclusion to an engineer who has no background in statistics? That is, how would you explain it in plain English, without using any statistical terms?
6. Repeat question e, but assume that the data are fairly consistent with the null hypothesis in Question a – approximately what you would have expected. What would you conclude, and how would you explain this, again using no statistical terms?
7. Now perform a two-sample t test comparing the population means in JMP. Use the default option in JMP, which does NOT assume equal variances. Then answer the following questions:
   * What is the p value, assuming we use a two-sided alternative?
   * What is the p value if we use the alternative: H1: 1 > 2?
   * Explain why the answers to the above two questions are different.
   * Assuming we use a two-sided alternative, what can we conclude about the null hypothesis? Explain this not only in statistical terms but also in plain English.
8. Assume that we have been told that the Commerce Department is auditing the plant tomorrow, to verify that our 16oz soft drinks are actually 16oz on average. By federal law, if the population average volume for a soft drink labeled 16oz were less than 16oz, this would constitute criminal fraud. Assume further that the Commerce Department is not concerned about machine 1 versus machine 2; they only care about the population of soft drinks coming out of the plant. What would be appropriate hypotheses for the Commerce Department to use when statistically evaluating the plant, to determine if there is evidence of fraud or not? Explain your answer.
9. This experiment is described on the next two pages, and the data can be found in the **“Boys Shoes”** worksheet. Answer the questions below.

a) Provide an appropriate plot of the data, using JMP.

1. Perform the “matched pairs” t test in JMP and answer the following questions:
   * What is the p value, assuming we use a two-sided alternative?
   * What is the p value if we use the alternative: H1: B > A?
   * Assuming we use a two-sided alternative, what can we conclude about the null hypothesis?
2. Use the same data to perform at two-sample t test comparing the population means in JMP (Ignoring that the data are paired). Use the default option in JMP, which does NOT assume equal variances. Then answer the following questions:
   * What is the p value, assuming we use a two-sided alternative?
   * What is the p value if we use the alternative: H1: B > A?
   * Why do these answers differ from the answers in the “matched pairs” analyses?

