Homework06stat

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library(agricolae) library(readxl) library(dplyr)

12.31)

```
my_data <- readxl::read_excel("ex12-31loss.xls")
control <- my_data[which(my_data$Group == 'Ctrl'), ]
group <- my_data[which(my_data$Group == 'Grp'), ]
individual <- my_data[which(my_data$Group == 'Indiv'), ]
chrt <- matrix(c(length(control$Group), mean(control$Loss), sd(control$Loss), length(individual$Group),
colnames(chrt) <- c("Number", "Mean", "Standard Deviation")
rownames(chrt) <- c("Control", "Individual", "Group")
chrt
```

```
##            Number       Mean Standard Deviation
## Control        35  -1.008571           11.500726
## Individual     35  -3.708571            9.078364
## Group          34 -10.785294           11.139151
```

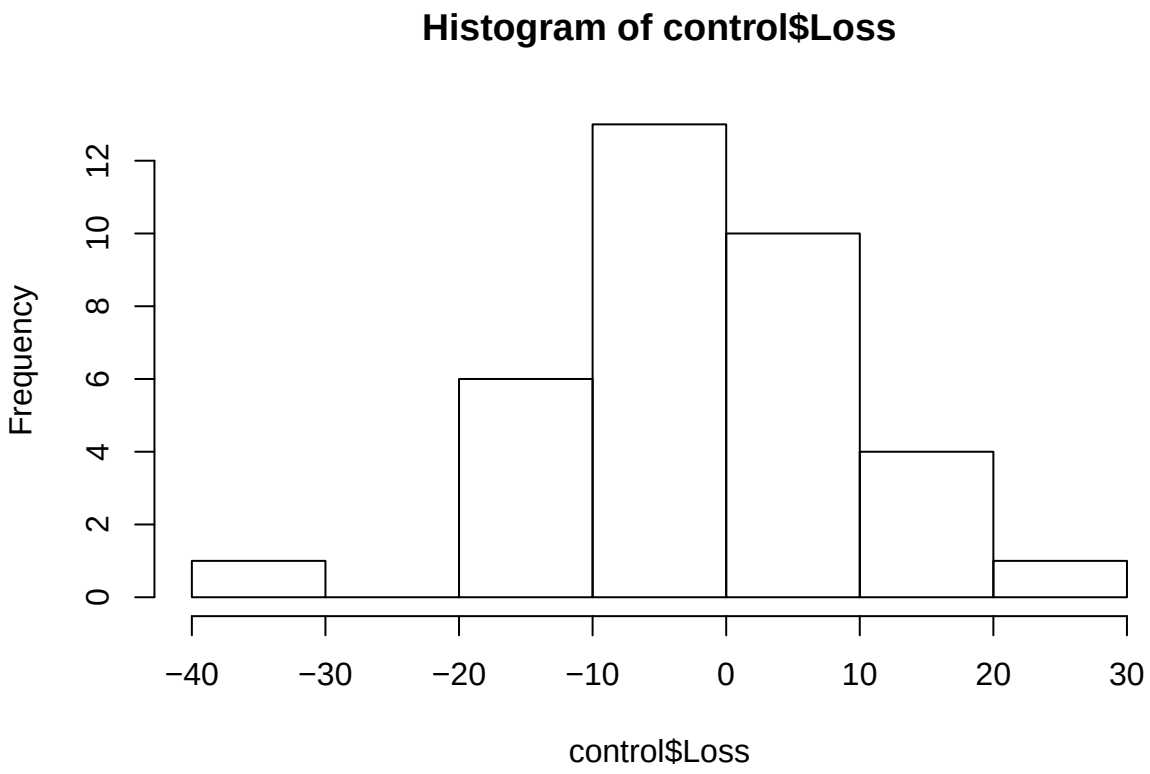
```
2 * sd(individual$Loss) > sd(control$Loss)
```

```
## [1] TRUE
```

