MAT5007 RLab Digital Assignment-II

Faculty: Dr. A. David Maxim Gururaj Lab Slot: L5+L6 Submission

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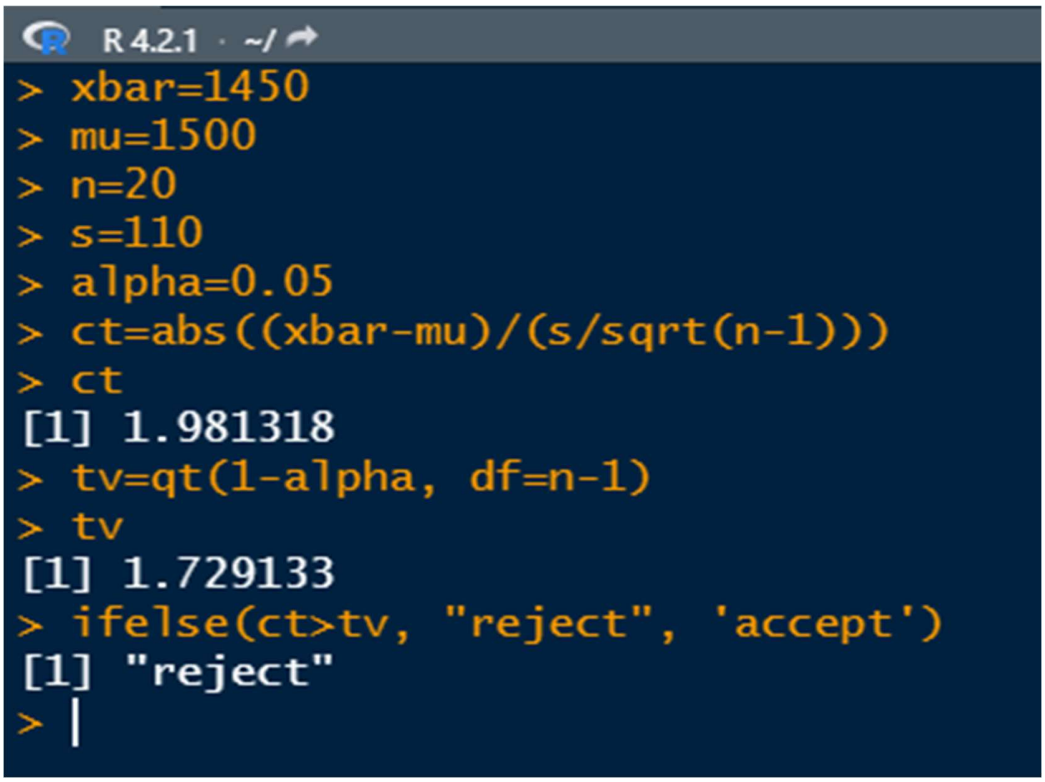
Write an R-Code for the following problems:

