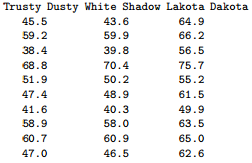
Statistics 140 Winter 17

Hand-In Assignment #5

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Last 4 Digits of SID: 7194

Linda, Rachel and Luke have taken up dog-sled racing in hopes that someday they can enter The Iditarod Dog Sled Race in Alaska with Trusty Dusty, White Shadow and Lakota Dakota as their respective lead dogs. Since there is a lack of snow in Southern California, each have obtained a sled in which the runners have been replaced by wheels. After a significant number of practice runs, Linda, Rachel and Luke race every day (not necessarily together) for 3 months and record their time to finish the course (in minutes). Brandon does not believe there is a significant difference in finish times between the three teams. To test his claim, Brandon takes three independent random samples of 10 times for each of the three teams, yielding the following data:



1. Use the Kruskal-Wallis test to determine whether the finshing time for all three teams all have the same distribution function. Use α = 0.05. (10 pts)

**H0: The three, k, dog race team population distribution functions are identical.**

**Ha: At least one of the dog race team populations tends to have larger observations than at least one of the other ones.**

R Code:

> dog<-read.table("C:\\Users\\Sarah\\Downloads\\DOGRACE1S.DAT", header=TRUE)

> dog #Print as check

> names(dog)

[1] "Dusty" "Shadow" "Lakota"

> attach(dog)

> kruskal.test(dog)

Kruskal-Wallis rank sum test

data: dog

Kruskal-Wallis chi-squared = 7.44, df = 2, p-value = 0.02423

**TS: X2: 7.44 with p-value = 0.02423**

**Since the p-value of 0.02423 is less than α = 0.05, we reject H0**

**There is sufficient evidence to indicate that at least one of the dog race team populations tends to have larger observations than at least one of the other ones.**

1. Refer to Question 1. If appropriate, use multiple comparisons (the non-parametric version) to determine which team(s) has(have) significantly different distribution functions. If not appropriate, indicate why it is not appropriate to use multiple comparisons for this data. (5 pts)

**Since we rejected the null above, we can perform a test to determine which teams have significantly different distribution functions.**

R Code:

> library(dunn.test)

> dunn.test(dog)

Kruskal-Wallis rank sum test

data: dog and group

Kruskal-Wallis chi-squared = 7.44, df = 2, p-value = 0.02

Comparison of dog by group

(No adjustment)

Col Mean -|

Row Mean | 1 2

--------------+----------------------------

2 | 0.000000

| 0.5000

|

3 | -2.362202 -2.362202

| 0.0091 0.0091

|  |  |  |  |
| --- | --- | --- | --- |
| Comparison | p-value | p-value < α (0.05) (Yes or No) | Sign. Difference? (Yes or No) |
| Trusty Dusty v. White Shadow | 0.5000 | No | No |
| Trusty Dusty v. Lakota Dakota | 0.0091 | Yes | Yes |
| White Shadow v. Lakota Dakota | 0.0091 | Yes | Yes |

**Trusty Dusty v. Lakota Dakota and White Shadow v. Lakota Dakota have significantly different distribution functions.**