ANOVA

CRD

AIM – TO FIND THE ANOVA USING CRD TO TEST THE NULL HYPOTHESIS (H0) GAIST ALTERNATIVE HYPOTHESIS (H1) WITH LEVEL OF SIGNIFICANCE , ALPHA = 0.05

QUESTION :

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 - 22,42,44,52,45,37

Item2 - 52,33,8,47,43,32

Item3 - 16,24,19,18,34,39

ANSWER :

CODE :

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))

summary(group)

stgr = stack(group);

crd = aov(values~ind,data=stgr)

summary(crd)

```
     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
```

OUTPUT :

```
             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
```

INFERENCE :

P value 0.112 is greater than the alpha value(0.05). Therefore accept the null hypothesis. There is significant no difference between items.

RANDOMISED BLOCK DESIGN

AIM: To find the ANOVA using RBD to test the null hypotheses against alternative hypotheses with level of significance , alpha=0.05.

PROBLEM:

Four different machines M1, M2, M3 and M4 are being considered for the assembling of a particular product. It was decided that six different operators would be used in a randomized block experiment to compare the machines. The machines were assigned in a random order to each operator. The operation of the machines requires physical dexterity , and it was anticipated that there would be a difference among the operators in the speed with which they operated the machines. The amounts of time (in seconds) required to assemble the product are shown in the table below. Test the hypothesis H0 at the 0.05 level of significance, that the machines perform at the same mean rate of speed and there is no significance difference between the performances of the operators. (See the attached data file named as "data2.txt")

	Operator					
Machine	1	2	3	4	5	6
1	42.5	39.3	39.6	39.9	42.9	43.6
2	39.8	40.1	40.5	42.3	42.5	43.1
3	40.2	40.5	41.3	43.4	44.9	45.1
4	41.3	42.2	43.5	44.2	45.9	42.3

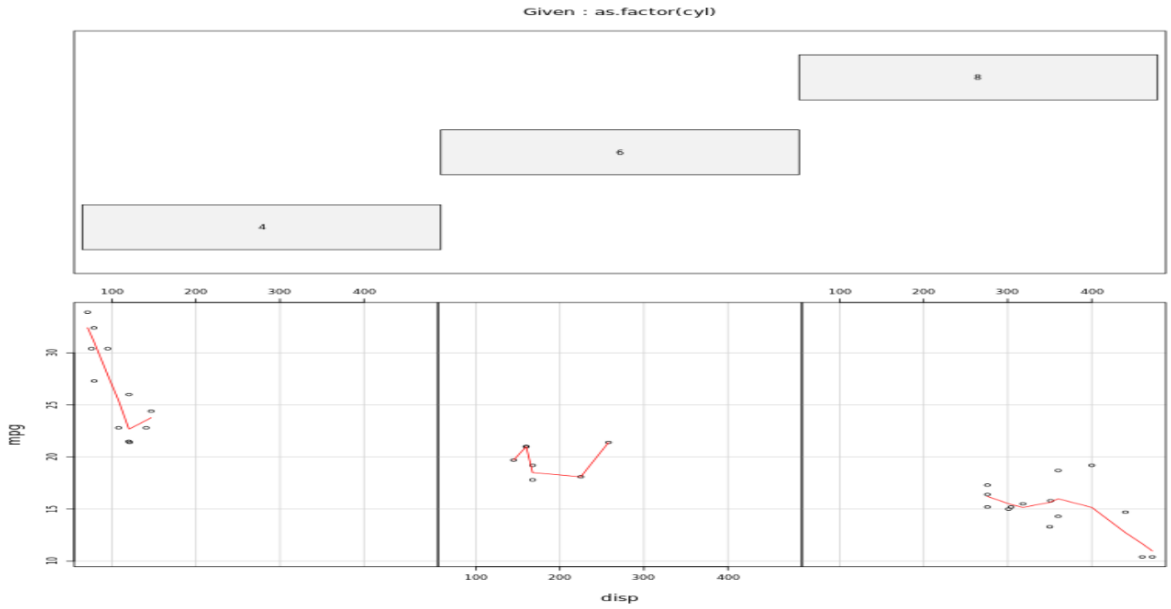
Code:

```
pairs(mtcars, main = "mtcars data", gap = 1/4)

coplot(mpg ~ disp | as.factor(cyl), data = mtcars,
```

```
      panel = panel.smooth, rows = 1)
mtcars2 <- within(mtcars, {
  vs <- factor(vs, labels = c("V", "S"))
  am <- factor(am, labels = c("automatic", "manual"))
  cyl  <- ordered(cyl)
  gear <- ordered(gear)
  carb <- ordered(carb)
})
summary(mtcars2)
 }
data<-read.table(file.choose(),header=TRUE)

time=c(t(as.matrix(data)))

f=c("Oper1","Oper2","Oper3","Oper4","Oper5","Oper
6")

g=c("M1","M2","M3","M4")

k=ncol(data)
```

```
n=nrow(data)

Operators=gl(k,1,n*k,factor(f))

Machines=gl(n,k,n*k,factor(g))

anova=aov(time ~ Machines + Operators)

summary(anova)

interaction.plot(Operators,Machines,time)

par(mfrow=c(1,2))

plot(time~Machines+Operators,main="Produ

ct time")
```

Output :


Given : as.factor(cyl)
8
6
4
100
200
300
400
mpg
10
15
20
25
30
disp