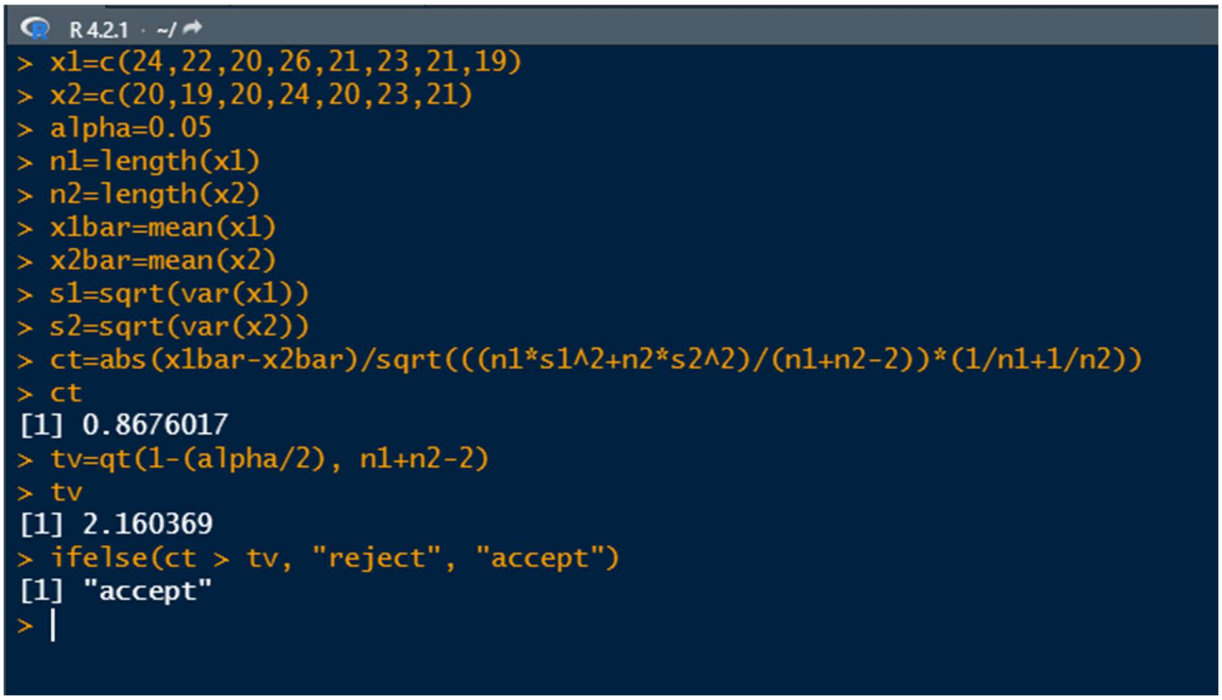
1) The mean life-time of a sample of 20 bulbs is found as 1450 hours with a S.D. of 110 hours. The company manufacturing the bulbs claims that the average life of their bulbs is 1500 bulbs. Is the claim acceptable at 5% LOS?



2) Two independent samples of sizes 8 and 7 contained the following values:

Sample I	24	22	20	26	21	23	21	19
Sample II	20	19	20	24	20	23	21	

Is the difference between the sample mean significant?

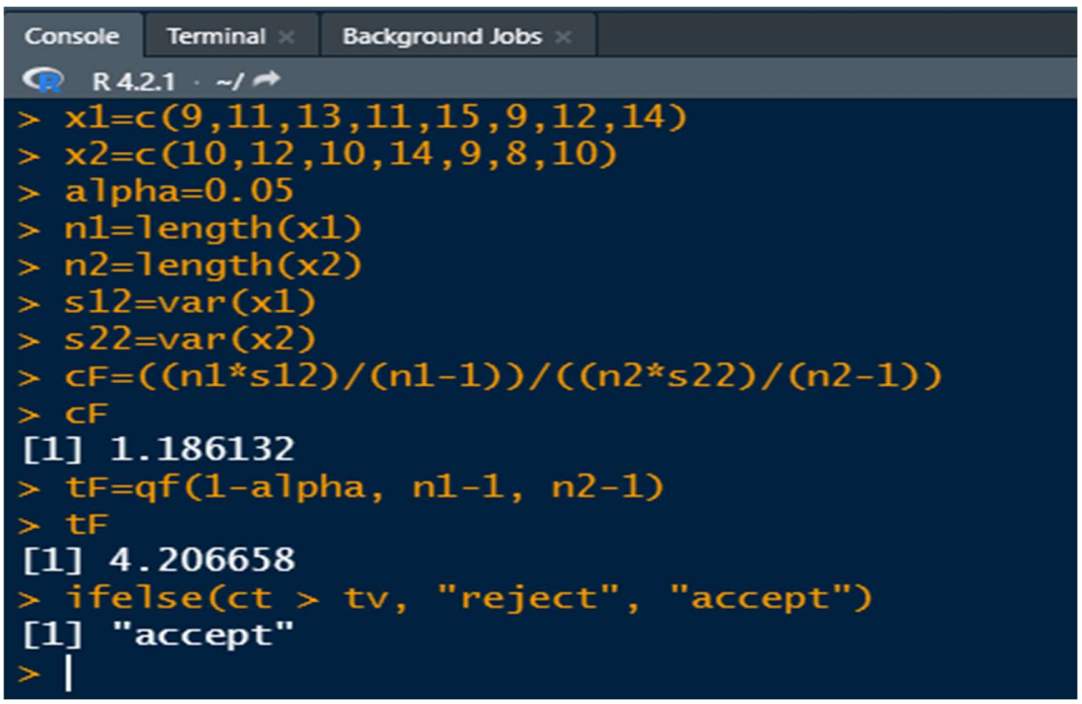


Since, we accept test statistics vale and conclude that there is no significant difference between the means.