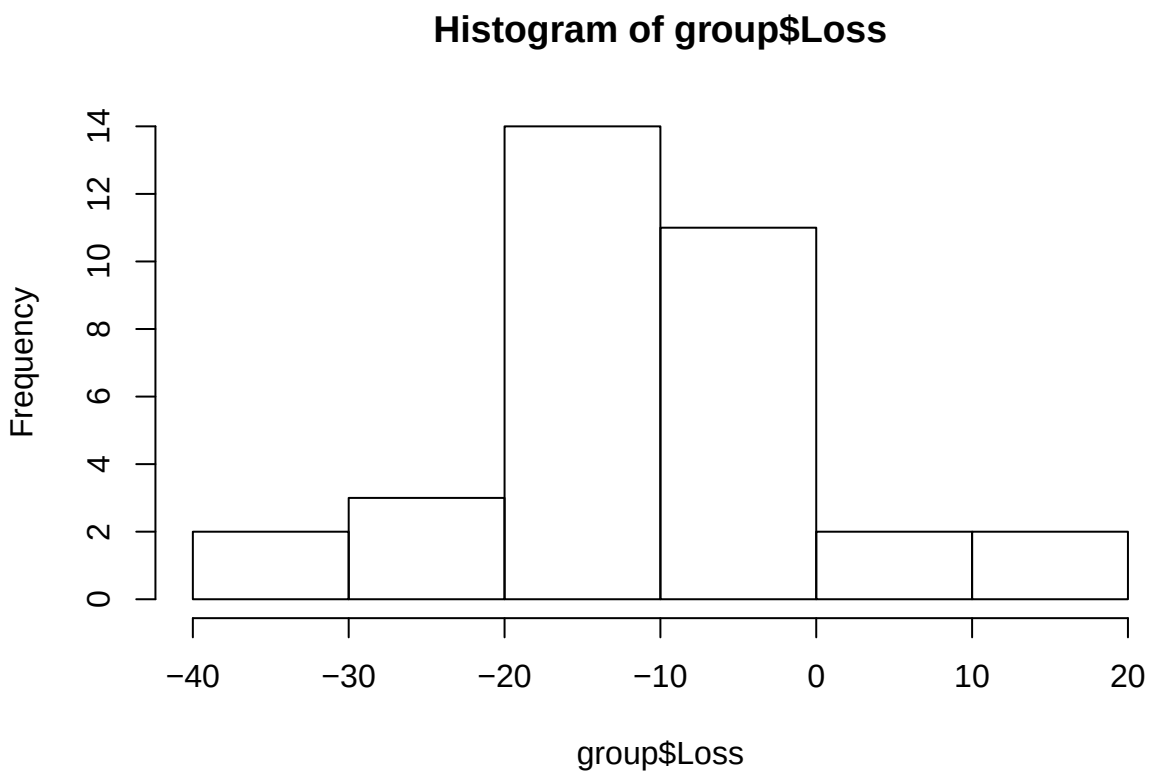
```
"Yes"
```

```
## [1] "Yes"
```

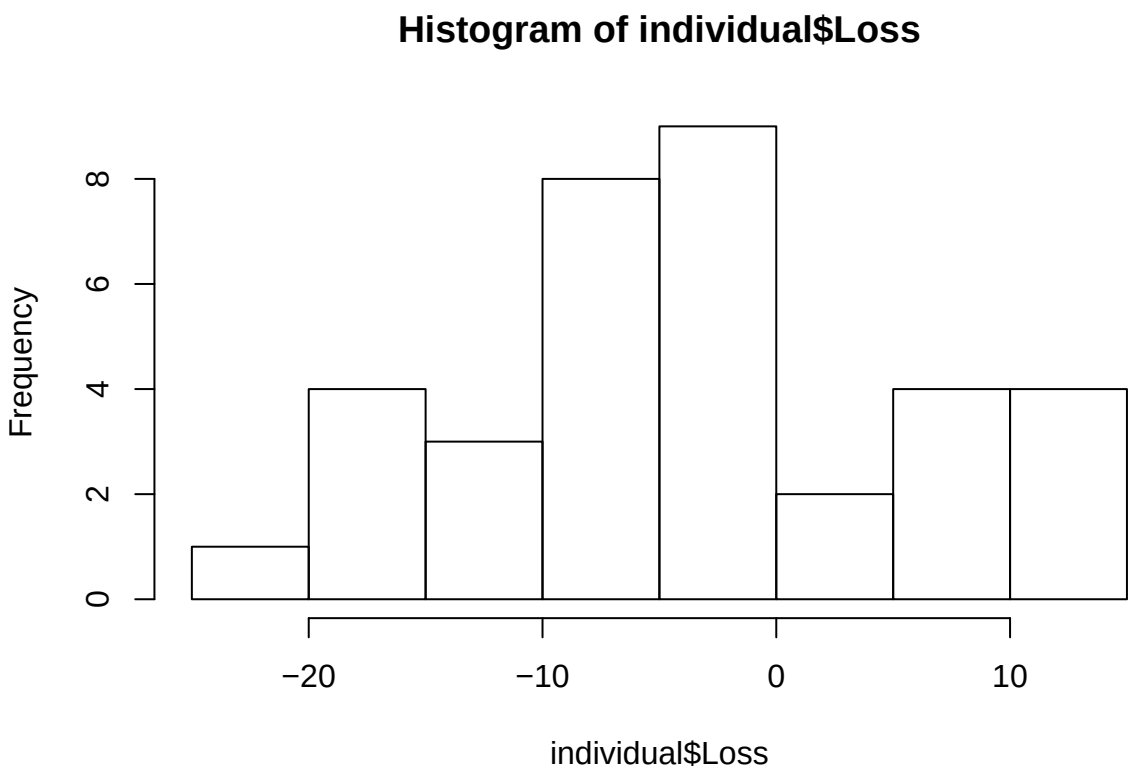
```
hist(control$Loss)
```




```
hist(group$Loss)
```




```r
hist(individual$Loss)
```



