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MAT2001 Statistics for Engineers

DIGITAL ASSIGNMENT 5

(MAT2001-ELA DA5)

Problem 1:

In a test given to two groups of students, the marks obtained are as follows:

I st Group	18	20	36	50	49	36	34	49	41
II nd Group	29	28	26	35	30	44	46		

Test the significance of the difference between the means of the marks scored by the students at 5% level of significance.

R code:

```
> first=c(18,20,36,50,49,36,34,49,41)
> second=c(29,28,26,35,30,44,46)
> var.test(first,second)

        F test to compare two variances

data:  first and second
F = 2.2034, num df = 8, denom df = 6, p-value = 0.3515
alternative hypothesis: true ratio of variances is not equal to 1
95 percent confidence interval:
  0.393485 10.249397
sample estimates:
ratio of variances
          2.203368
> #variances are unequal.
> t.test(first,second,var.equal=FALSE,paired=FALSE)

        Welch Two Sample t-test

data:  first and second
t = 0.60072, df = 13.797, p-value = 0.5578
alternative hypothesis: true difference in means is not equal to 0
95 percent confidence interval:
 -7.725987 13.725987
sample estimates:
mean of x mean of y
       37        34
> #since p-value>0.05, we accept null hypothesis, i.e., we conclude that
the means of the two groups are significantly similar.
```

Problem 2:

1000 families were selected at random in a city to test the belief that high income families usually send their children to public schools and the low income families often send their children to government schools. The following results were obtained:

Income/School	Public	Govt.	Total
Low	370	430	800
High	130	70	200
Total	500	500	1000

Test at 5% level of significance if there is any association between income and type of schooling.

R code:

```
> data=matrix(c(370,430,130,70),ncol=2,byrow=T)
> data
     [,1] [,2]
[1,]  370  430
[2,]  130   70
> chisq.test(data)

        Pearson's Chi-squared test with Yates' continuity correction

data:  data
X-squared = 21.756, df = 1, p-value = 3.096e-06

> #Here p-value<0.05. Hence we reject the null hypothesis. Hence, income
and type of schooling are not independent.
```