MAT5007 – Applied Statistical Methods

Embedded Lab – *R* Statistical Software

FALL SEMESTER –
20222023L25+L26
SLOT

E-RECORD
Experiment No.: 9

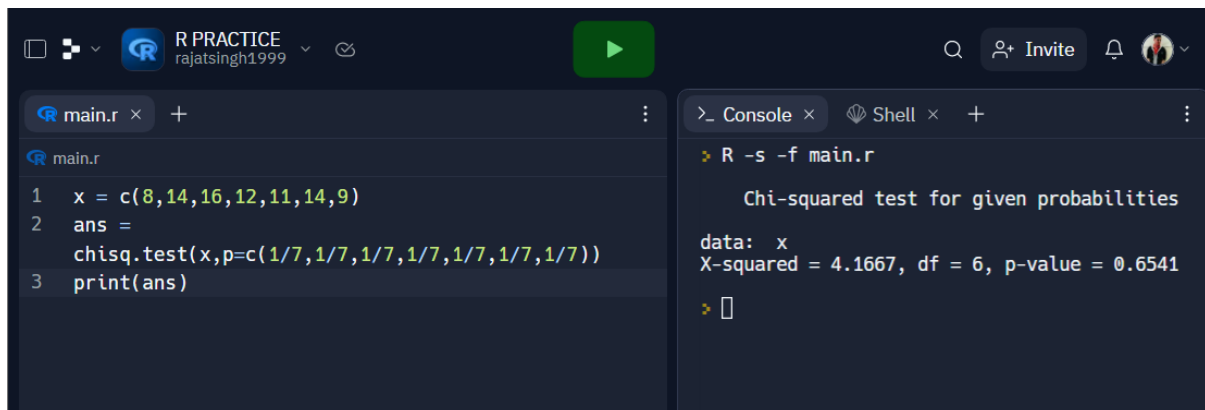Submitted By

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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. The following table gives the number of fatal road accidents that occurred during the 7 days of a week. Write down the R programming code to test whether the accidents are uniformly distributed over the week at 95 % level of confidence.

Days:	Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
Number:	8	14	16	12	11	14	9

```
R PRACTICE
rajatsinghh1999

main.r ×    +

main.r

1    x = c(8,14,16,12,11,14,9)
2    ans =
     chisq.test(x,p=c(1/7,1/7,1/7,1/7,1/7,1/7,1/7))
3    print(ans)
```
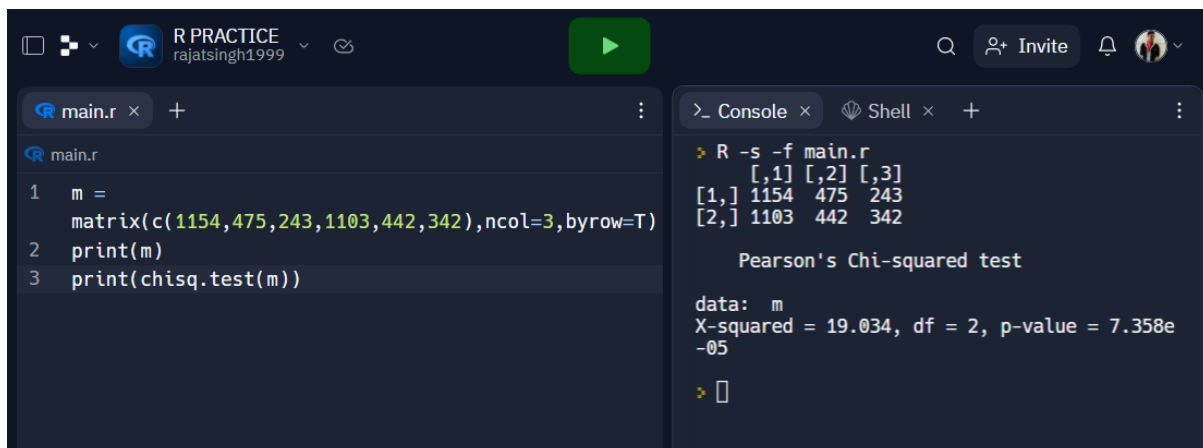
```
> Console ×   Shell ×   +

> R -s -f main.r

        Chi-squared test for given probabilities

data:  x
X-squared = 4.1667, df = 6, p-value = 0.6541

>
```

The p-value 0.6541 is greater than the 0.05. Hence, at 0.05 significance level, we fail to reject the null hypothesis that accidents are uniformly distributed over the week.

2. A total number of 3759 individuals were interviewed according to gender and decision in a public opinion survey on a political proposal with the results as in the following table. Write down the R programming code to test the hypothesis that there is no association between gender and attitude 5 % level of significance.

	Decision		
	Favoured	Opposed	Undecided
Male	1154	475	243
Female	1103	442	342

main.r ×   +

main.r

```
1   m =
    matrix(c(1154,475,243,1103,442,342),ncol=3,byrow=T)
2   print(m)
3   print(chisq.test(m))
```

> Console ×   Shell ×   +

```
> R -s -f main.r
       [,1] [,2] [,3]
[1,] 1154  475  243
[2,] 1103  442  342

        Pearson's Chi-squared test

data:  m
X-squared = 19.034, df = 2, p-value = 7.358e
-05

> 
```

Here the p-value is 0.00007358(<0.05). So, at 5% significance level, we succeed in rejecting the null hypothesis that there is association between gender and attitude

3. A random sample is selected from each of 3 makes of ropes (Type 1, Type 2 and Type 3) and their breaking strength (in certain units) are measured with the results in the following table.

Type 1 :	70	72	75	80	83		
Type 2 :	60	65	57	84	87	73	
Type 3 :	100	110	108	112	113	120	107

Write down the R programming code to test whether the breaking strengths of the ropes differ significantly at 5% level of significance.


```
main.r

1  a=c(70,72,75,80,83,60,65,57,84,87,73,100,110,108,112,113,120,107)
2  b=c(rep('Type 1', 5), rep('Type 2', 6), rep('Type 3', 7))
3  summary(aov(a~b))
```

```
> R -s -f main.r
            Df Sum Sq Mean Sq F value   Pr(>F)
b            2   5838  2919.2   38.89 1.16e-06 ***
Residuals   15   1126    75.1

Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
>
```

The p-value is 0.00000116(<0.05). So, at 5% significance level, we succeed in rejecting the null hypothesis that the breaking strengths of the ropes do not differ significantly.