M4A1 Fast Technologies Part 4 - Sampling and Inferential Statistics Student

Download M4A1 Fast Employee Data. Immediately save the file with a new name in this format: **LastName_FirstName_M4A1.xlsx**. All work on this assignment must be submitted in this file.

Connie Smith has an interest in several human resource issues her Fast senior management has mentioned. She wants you to answer the following seven questions using **good statistical methods**. The data in the M4A1 Fast Employee Data file was developed from a **large, random sampling** of Fast Employees worldwide. **It does not represent a census of all Fast Employees.**

Answer the each of the seven questions using appropriate hypothesis tests. Remember, because you have sample data, not the entire population of all Fast Employees, you cannot just find and compare averages. You must run the appropriate hypothesis test for each question.

For **each question**, complete and document in your Excel workbook the following 10 steps of the hypothesis test process on each question's worksheet so they are easily found and understood:

1. State the null and alternative hypotheses **in words**.
2. State the null and alternative hypotheses using **math symbols**.
3. Identify whether the null or the alternative is the claim.
4. Identify the appropriate hypothesis test to run.
5. Identify the tail of the test.
6. Decide on the significance level alpha, α, to use and explain why you chose that significance level. i.e what are the consequences of a wrong decision [making a Type I or Type II error]
7. Manipulate the data so you have just the records you need for the test (this may be done with Pivot Tables or using other Excel techniques)
8. Conduct the test using Excel functions, copies of the provided calculators, and /or the Data Analysis ToolPak. Put the Excel calculations you use, ***including your data***, on a worksheet behind the question worksheet.
9. State your decision and the reason for your decision (p-value method).
10. Draw and state a well-formed conclusion.

Before you begin, some suggestions on how to proceed: How to Do It

- Setting up Hypothesis Tests
- Using Pivot Tables to Find Data

Connie's Questions:

1. Fast advertises that the mean salary of employees with the job title **Programmer I** is $65,000.

   Connie has received feedback that some employees think the ad is misleading because they think the mean salary is not $65,000. She asks you to check the available data to see if it supports the employees' claim. If the Fast Employee Data indicates the mean salary is too different from $65,000, she will have to consider changing the ad.

   Assume the population standard deviation is $7000. Should you recommend Connie change the ad?

How to do it: One Sample z-test for Mean

2. Verify the claim that men are paid more than women at Fast (all locations, departments and job titles).

   a. Create a random sample of the Fast Employee Data with n = 50 records. Test the claim that men are paid more than women using this sample. Assume the variances are not equal.

      How to do it: How to Take a Random Sample Using Excel

   b. Test the claim using all the records in the sample dataset. Assume the variances are not equal.

      How to do it: Two-sample t-test for Mean

   c1. Are the results of the tests (a and b) different? Why?
   c2. Which is more reliable? Hint: find the confidence interval for the test statistics and compare them. Which has the smallest CI?

3. Test the claim that the salaries of *females* who have the job title **Developer III** are at least 10% more than the salaries of *males* with that title? Assume the variances are not equal.

   How to do it: Two-sample t-test Mean Difference

4. The Atlanta office manager thinks the Manager I's in his office are paid less than Manager I's in the other five offices. Using a Single Factor ANOVA, determine if the mean salaries of Manager I's are different in the six offices and, if so, which offices are different.

   How to do it: ANOVA

5. A Fast Board member believes women programmers are underrepresented in the Design Department management ranks. Does the data support this claim: the proportion of female programmers in the Design Department (**Programmer I, II, or III**) is *greater than* the proportion of women who are **Programmer Managers in the Design Department**?

   How to do it: Two-sample z-test Proportions

6. Is gender a factor in determining whether an employee has the job title **Manager I**, **Manager II**, or **Manager III**?

   How to do it: How to use the Chi-square Test for Independent Calculator

7. Fast developed a staffing plan for some departments last year. The plan's goals are expressed as a % of the total headcount in those five departments. As an example, the current headcount of the Administration department should be 13% of the total headcount in these five departments if they met their goal.
    a. Administration-13%
    b. Controller – 5%
    c. Design – 35%
    d. Logistics – 28%
    e. Production – 19%

    Based on the data in the random sample, do the current head counts of these five departments in London indicate the London managers achieved the plan?

    How to do it: Chi-square Goodness of Fit

Submit the results of your analysis in a well-formatted and organized Excel file properly named.