DIGITAL ASSIGNMENT 6

(MAT2001-ELA DA6)

Problem 1:

The following table gives the yields on 15 sample plots under three varieties of seeds

A	20	21	23	16	20
B	18	20	17	15	25
C	25	28	22	28	32

Test whether the average yields of land under different varieties of seeds shows significant differences at 5% level of significance.

R code:

```
> data=c(20,21,23,16,20,18,20,17,15,25,25,28,22,28,32)
> varieties=c(rep("A",5),rep("B",5),rep("C",5))
> anova1=aov(data~varieties)
> summary(anova1)
            Df Sum Sq Mean Sq F value  Pr(>F)
varieties    2    190   95.00   8.143 0.00583 **
Residuals   12    140   11.67
---
Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
> #since p-value<0.05 , so we reject null hypothesis, i.e.,
> #average yields of land under different varieties of seeds
> #shows significant differences at 5% level of significance
```

Problem 2:

To study the performance of three detergents and three different water temperatures, the following 'whiteness' reading were obtained with specially designed equipment.

Water temperature/Detergents	Detergent A	Detergent B	Detergent C
Cold water	57	55	67
Warm water	49	52	68
Hot water	54	46	58

Perform a two-way analysis of variance at 5% level of significance.

R code:

```
> data=c(57,55,67,49,52,68,54,46,58)
> watertemp=c(rep("Cold water",3),rep("Warm water",3),rep("Hot water",3))
> detergents=c(rep("Detergent A",3),rep("Detergent B",3),rep("Deteregent C",3))
> anova2=aov(data~detergents+watertemp)
> anova2
Call:
   aov(formula = data ~ detergents + watertemp)

Terms:
                detergents watertemp Residuals
Sum of Squares    73.55556 304.22222  61.77778
Deg. of Freedom          2         2         4

Residual standard error: 3.929942
Estimated effects may be unbalanced
> summary(anova2)
            Df Sum Sq Mean Sq F value Pr(>F)
detergents   2  73.56   36.78   2.381 0.2084
watertemp    2 304.22  152.11   9.849 0.0285 *
Residuals    4  61.78   15.44
---
Signif. codes:  0 ‘***’ 0.001 ‘**’ 0.01 ‘*’ 0.05 ‘.’ 0.1 ‘ ’ 1

> #There's a significant difference in whiteness shown by different detergents(p>0.05. Reject null hypothesis.
> #There isn't any significant difference in whiteness shown by different water temperatures(p<0.05). Accept null hypothesis.
```