3) Two independent samples of 8 and 7 items respectively had the following values of the variable:

Sample I	9	11	13	11	15	9	12	14
Sample II	10	12	10	14	9	8	10	-

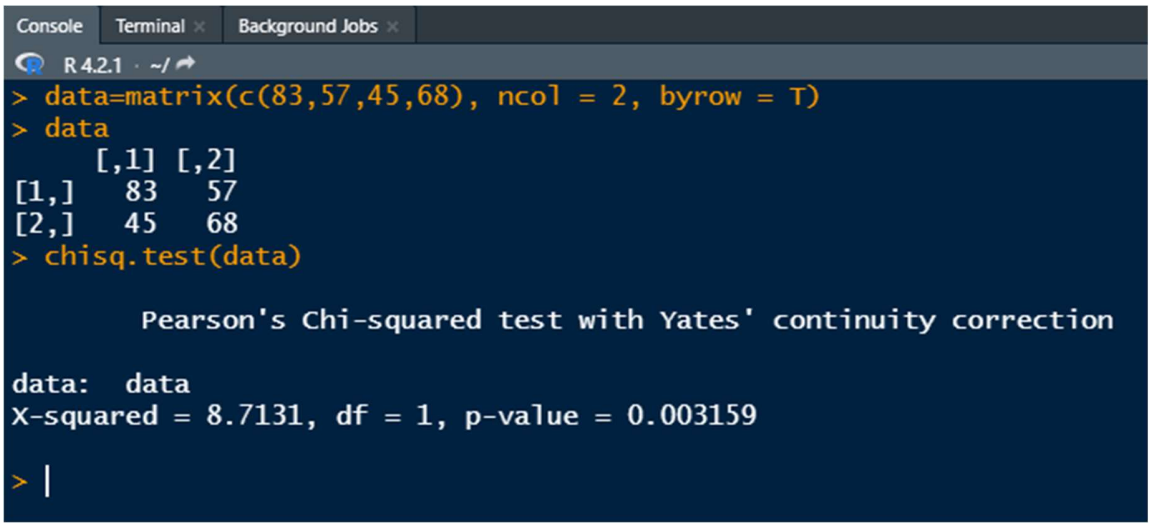
Do the two estimates of population variance differ significantly at 5% LOS?



Since, we accept test statistics vale and conclude that there is no significant difference between the population variance.

4) The following data given in the table below are collected on two characters: Based on this data, can you say that there is no relation between smoking and literacy?

	Smokers	Non-Smokers
Literates	83	57
Illiterates	45	68



5) Suppose the following table represents the sales figures of the 3 new menu items in the 18 restaurants after a week of test marketing. At .05 level of significance, test whether the mean sales volume for the 3 new menu items are all equal.

