MAT5007 – Applied Statistical Methods

Embedded Lab – R Statistical Software

FALL SEMESTER – 2022~2023 L25+L26 SLOT

E-RECORD

Assignment No.: 7

Submitted By

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MCA– I Year

SITE

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Date: 25/12/2022

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Experiment 1:

A random sample of 10 boys with the following IQs: 70, 120, 110, 101, 88, 83, 95, 98, 107, and 100. Write down the R programming code to test whether the data support the assumption of a population mean IQ of 100 at 5 % level of significance.

```
> iqs = c(70, 120, 110, 101, 88, 83, 95, 98, 107, 100)
> iqs
> t.test(iqs, mu = 100)
```

```
> iqs = c(70, 120, 110, 101, 88, 83, 95, 98, 107, 100)
>
> iqs
 [1]  70 120 110 101  88  83  95  98 107 100
>
> t.test(iqs, mu = 100)

        One Sample t-test

data:  iqs
t = -0.62034, df = 9, p-value = 0.5504
alternative hypothesis: true mean is not equal to 100
95 percent confidence interval:
  86.98934 107.41066
sample estimates:
mean of x
     97.2
```

Interpretation: Here since the p-value > 0.05 we fail to reject the null hypothesis i.e. that the given random sample of IQs are from a population with mean IQ of 100 at 5% level of significance.

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Experiment 2:

The mean height and the standard deviation height of 8 randomly chosen soldiers are 166.9 cm and 8.29 cm respectively. The corresponding values of 6 randomly chosen sailors are 170.3 cm and 8.50 cm respectively. Write down the R programming code to test whether the soldiers are shorter than the sailors on the basis of average height.

```
> n1 = 8

> x1 = 166.9

> s1 = 8.29

> n2 = 6

> x2 = 170.3

> s2 = 8.50

> alpha = 0.05

> t = (x1 - x2)/sqrt(((n1 * s1^2 + n2 * s2^2) / (n1 + n2 - 2)) * (1 / n1 + 1 /
n2))

> t

> talpha = qt(p = alpha, df = (n1 + n2 - 2))

> talpha

> abs(t) < abs(talpha)
```

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```
> x1 = 166.9

> s1 = 8.29

> n2 = 6

> x2 = 170.3

> s2 = 8.50

> alpha = 0.05

> t = (x1 - x2)/sqrt(((n1 * s1^2 + n2 * s2^2) / (n1 + n2 - 2)) * (1 / n1 + 1 / n2))

> t
[1] -0.6954801

> talpha = qt(p = alpha, df = (n1 + n2 - 2))

> talpha
[1] -1.782288

> abs(t) < abs(talpha)
[1] TRUE
```

Interpretation: Here since the |t| < |talpha| we fail to reject the null hypothesis i.e. there is no height difference between sailor and soldier based on their average heights at 5% level of significance.

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