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DIGITAL ASSIGNMENT: -5

- 1) **The following data come from a hypothetical survey of 920 people (Men, Women) that ask for their preference of one of the three ice cream flavors (chocolate, vanilla, strawberry). Is there any association between gender and preference for ice-cream flavor?**

GENDER	CHOCOLATE	VANILLA	STRAWBERRY
MEN	100	120	60
FEMALE	350	320	150

CODE: -

```
> data<-matrix(c(100,120,60,350,320,150),ncol=3,byrow=T)
> data
[,1] [,2] [,3]
[1,] 100 120 60
[2,] 350 320 150
> chisq.test(data)
Pearson's Chi-squared
test data: data
X-squared = 4.3195, df = 2, p-value = 0.1154
```

CONCLUSION: -

Here p-value is greater than 0.05, hence there is no evidence to reject the null hypothesis. So we consider the gender and the preference for ice-cream as independent

- 2) **As a part of quality improvement project focused on a delivery of mail at a department office within a large company, data were gathered on the number of different addresses that had to be changed so that the mail could be redirected to the correct mail stop. Table shows the frequency distribution. Fit binomial distribution and test goodness of fit.**

X	0	1	2	3	4
FX	5	20	45	20	10

CODE: -

```
> x=c(0,1,2,3,4)
> n=4
> N=100;
> p<-0.25
> obf<-c(5,20,45,20,10)
> exf<-dbinom(x,n,p)*100
> sum(obf)
[1] 100
> sum(exf)
[1] 100
> chisq<-sum((obf-exf)^2/exf)
> chisq
[1] 347.6049
> qchisq(0.95,3 )
[1] 7.814728
```

CONCLUSION: -

Calculated value of chi-square is greater than critical value ($347.6049 > 7.8147$). so H_0 , which assumes that the given distribution is approximately a binomial distribution, is rejected, i.e. the binomial fit for the given distribution is not satisfactory.

- 3) **A series of traps were set in line across sand dunes and the number of different types of insects caught in a fixed time interval are recorded to study their movement across the dune. Following table shows the data on the movement of leafhopper (Hemiptera) across a sand dune.**

Leafhopper(Hemiptera) Per trap Xi	Frequency(fi)
0	6
1	8
2	12
3	4
4 or more	3

Fit poisson distribution to the above data and test goodness of fit.

CODE: -

```
>x=0:4
> f=c(6,8,12,4,3)
> lambda=(sum(f*x)/sum(f))
> expf=dpois(x,lambda)*sum(f)
> f1=round(expf)
> sum(f)
[1] 33
> sum(f1)
[1] 32
> f1
[1] 6 10 9 5 2
> obf=c(6,8,12,7)
> exf=c(6,10,9,7)
> chisq=sum(((obf-exf)^2)/exf)
> chisq
[1] 1.4
> qchisq(0.95,3)
[1] 7.814728
```

CONCLUSION: -

Calculated value of chi-square is less than critical value ($1.4 < 7.8147$)
So we can conclude that poisson distribution is not good fit to the given data.