Item1	Item2	Item3
22	52	16
42	33	24
44	8	19
52	47	18
45	43	34
37	32	39

```
> item1=c(22,42,44,52,45,37)
> item2=c(52,33,8,47,43,32)
> item3=c(16,24,19,18,34,39)
> group=data.frame(cbind(item1,item2,item3))
> group
  item1 item2 item3
1    22    52    16
2    42    33    24
3    44     8    19
4    52    47    18
5    45    43    34
6    37    32    39
> summary(group)
     item1           item2           item3
 Min.   :22.00   Min.   : 8.00   Min.   :16.00
 1st Qu.:38.25   1st Qu.:32.25   1st Qu.:18.25
 Median :43.00   Median :38.00   Median :21.50
 Mean   :40.33   Mean   :35.83   Mean   :25.00
 3rd Qu.:44.75   3rd Qu.:46.00   3rd Qu.:31.50
 Max.   :52.00   Max.   :52.00   Max.   :39.00
> stgr=stack(group)
> stgr
   values   ind
1      22 item1
2      42 item1
3      44 item1
4      52 item1
5      45 item1
6      37 item1
7      52 item2
8      33 item2
9       8 item2
10     47 item2
11     43 item2
12     32 item2
13     16 item3
14     24 item3
15     19 item3
16     18 item3
17     34 item3
18     39 item3
> crd=aov(values~ind,data=stgr)
> crd
Call:
   aov(formula = values ~ ind, data = stgr)

Terms:
                      ind Residuals
Sum of Squares   745.4444 2200.1667
Deg. of Freedom         2        15

Residual standard error: 12.11106
Estimated effects may be unbalanced
> summary(crd)
            Df Sum Sq Mean Sq F value Pr(>F)
ind          2  745.4   372.7   2.541  0.112
Residuals   15 2200.2   146.7
> boxplot(group)
>
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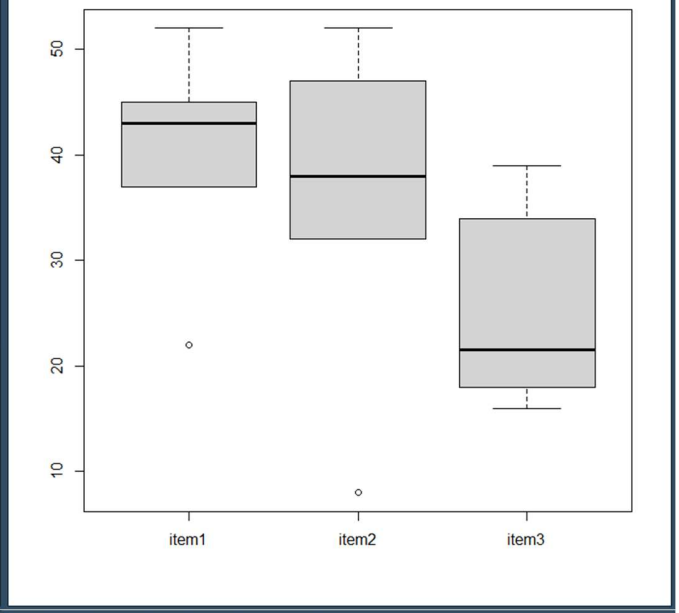

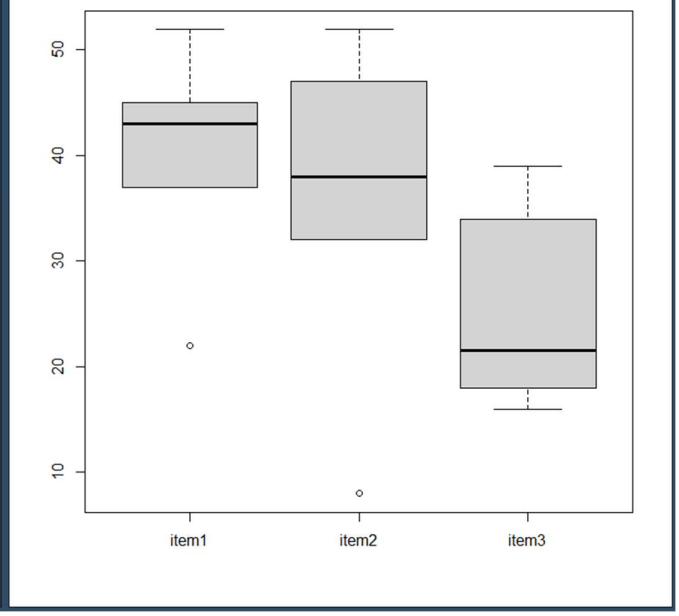

6) Five breeds of cattle B_1, B_2, B_3, B_4, B_5 were fed on four different rations R_1, R_2, R_3, R_4 Gains in weight in Kg over a given period were recorded and given below:

	B_1	B_2	B_3	B_4	B_5
R_1	1.9	2.2	2.6	1.8	2.1
R_2	2.5	1.9	2.3	2.6	2.2
R_3	1.7	1.9	2.2	2.0	2.1
R_4	2.1	1.8	2.5	2.3	2.4

Is there a significant difference between (i) Breads and (ii) Rations?

