High Temperatures in The Spring and Fall Seasons

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The purpose of this paper is to determine if there is a difference between the spring and fall temperatures at Lancer Park. The Longwood Environmental Observatory (LEO) collected high temperatures in Celsius daily over several years at Hull Springs Farm and Lancer Park. The data set contains a simple random sample from Lancer Park over a two year time period. Using this information I will find if there is a difference between the spring and fall high temperatures at Lancer Park. I chose to estimate the average high temperatures in both the spring and fall seasons, because I prefer high temperatures over low temperatures and I am curious as to whether or not there is a difference between the two seasons.

Appendix:

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| Season | High Temps. | Season | High Temps. |
| Spring | 27.99 | Fall | 26.54 |
| Spring | 25.7 | Fall | 19.07 |
| Spring | 24.86 | Fall | 16.08 |
| Spring | 26.14 | Fall | 26.08 |
| Spring | 16.01 | Fall | 7.88 |
| Spring | 29.36 | Fall | 17.71 |
| Spring | 20.45 | Fall | 28.84 |
| Spring | 23.27 | Fall | 29.72 |
| Spring | 12.51 | Fall | 22.73 |
| Spring | 29.83 | Fall | 31.04 |
| Spring | 16.72 | Fall | 20.6 |
| Spring | 21.63 | Fall | 19.23 |
| Spring | 11.77 | Fall | 20.23 |
| Spring | 30.51 | Fall | 30.76 |
| Spring | 19.68 | Fall | 29.91 |
| Spring | 23.27 | Fall | 24.81 |
| Spring | 8.89 | Fall | 27.08 |
| Spring | 19.17 | Fall | 31.99 |
| Spring | 20.81 | Fall | 19.71 |
| Spring | 5.2 | Fall | 21.13 |
| Spring | 15.04 | Fall | 18.55 |
| Spring | 16.52 | Fall | 28.22 |
| Spring | 23.8 | Fall | 18.43 |
| Spring | 23.27 | Fall | 9.27 |
| Spring | 26 | Fall | 21.83 |

There are two hypotheses for this test, the alternate and the null. The Null hypothesis is that μ1 = μ2 and the alternate hypothesis is that μ1 ≠ μ2. There are two parameters used in this hypothesis test, defining each sample. μ1 is the true mean temperature in Celsius during the spring in Lancer Park. μ2 is the true mean temperature in Celsius during the fall in Lancer Park. I conducted a hypothesis test for two means based off of the data and used a 2 Sample T-test because there are two separate populations and the population standard deviation is unknown for both. The data for this test included a simple random sample given by The Longwood Environmental Observatory. After graphing the data of both samples in a boxplot and histogram it was found that sample one did not have any outliers and the skew was close to normal, while sample two did not have any outliers and a slight skew. The slight skew requires a sample size of at least fifteen, however this is not a problem as we have a sample size of 25. There were no other possible problems with this test. The other conditions needed for this test are that both samples need to be a simple random sample, the two samples need to be independent of each other, and the population standard deviation needs to be unknown.

After determining the hypotheses, parameters, and conditions of the test I found the statistics by entering the data into the calculator for the 2 sample t-test. After entering the data I found that the mean temperature for sample one is 20.736 and the sample standard deviation is 6.6311. I also found that the mean temperature for sample two is 22.6976 and the sample standard deviation is 6.4295. The sample size for both samples is twenty five and the significance level is .10. Entering the data into the calculator also provides us with the t and p values. The t-value of this data is -1.0619 and the p-value is .2936.

According to the test, there is not significant evidence that the true mean temperature in Celsius is different in Lancer Park during the spring and fall seasons. The negative p-value indicates that the high temperatures would decrease from the spring to fall season. The p-value of .2936 is greater than the .10 significance level, which means we do not believe the null hypothesis.