Control and group is appear to be normal, individual is left skewed but it has a large enough sample size to be ignored

12.32)

```
loss <- aov(Loss ~ Group, data = my_data)
summary(loss)
```

```
##              Df Sum Sq Mean Sq F value   Pr(>F)
## Group         2   1753   876.3   7.768 0.000728 ***
## Residuals   101  11394   112.8
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
```

```
"fvalue is 7.768, df is 2, pvalue is .0001 which is less than .05 so reject the null that the means are
```

```
## [1] "fvalue is 7.768, df is 2, pvalue is .0001 which is less than .05 so reject the null that the mea
```

```
agricolae::LSD.test(loss, "Group", console = TRUE)
```

```
##
## Study: loss ~ "Group"
##
## LSD t Test for Loss
##
```

```
## Mean Square Error:  112.8109
##
## Group,  means and individual ( 95 %) CI
##
##             Loss       std  r       LCL       UCL   Min  Max
## Ctrl   -1.008571 11.500726 35  -4.57000  2.552857 -30.4 25.5
## Grp   -10.785294 11.139151 34 -14.39872 -7.171871 -32.1 19.4
## Indiv  -3.708571  9.078364 35  -7.27000 -0.147143 -23.5 12.4
##
## Alpha: 0.05 ; DF Error: 101
## Critical Value of t: 1.983731
##
## Groups according to probability of means differences and alpha level( 0.05 )
##
## Treatments with the same letter are not significantly different.
##
##             Loss groups
## Ctrl   -1.008571      a
## Indiv  -3.708571      a
## Grp   -10.785294      b
```

```
"We can see that the group mean is signficantly different than the other two means"
```

```
## [1] "We can see that the group mean is signficantly different than the other two means"
```

```
"Because we rejected the null hypothesis that all the means were the same, we did the LSD test to find
```

```
## [1] "Because we rejected the null hypothesis that all the means were the same, we did the LSD test t
```

12.33)

```
my_data['Loss'] <- my_data['Loss'] / 2.2
my_data
```

```
## # A tibble: 104 x 2
##    Group    Loss
##    <chr>   <dbl>
##  1 Ctrl    2.41
##  2 Ctrl    1.77
##  3 Ctrl    7.50
##  4 Ctrl   -6.77
##  5 Ctrl   -0.136
##  6 Ctrl   -1.95
##  7 Ctrl  -13.8
##  8 Ctrl   -5.68
##  9 Ctrl   -7
## 10 Ctrl   -8.86
## # ... with 94 more rows
```

```
summary(aov(Loss ~ Group, data = my_data))
```

```
##              Df Sum Sq Mean Sq F value   Pr(>F)
## Group         2  362.1  181.05   7.768 0.000728 ***
## Residuals   101 2354.1   23.31
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
```

```
"has the same values from before, since no direct change happened"
```

```
## [1] "has the same values from before, since no direct change happened"
```

12.41) a. x = u2 - (u1 + u4) / 2 b. y = u3 - (u1 + u2 + u4) / 3

12.42) a. part a H0: x = 0 HA: x != 0

part b H0: y = 0 HA: y != 0

b.

```
nblue <- 67
nbrown <- 37
ndown <- 41
ngreen <- 77
mblue <- 3.19
mbrown <- 3.72
mdown <- 3.11
mgreen <- 3.86
sblue <- 1.75
sbrown <- 1.72
sdown <- 1.53
sgreen <- 1.67
c1 <- mbrown - (mblue + mgreen) / 2
c1
```

```
## [1] 0.195
```

```
c2 <- mdown - (mblue + mbrown + mgreen) / 3
c2
```

```
## [1] -0.48
```

SEc1 = 0.3098 SEc2 = 0.2933

t1 = c1/SEc1 = 0.64 dfnum = 3 dfden = 218 p = 0.52 the p-value is greater than .05 so we fail to reject the null hypothesis so there is not enough evidence the show that the average score of brown eyes is different than the other two colors

t2 = c2/SEc2 = 1.66 dfnum = 3 dfden = 218 p = 0.098 the p-value is greater than .05 so we fail to reject the null hypothesis so there is not enough evidence the show that the average score of down eyes is not different than when they are not