```
> R1=c(1.9,2.2,2.6,1.8,2.1)
> R2=c(2.5,1.9,2.3,2.6,2.2)
> R3=c(1.7,1.9,2.2,2.0,2.1)
> R4=c(2.1,1.8,2.5,2.3,2.4)
> data=data.frame(R1,R2,R3,R4)
> data=t(data)
>
> Weight=c(t(as.matrix(data)))
> Weight
 [1] 1.9 2.2 2.6 1.8 2.1 2.5 1.9 2.3 2.6 2.2
[11] 1.7 1.9 2.2 2.0 2.1 2.1 1.8 2.5 2.3 2.4
> f=c("B1","B2",'B3','B4','B5')
> g=c("R1",'R2','R3','R4')
> k=ncol(data)
> n=nrow(data)
> Breeds=gl(k, 1, n*k, factor(f))
> Breeds
 [1] B1 B2 B3 B4 B5 B1 B2 B3 B4 B5 B1 B2 B3 B4
[15] B5 B1 B2 B3 B4 B5
Levels: B1 B2 B3 B4 B5
> Rations=gl(n, k, n*k, factor(g))
> Rations
 [1] R1 R1 R1 R1 R1 R2 R2 R2 R2 R2 R3 R3 R3 R3
[15] R3 R4 R4 R4 R4 R4
Levels: R1 R2 R3 R4
> anova=aov(Weight ~ Rations + Breeds)
> summary(anova)
            Df Sum Sq Mean Sq F value Pr(>F)
Rations      3 0.2855 0.09517   1.674  0.225
Breeds       4 0.4620 0.11550   2.032  0.154
Residuals   12 0.6820 0.05683
> interaction.plot(Breeds, Rations, Weight)
> plot(Weight ~ Rations + Breeds, main= "Final Weig
ht")
Hit <Return> to see next plot:
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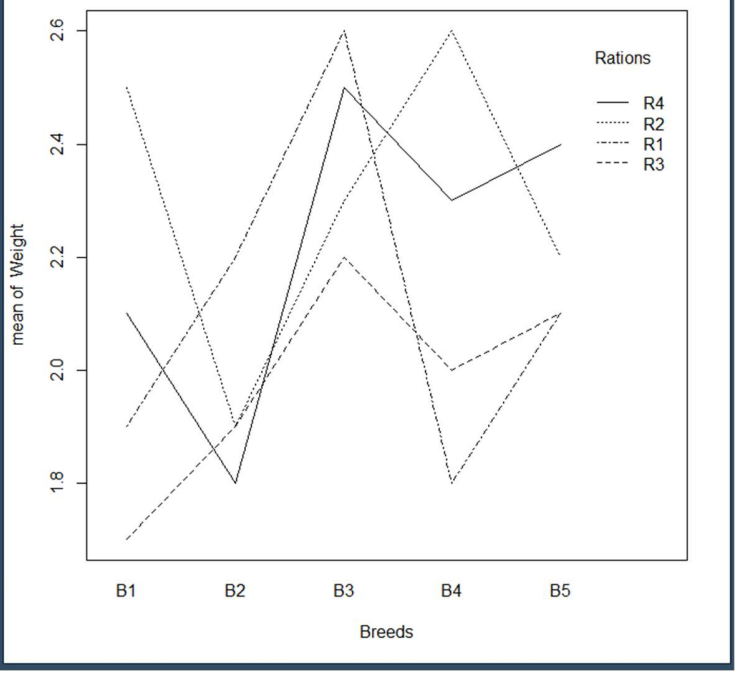

```
> R1=c(1.9,2.2,2.6,1.8,2.1)
> R2=c(2.5,1.9,2.3,2.6,2.2)
> R3=c(1.7,1.9,2.2,2.0,2.1)
> R4=c(2.1,1.8,2.5,2.3,2.4)
> data=data.frame(R1,R2,R3,R4)
> data=t(data)
>
> Weight=c(t(as.matrix(data)))
> Weight
 [1] 1.9 2.2 2.6 1.8 2.1 2.5 1.9 2.3 2.6 2.2
[11] 1.7 1.9 2.2 2.0 2.1 2.1 1.8 2.5 2.3 2.4
> f=c("B1","B2",'B3','B4','B5')
> g=c("R1",'R2','R3','R4')
> k=ncol(data)
> n=nrow(data)
> Breeds=gl(k, 1, n*k, factor(f))
> Breeds
 [1] B1 B2 B3 B4 B5 B1 B2 B3 B4 B5 B1 B2 B3 B4
[15] B5 B1 B2 B3 B4 B5
Levels: B1 B2 B3 B4 B5
> Rations=gl(n, k, n*k, factor(g))
> Rations
 [1] R1 R1 R1 R1 R1 R2 R2 R2 R2 R2 R3 R3 R3 R3
[15] R3 R4 R4 R4 R4 R4
Levels: R1 R2 R3 R4
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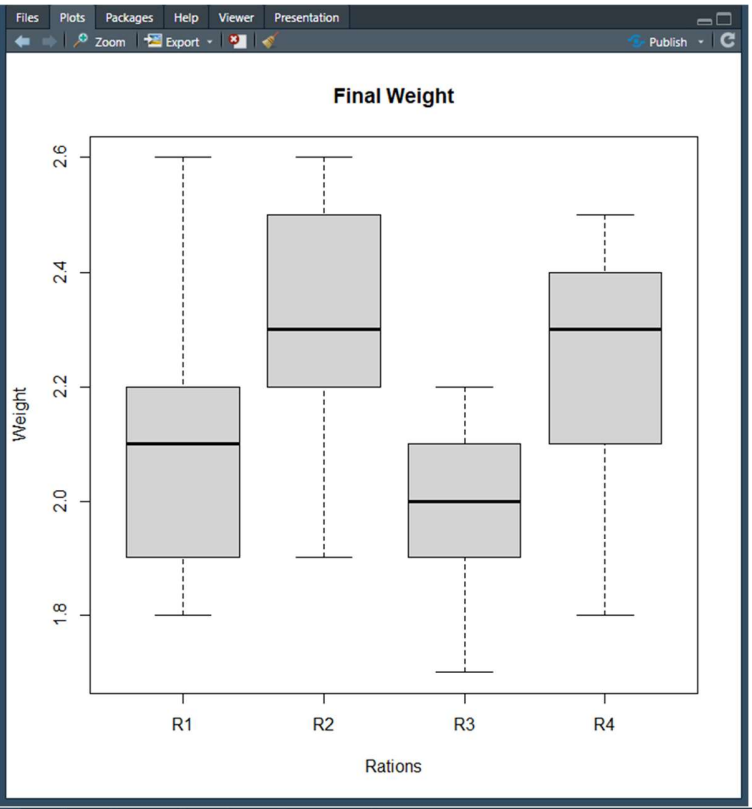


