# Lab experiment - 3

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**Subject:** Essentials of data analytics

**Subject code:** CSE3506

**Professor:** A Sheik Abdullah

**Slot:** L55+L56

1. **Our company is testing a new drug that reduces hypertension. A total of 14000. individuals with high blood pressure (r= 150 mmlg, SD= 10 mmlg) are given the drug for a month, and then their blood pressure is measured again. The mean systolic blood pressure has decreased to 144 mmitz, with a standard deviation of 9 mmHg**

```
#question 1 :
before <- rnorm(14000, 150, 10)
after <- rnorm(14000, 144, 9)
t.test(before, after,paired = TRUE)
```

```
1  #question 1 :
2  before <- rnorm(14000, 150, 10)
3  after <- rnorm(14000, 144, 9)
4  t.test(before, after,paired = TRUE)
5
```

```
> #question 1 :
> before <- rnorm(14000, 150, 10)
> after <- rnorm(14000, 144, 9)
> t.test(before, after,paired = TRUE)

        Paired t-test

data:  before and after
t = 52.082, df = 13999, p-value < 2.2e-16
alternative hypothesis: true mean difference is not equal to 0
95 percent confidence interval:
 5.663814 6.106805
sample estimates:
mean difference
       5.885309
```

**<u>Interpretation</u>:**
Since the p-value is less than the significance value, we can confirm that the new drug does reduce hypertension.

2. **The following table gives monthly sales (in thousand rupees) of a certain firm in the 3 states by its four salesmen.**

| States | Salesman | | | |
|---|---|---|---|---|
| | I | II | III | IV |
| A | 6 | 5 | 3 | 8 |
| B | 8 | 9 | 6 | 5 |
| C | 10 | 7 | 8 | 2 |

**Setup the analysis of variance table and test whether there is any significant difference (i) between the salesmen (ii) between sales in the states.**

```
#question 2 :
A <- c(6,5,3,8)
B <- c(8,9,6,5)
C <- c(10,7,8,7)
summary (aov (A~B + C))

States <- c('A', 'B', 'C')
I <- c (6,8,10)
II <- c (5,9,7)
III <- c (3,6,8)
IV <- c (8,5,7)
df <- data.frame (States, I, II, III, IV)
a <- aov (I ~ II + III + III)
summary(a)
```

```
 7  #question 2 :
 8  A <- c(6,5,3,8)
 9  B <- c(8,9,6,5)
10  C <- c(10,7,8,7)
11  summary (aov (A~B + C))
12
13  States <- c('A', 'B', 'C')
14  I <- c (6,8,10)
15  II <- c (5,9,7)
16  III <- c (3,6,8)
17  IV <- c (8,5,7)
18  df <- data.frame (States, I, II, III, IV)
19  a <- aov (I ~ II + III + III)
20  summary(a)
```

```
>
> A <- c(6,5,3,8)
> B <- c(8,9,6,5)
> C <- c(10,7,8,7)
> summary (aov (A~B + C))
            Df Sum Sq Mean Sq F value Pr(>F)
B            1  0.900   0.900   0.075  0.830
C            1  0.029   0.029   0.002  0.969
Residuals    1 12.071  12.071
>
> States <- c('A', 'B', 'C')
> I <- c (6,8,10)
> II <- c (5,9,7)
> III <- c (3,6,8)
> IV <- c (8,5,7)
> df <- data.frame (States, I, II, III, IV)
> a <- aov (I ~ II + III + III)
> summary(a)
            Df Sum Sq Mean Sq
II           1      2       2
III          1      6       6
```

There is no significant difference between states.