

MAT5007 – Applied Statistical Methods

Embedded Lab – R Statistical Software

FALL SEMESTER – 2022~2023 L25+L26 SLOT

E-RECORD

Assignment No.: 8

Submitted By
KAMRAN ANSARI

22MCA0223

MCA– I Year
SITE



**DEPARTMENT OF COMPUTER APPLICATIONS
SCHOOL OF INFORMATION TECHNOLOGY AND ENGINEERING
VELLORE INSTITUTE OF TECHNOLOGY
VELLORE – 632 014
TAMIL NADU
INDIA**

Date: 25/12/2022

Name: Kamran Ansari
Reg No: 22MCA0223

Experiment 1:

The following data relate to the marks obtained by 11 students in two sets, one held at the beginning of a year and the other at the end of the year after intensive coaching. Do the data indicate that the students have benefited by coaching at 5 % level of significance? Test I : 19 23 16 24 17 18 20 18 21 19 20 Test II : 17 24 20 24 20 22 20 20 18 22 19.

```
> x = c(19, 23, 16, 24, 17, 18, 20, 18, 21, 19, 20)
```

```
> y = c(17, 24, 20, 24, 20, 22, 20, 20, 18, 22, 19)
```

```
> alpha = 0.05
```

```
> t.test(x, y, paired = TRUE)
```

```
> talpha = qt(alpha, df = length(x) - 1)
```

```
> talpha
```

```
> x = c(19, 23, 16, 24, 17, 18, 20, 18, 21, 19, 20)
```

```
>
```

```
> y = c(17, 24, 20, 24, 20, 22, 20, 20, 18, 22, 19)
```

```
>
```

```
> alpha = 0.05
```

```
>
```

```
> t.test(x, y, paired = TRUE)
```

Paired t-test

data: x and y

t = -1.3772, df = 10, p-value = 0.1985

alternative hypothesis: true difference in means is not equal to 0

95 percent confidence interval:

-2.6179307 0.6179307

sample estimates:

mean of the differences

-1

```
>
```

```
> talpha = qt(alpha, df = length(x) - 1)
```

```
>
```

```
> talpha
```

```
[1] -1.812461
```

Interpretation: Here since the p-value > 0.05 and $|t| < |\alpha|$ we fail to reject the null hypothesis i.e. that the students have not benefited by the coaching at 5% level of significance.

Experiment 2:

Two random samples drawn from two normal populations with the following observations.

Sample I : 21 24 25 26 27 Sample II : 22 27 28 30 31 36 Write down the R programming code to test whether the two populations have the same variance at 5 % level of significance.

```
> x = c(21, 24, 25, 26, 27)
```

```
> y = c(22, 27, 28, 30, 31, 36)
```

```
> var.test(x, y)
```

```
> x = c(21, 24, 25, 26, 27)
>
> y = c(22, 27, 28, 30, 31, 36)
>
> var.test(x, y)
```

F test to compare two variances

```
data: x and y
F = 0.24537, num df = 4, denom df = 5, p-value = 0.1981
alternative hypothesis: true ratio of variances is not equal to 1
95 percent confidence interval:
 0.03321253 2.29776367
sample estimates:
ratio of variances
 0.2453704
```

Interpretation: Here since the p-value > 0.05 we fail to reject the null hypothesis i.e. the two populations indeed have the same variance at 5% level of significance.