Chi Square and ANOVA

PRANAVCHENDUR T K - 15BCE1097
Faculty : ARUN PRASATH G M

Q1

A biologist is conducting a plant breeding experiment in which plants can have one of four phenotypes. If these phenotypes are caused by a simple Mendelian Model, the phenotypes should occur in a 9:3:3:1 ratio. She raises 41 plants with the following phenotypes.

Phenotype	1	2	3	4
Count	20	10	7	4

Should she worry that the simple genetic model doesn't work for her phenotype

Code

```
plants<-c(20,10,7,4)

chisq.test(plants,p=c(9/16,3/16,3/16,1/16))
```

```
        Chi-squared test for given probabilities

data:  plants
X-squared = 1.9702, df = 3, p-value = 0.5786
```

Q2

A survey of 320 families with 5 children each revealed the following distribution

No of Boys	5	4	3	2	1	0
No of Girls	0	1	2	3	4	5
No of Families	14	56	110	88	40	12

Is this result consistent with hypothesis that male and female births are equally possible ?

Code

```
> n=5

> alpha = 0.05

> N=320

> p<-0.5

> x=c(0:n)

> obf<-c(14,56,110,88,40,12)

> exf<-(dbinom(x,n,P)*320)

> sum(obf)
[1] 320

> sum(exf)
[1] 320

> chisq<-((obf-exf)^2/exf)

> cv=chisq

> tv=qchisq(1-alpha,n-1)

> if(cv<=tv) {print("Accept H0")} else {print("Reject H0")}
[1] "Reject H0"
```

Q3

Fit a Poisson distribution to the following data and test the hypothesis

X	0	1	2	3	4	5	6
f	275	72	30	7	5	2	1

Code

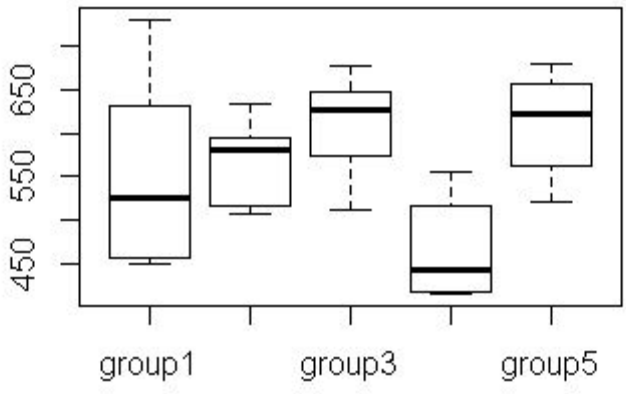
```
> n=6

> alpha = 0.05

> N=392

> p<-0.5

> x=c(0:n)

> obf<-c(275,72,30,7,5,2,1)

> exf<-(dpois(x,n,p)*N)

> sum(obf)
[1] 392

> sum(exf)
[1] 237.6707

> chisq<-((obf-exf)^2/exf)

> cv=chisq

> tv=qchisq(1-alpha,n-1)

> if(cv<=tv) {print("Accept H0")} else {print("Reject H0")}
[1] "Reject H0"
```

ANOVA

COMPLETELY RANDOMIZED DESIGN

CODE:

```
> group1<-c(551,457,450,731,499,632)

> group2<-c(595,580,508,583,633,517)

> group3<-c(639,615,511,573,648,677)

> group4<-c(417,449,517,438,415,555)

> group5<-c(563,631,522,613,656,679)

> group<-data.frame(cbind(group1,group2,group3,group4,group5))

> summary(group)
    group1          group2          group3          group4          group5
 Min.   :450.0   Min.   :508.0   Min.   :511.0   Min.   :415.0   Min.   :522.0
 1st Qu.:467.5   1st Qu.:532.8   1st Qu.:583.5   1st Qu.:422.2   1st Qu.:575.5
 Median :525.0   Median :581.5   Median :627.0   Median :443.5   Median :622.0
 Mean   :553.3   Mean   :569.3   Mean   :610.5   Mean   :465.2   Mean   :610.7
 3rd Qu.:611.8   3rd Qu.:592.0   3rd Qu.:645.8   3rd Qu.:500.0   3rd Qu.:649.8
 Max.   :731.0   Max.   :633.0   Max.   :677.0   Max.   :555.0   Max.   :679.0

> stgr<-stack(group)

> crd<-aov(values~ind,data=stgr)

> summary(crd)
            Df Sum Sq Mean Sq F value  Pr(>F)
ind          4  85356   21339   4.302 0.00875 **
Residuals   25 124020    4961
---
Signif. codes:  0 ‘***’ 0.001 ‘**’ 0.01 ‘*’ 0.05 ‘.’ 0.1 ‘ ’ 1

> boxplot(group)
```



Q

Four different machines M1,M2,M3 and M4 are being considered for the assembling of a particular product.

```
data<-read.table(file.choose(),header=TRUE)
time=c(t(as.matrix(data)))
f=c("Oper1","Oper2","Oper3","Oper4","Oper5","Oper6")
g=c("M1","M2","M3","M4")
k=ncol(data)
n=nrow(data)
Operators=g1()
```