

# MAT5007 – Applied Statistical Methods

## Embedded Lab – R Statistical Software

FALL SEMESTER –  
20222023L25+L26  
SLOT

### E-RECORD

**Experiment No.: 7**

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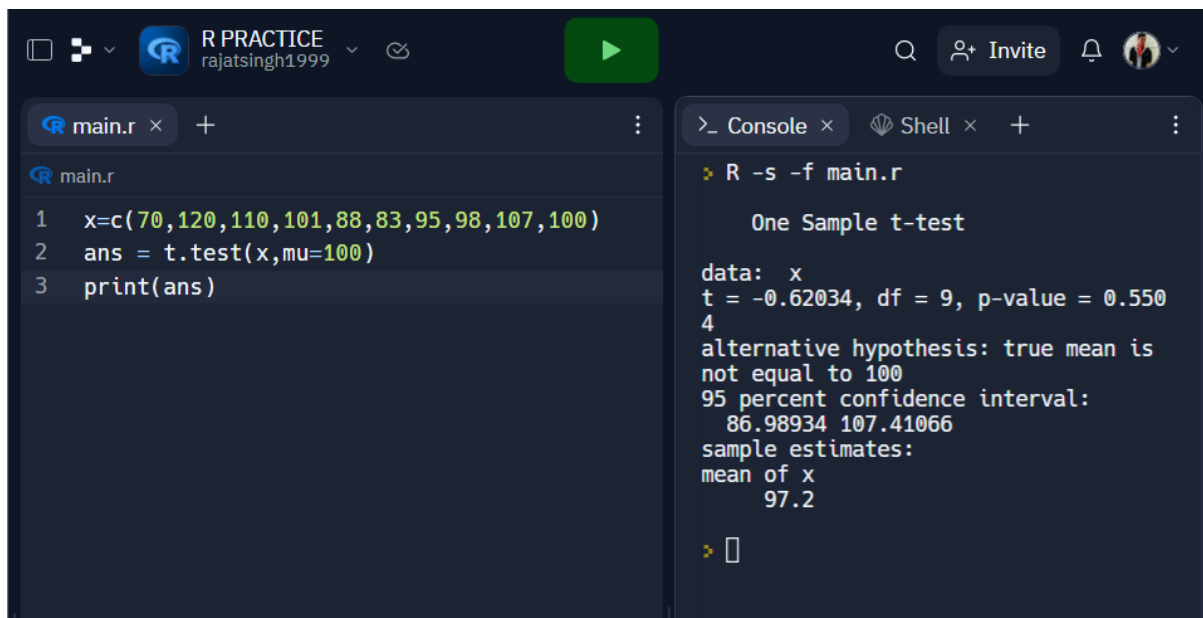
MCA-I Year  
SITE



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**Note: The codes are done in “repl it” environment because I was facing errors in Rstudio due to my laptop data being corrupted. Thank You for the considerations.**

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.



The screenshot shows an R REPL interface. The left pane displays the R script with three lines of code: `x=c(70,120,110,101,88,83,95,98,107,100)`, `ans = t.test(x,mu=100)`, and `print(ans)`. The right pane shows the console output for the command `R -s -f main.r`. The output is a one-sample t-test result for data 'x'. It shows a t-statistic of -0.62034 with 9 degrees of freedom and a p-value of 0.5504. The alternative hypothesis is that the true mean is not equal to 100. The 95% confidence interval is (86.98934, 107.41066). The sample mean is 97.2.

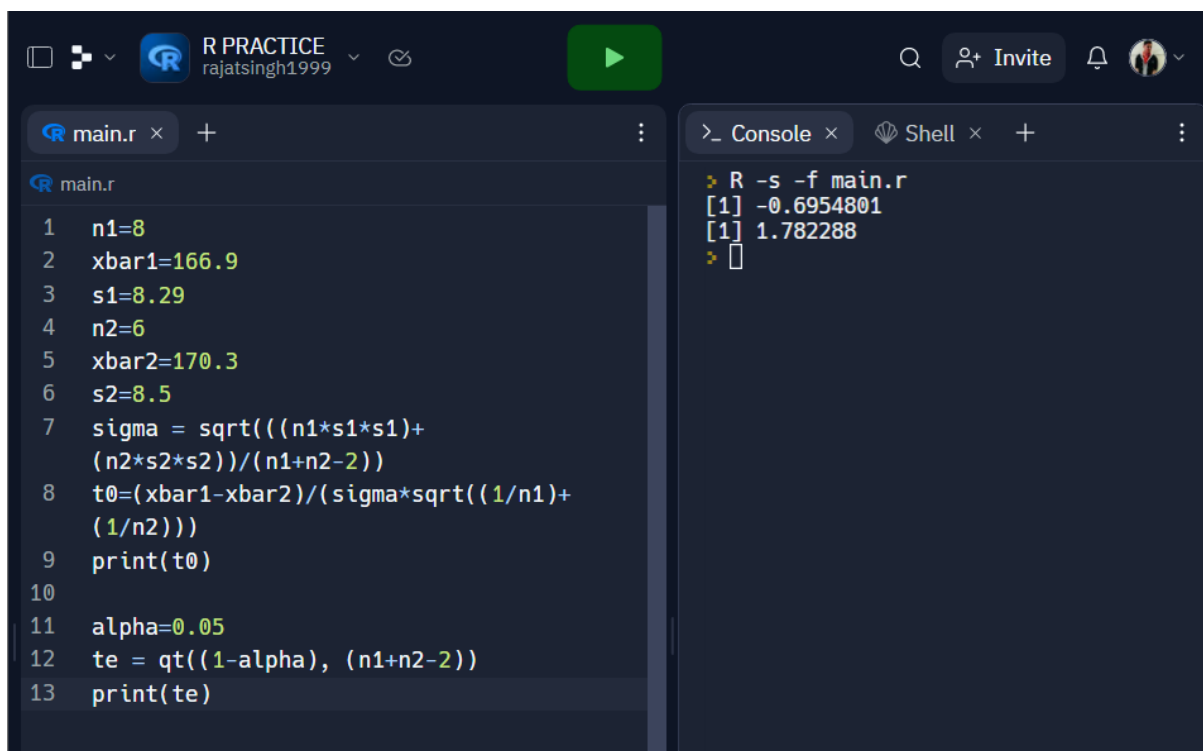
```
> R -s -f main.r

One Sample t-test

data: x
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
```

The p-value 0.5504 is greater than the 0.05 (two tailed test). Hence, at 0.05 significance level, we fail to reject the null hypothesis that the mean IQ of a population is 100.

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.



```
main.r x +
R PRACTICE
rajatsingh1999
main.r
1 n1=8
2 xbar1=166.9
3 s1=8.29
4 n2=6
5 xbar2=170.3
6 s2=8.5
7 sigma = sqrt(((n1*s1*s1)+
8 (n2*s2*s2))/(n1+n2-2))
9 t0=(xbar1-xbar2)/(sigma*sqrt((1/n1)+
10 (1/n2)))
11 print(t0)
12 alpha=0.05
13 te = qt((1-alpha), (n1+n2-2))
14 print(te)

Console x Shell x +
> R -s -f main.r
[1] -0.6954801
[1] 1.782288
> 
```

$|t_0| = 0.6954801$  is less than  $|t_e| = 1.782288$  (left tailed test). Hence, at 0.05 significance level, we fail to reject the null hypothesis that soldiers are equally as tall as sailors based on average height