# MAT 243 Project Two Summary Report

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## Introduction: Problem Statement

The issue at the center of topic here today is to find the Jazz’s statistical significance for claims being made about this team using multiple hypothesis tests. We will be looking at data sets from the 1996-1998 Bulls team and our 2013-2015 team using points per game (ppg) and the relative skill level of each team (elo). The method that will be used as I mentioned before will be hypothesis tests to help us determine claims that are being made of our team.

## Introduction: Your Team and the Assigned Team

The team I have picked is the Utah Jazz and the years I will be observing for the Jazz will be from 2013 to the year 2015. The team that I will be comparing the 2013-2015 Jazz team will be the Chicago Bulls from the years 1996 up to the year 1998.

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|  | **Name of Team** | **Years Picked** |
| Mine | Utah Jazz | 2013-2015 |
| Assigned | Chicago Bulls | 1996-1998 |

## Hypothesis Test for the Population Mean (I)

Hypothesis testing allows us to find out if whether we should fail our null hypothesis or reject to fail our null hypothesis to determine further digging. The null hypothesis is that suggest there is no significant difference between the specified populations and any observed difference due to error from sampling or experimental in this case it is H0=1340 or the null hypothesis is 1340. In other words, it is what is believed will happen from the experiment like the hypothesis in science while the alternative hypothesis opposes the null hypothesis our alternative hypothesis here is a relative skill level is Ha>1340 or higher than 1340. In this particular case we are getting the test statistic and the p-value numbers to test and see if we reject the hypothesis or not. The significance level is determined by the alpha level or significance level here we are looking at a 5% significance level so the alpha level that will be compared to the p-value.

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| **Statistic** | **Value** |
| Test statistic | 30.77 |
| P-value | 0.0 |

Based off our significant level and the p-value 0.0>0.5 is false so we reject the null hypothesis which is 1340. This along with the mean of our relative skill shows that the management is correct, and we did have a better relative skill level during the years of 2013-2015.

## Hypothesis Test for the Population Mean (II)

The null hypothesis we are dealing with regarding the points is H0=106 or 106 points per game. The alternate hypothesis is Ha<106 or anything lower than 106 points scored per game during the 2013-2015 seasons. The level of significance is 1% so our alpha level is 0.01 which is what we will compare to the p-value like we did with the last hypothesis test.

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| **Statistics** | **Value** |
| Test Statistic | -14.55 |
| P-value | 0.0 |

Judging by the results 0.0>0.01 from the p-value and the alpha level we can agree to reject the null hypothesis because our p-value is less than our alpha level making our alternative hypothesis correct. We know can say the coach was right because of our p-value and the mean of our points during the 2013-2015 years which is 96.06 points. The practical significance is 9.94 which is a small difference from what the management believed in the null hypothesis.

## Hypothesis Test for the Population Proportion

We are doing a hypothesis test here to find the proportion of games our team won during the year of 2013-2015 when scoring 102 points or more. Our null hypothesis in this case is H0=0.90 or 0.90 of games won by 102 points or more. The alternative hypothesis would be Ha≠0.90 or any proportion that isn’t 0.90 whether it is less than or more than 0.90. The level of significance here is 5% which would mean that the alpha level we will be comparing to the p-value is going to be 0.5.

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| **Statistic** | **Value** |
| Test Statistic | -4.07 |
| P-value | 0.0 |

Here we can reject the hypothesis and what the management believes that the team was able to get a proportion of 0.90 or 90% wins when scoring 102 or more points. Our p-value is at 0.0 once again compared to the alpha 0.05 or 0.0>0.05 is false so we were able to determine that our null hypothesis failed. We can see that our mean is 0.746 or 74.6% of games won with 102 points or more. That is a 13.4% or 0.134 difference that what the management believes and by looking at our test statistic this is not a large difference to the naked eye but with this being a proportion it Is quite a difference.

## Hypothesis Test for the Difference Between Two Population Means

We will now do a hypothesis test on the relative skill level for our team during the years 2013-2015 is at the same level as the skill level of the Bulls during 1996 through 1998 or H0=1739.9. Our null hypothesis for this hypothesis test is the relative skill level for the Bulls during the years of 1996-1998 which is 1739.9. Our alternative hypothesis is our skill level being less than or more than the Bulls during 1996-1998 and our skill level during 2013-2015 or Ha≠1739.9. The level of significance is 1% making our alpha level 0.01.

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| **Statistic** | **Value** |
| Test Statistic | 4.35 |
| P-value | 0.0 |

The p-value is less than the alpha level 0.0>0.01 is false so as seen here the p-value is 0.0 and the alpha level is 0.01. We know because of the p-value being less than the alpha level we can reject the null hypothesis making our hypothesis wrong about our skill level being the same as the 1996-1998 Bulls. Our practical significance is going to be 276.95 which is a significant difference between the null hypothesis and our actual relative skill level.

## Conclusion

We have performed hypothesis tests on stats we find important to helping our team to grow and succeed in further games and seasons. Management had a pretty good idea of how this team performed in the years 2013-2015 with some exceptions. As we saw the team did not have a critically low relative skill level as the team’s skill level was well over with a skill level of 1462.85. The team unfortunately had struggles hitting 100 points let alone 106 points per game during the 3 years. The team also still had some struggles winning games even when they scored 102 points winning 74.6% of those games rather than winning 90% of those games. Finally, looking at the relative skill our team was nowhere near the relative skill level of the very successful Bulls team during the years 1996-1998. This information tells me that the Utah Jazz team during these years were either in the middle of the pack with their record or just above/under that. Compared to the Bulls from this info we can see that the Jazz didn’t hit the expectation during 2013-2015 like the Bulls did during the 1996-1998 years.