Homework 1

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Statistical Inference

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Exercise 1. Using the dataset for spitting candy test whether there is an difference between groups with two analysis packages.

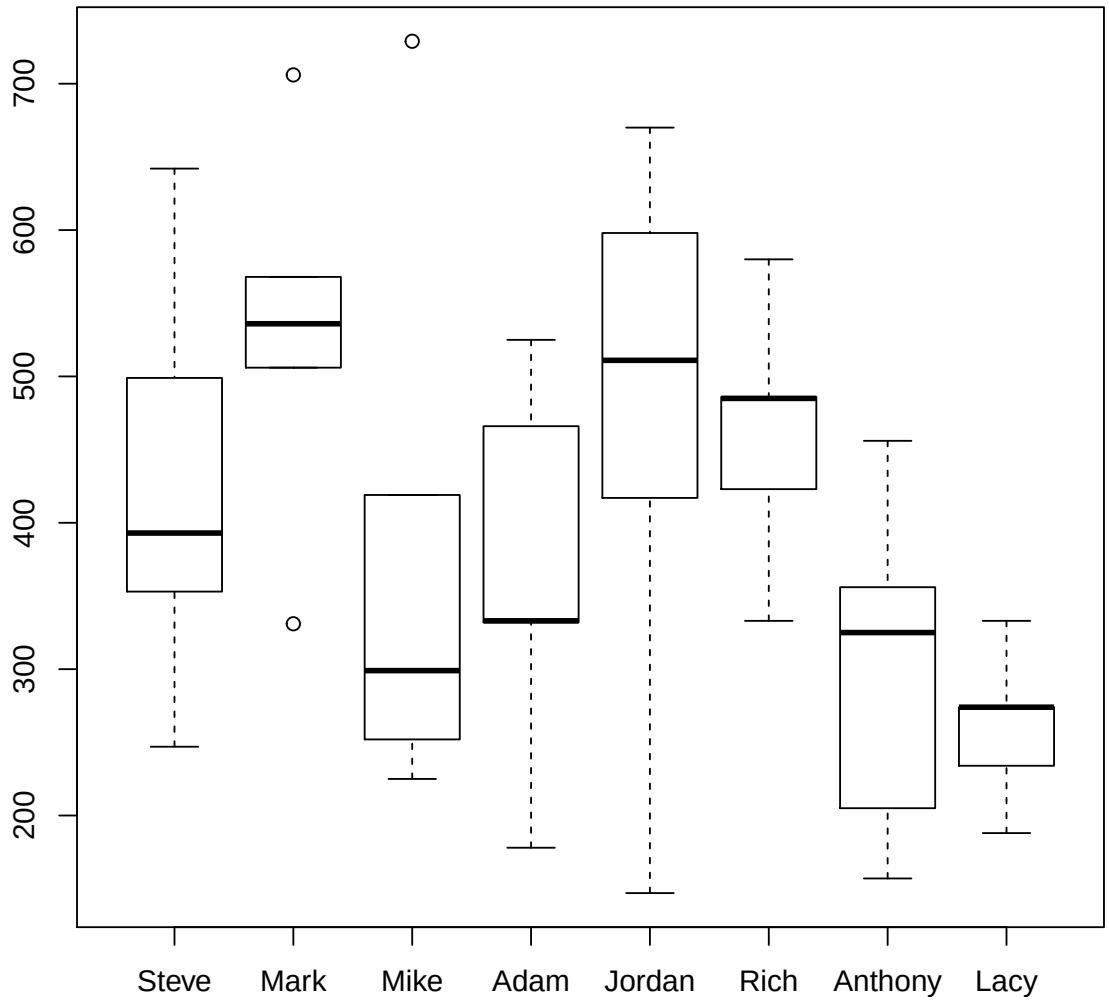
Answer

To answer this question in R and excel we load up the spit data and perform an ANOVA. The ANOVA has a null that there is no difference between groups and an alternative hypothesis of differences between groups.

```
spit <- read.csv("./spit_data.csv",header=TRUE)

attach(spit)

# give boxplot of spit
boxplot(spit)
```


700
600
500
400
300
200
Steve
Mark
Mike
Adam
Jordan
Rich
Anthony
Lacy

```
# load in package reshape2
library(reshape2)

# Use melt function to place data in long format
spit.take <- melt(spit,measure.vars=c("Steve","Mark","Mike","Adam",
                                      "Jordan","Rich","Anthony","Lacy"))


#Get summary results from aov
xtable::xtable(summary(aov(value~variable,data=spit.take)),
               caption="R Output for ANOVA on Spit Data")
```

	Df	Sum Sq	Mean Sq	F value	Pr(>F)
variable	7	283718.97	40531.28	1.93	0.0979
Residuals	32	673648.00	21051.50		

Table 1: R Output for ANOVA on Spit Data

```
excel.anova <-  read.csv("./excel_spit_anova.csv")

 xtable::xtable(excel.anova,caption="Excel Output for ANOVA on Spit Data")
```

	Source.of.Variation	SS	df	MS	F	P.value	F.crit
1	Between Groups	283718.97	7	40531.28	1.93	0.10	2.31
2	Within Groups	673648.00	32	21051.50			
3							
4	Total	957366.97	39				

Table 2: Excel Output for ANOVA on Spit Data

Tables one and two have our results for the ANOVA test in R and Excel, respectively. Because our test has a p-value near 10% we do not reject our null for either test and conclude there is a difference between groups. I also implimented a Kruskal-Wallis rank sum test in order to account for non-normality, but those results were similar to our results here and so are not shown. It should be noted that with only five observations for each group it is hard to say whether a difference between groups actually exists.