```
> R2=c(2.5,1.9,2.3,2.6,2.2)
> R3=c(1.7,1.9,2.2,2.0,2.1)
> R4=c(2.1,1.8,2.5,2.3,2.4)
> data=data.frame(R1,R2,R3,R4)
> data=t(data)
>
> Weight=c(t(as.matrix(data)))
> Weight
 [1] 1.9 2.2 2.6 1.8 2.1 2.5 1.9 2.3 2.6 2.2
[11] 1.7 1.9 2.2 2.0 2.1 2.1 1.8 2.5 2.3 2.4
> f=c("B1","B2",'B3','B4','B5')
> g=c("R1",'R2','R3','R4')
> k=ncol(data)
> n=nrow(data)
> Breeds=gl(k, 1, n*k, factor(f))
> Breeds
 [1] B1 B2 B3 B4 B5 B1 B2 B3 B4 B5 B1 B2 B3 B4
[15] B5 B1 B2 B3 B4 B5
Levels: B1 B2 B3 B4 B5
> Rations=gl(n, k, n*k, factor(g))
> Rations
 [1] R1 R1 R1 R1 R1 R2 R2 R2 R2 R2 R3 R3 R3 R3
[15] R3 R4 R4 R4 R4 R4
Levels: R1 R2 R3 R4
> anova=aov(Weight ~ Rations + Breeds)
> summary(anova)
            Df Sum Sq Mean Sq F value Pr(>F)
Rations      3 0.2855 0.09517   1.674  0.225
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Residuals   12 0.6820 0.05683
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```