# MAT 243 Project Two Summary Report

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**Notes:**

* Replace the bracketed text on page one (the cover page) with your personal information.
* You will use your selected team for all three projects

## Introduction: Problem Statement

In this project, I am trying to statistically validate the claims made on the performance of the Los Angeles Lakers basketball team in the period of 2013-2015. The dataset used contains point scoring records, relative skill ratings of the teams, or the Elo rating, and game outcomes for the teams and seasons, which basically is a historical record of NBA games. The data frame for the Bulls (assigned team,) is “assigned\_team\_df” and the data frame for the Lakers (my chosen team) is “your\_team\_df.” I will be using four variables in the data set to study, the points scored by the team in a game, the measureL of relative skill level of the team in the league, the year when the team played the games, and the name of the NBA team.

In order to parse the data that I needed to solve my problem, I applied a number of statistical methods in the analysis, including the testing of the hypothesis. In the analysis, I used a one-sample t-tests to review whether the average relative level of the skills of the two years and the average points scored by the Lakers in the chosen years of 2013 – 2015, and how they differ from hypothesized values. I carried out a proportion z-test to test if the proportion of games won when the score was over a certain number of points is actually a match as it claimed. I then went to conduct a two-sample t-test to establish if the relative skill level mean difference of the Lakers and that of the Chicago Bulls was significant during the years that were used. The results of my analysis would have either confirmed the claims for the performance of the teams or it would have rejected them and help guide with making more informed and tailored decisions in order to improve the strategies used by the teams.

## Introduction: Your Team and the Assigned Team

*For my analysis I chose the Los Angeles Lakers for the years between 2013 – 2015. The assigned team I was given for comparative study was the Chicago Bulls, which covered the years between 1996 – 1998.*

Table 1. Information on the Teams

|  | **Name of Team** | **Years Picked** |
| --- | --- | --- |
| 1. Yours | Lakers | 2013 - 2015 |
| 2. Assigned | Bulls | 1996- 1998 |

## Hypothesis Test for the Population Mean (I)

*Suppose a relative skill level of 1340 represents a critically low skill level in the league. The management of your team has hypothesized that the average relative skill level of your team is greater than 1340. You tested this claim using a 5% level of significance. For this test, you assumed that the population standard deviation for relative skill level is unknown. Explain the steps you took to test this problem and interpret your results.*

*See Step 3 in the Python script to address the following items:*

* In general, how is hypothesis testing used to test claims about a population mean?
* Summarize all important steps of the hypothesis test. This includes:
  1. Null Hypothesis (statistical notation and its description in words)
  2. Alternative Hypothesis (statistical notation and its description in words)
  3. Level of Significance
  4. Report the Test Statistic and the P-value in a formatted table as shown below:

Table 2: Hypothesis Test for the Population Mean (I)

| **Statistic** | **Value** |
| --- | --- |
| Test Statistic | 2.94 |
| P-value | 0.0034 |

* 1. Conclusion of the hypothesis test and its interpretation based on the P-value
* What are the implications of your findings from this hypothesis test? What is its practical significance?

* Answer the questions in a paragraph response. Remove all questions and this note (but not the table) before submitting! Do not include Python code in your report.*

## Hypothesis Test for the Population Mean (II)

*Your team’s coach has hypothesized that average number of points scored by your team in the team’s years is less than 106 points. For this test, you assumed that the population standard deviation for points scored is unknown. You tested the claim using a 1% level of significance. Explain the steps you took to test this problem and interpret your results.*

*See Step 4 in the Python script to address the following items:*

* Summarize all important steps of the hypothesis test. This includes:

1. Null Hypothesis (statistical notation and its description in words)
2. Alternative Hypothesis (statistical notation and its description in words)
3. Level of Significance
4. Report the Test Statistic and the P-value in a formatted table as shown below:

Table 3: Hypothesis Test for the Population Mean (II)

| **Statistic** | **Value** |
| --- | --- |
| Test Statistic | -6.91 |
| P-value | 0.0000 |

* 1. Conclusion of the hypothesis test and its interpretation based on the P-value
* What are the implications of your findings from this hypothesis test? What is its practical significance?

* Answer the questions in a paragraph response. Remove all questions and this note* *(but not the table) before submitting! Do not include Python code in your report.*

## Hypothesis Test for the Population Proportion

*Suppose the management claims that the proportion of games that your team wins when scoring 102 or more points is 0.90. You tested this claim using a 5% level of significance. Explain the steps you took to test this problem and interpret your results.*

*See Step 5 in the Python script to address the following items:*

* In general, how is hypothesis testing used to test claims about a population proportion?
* Summarize all important steps of the hypothesis test. This includes:

1. Null Hypothesis (statistical notation and its description in words)
2. Alternative Hypothesis (statistical notation and its description in words)
3. Level of Significance
4. Report the Test Statistic and the P-value in a formatted table as shown below:

Table 4: Hypothesis Test for the Population Proportion

| **Statistic** | **Value** |
| --- | --- |
| Test Statistic | -2235.66 |
| P-value | 0.0000 |

* 1. Conclusion of the hypothesis test and its interpretation based on the P-value
* What are the implications of your findings from this hypothesis test? What is its practical significance?

* Answer the questions in a paragraph response. Remove all questions and this note (but not the table) before submitting! Do not include Python code in your report.*

## Hypothesis Test for the Difference Between Two Population Means

*You were asked to compare your team’s skill level (from its years) with the assigned team’s skill level (from the assigned time frame). You tested the claim that the skill level of your team is the same as the skill level of the assigned team, using a 1% level of significance.*

*See Step 6 in the Python script to address the following items:*

* In general, how is hypothesis testing used to test claims about the difference between two population means?
* Summarize all important steps of the hypothesis test. This includes:

1. Null Hypothesis (statistical notation and its description in words)
2. Alternative Hypothesis (statistical notation and its description in words)
3. Level of Significance
4. Report the Test Statistic and the P-value in a formatted table as shown below:

Table 5: Hypothesis Test for the Difference Between Two Population Means

| **Statistic** | **Value** |
| --- | --- |
| Test Statistic | 49.51 |
| P-value | 0.0000 |

1. Conclusion of the hypothesis test and its interpretation based on the P-value

* What are the implications of your findings from this hypothesis test? What is its practical significance?

* Answer the questions in a paragraph response. Remove all questions and this note (but not the table) before submitting! Do not include Python code in your report.*

## Conclusion

*Describe the results of your statistical analyses clearly, using proper descriptions of statistical terms and concepts.*

* What is the practical importance of the analyses that were performed?
* Describe what these results mean for the scenario.

* Answer the questions in a paragraph response. Remove all questions and this note before submitting! Do not include Python code in your report.*

## Citations

*You were* ***not*** *required to use external resources for this report. If you did not use any resources, you should remove this entire section. However, if you did use any resources to help you with your interpretation, you* ***must*** *cite them. Use proper APA format for citations.*

Insert references here in the following format:

Author's Last Name, First Initial. Middle Initial. (Year of Publication). Title of book: Subtitle of book, edition. Place of Publication: Publisher.