

## Lab Session 6: Two way Tables

In lab session two, we looked at the frequency table for one qualitative variable using `table` command. Here we are going to look at two-way tables to describe the relationship between two qualitative variables. Two-way tables organize data using Rows and Columns. Row and Column totals provide the marginal distributions of the two variables SEPERATELY.

R has three in built functions to generate frequency tables. The **`table()`** function, tables of proportions using the **`prop.table()`** function, and marginal frequencies using **`margin.table()`**.

### `table()`

Creating a two-way table by listing cells by rows.

```
attach( mtcars)
mytable <- table(vs, gear) # VS will be rows, gear will be columns
mytable # print table
```

### `margin.table()`

We can generate marginal distributions using the `margin.table()` function. If you pass just the table (the first argument) to the command, it calculates the total number of observations.

```
margin.table(mytable, 1) # row marginals
margin.table(mytable, 2) #column marginals
```

### `prop.table()`

You can get a table of the joint proportions with `prop.table()`. To calculate conditional probabilities, margin can be specified similarly to `margin.table()`

```
prop.table(mytable) # cell percentages
prop.table(mytable, 1) # row percentages
prop.table(mytable, 2) # column percentages
```

After generating tables, you can draw component bar charts, multiple bar chart using `barplot()` functions.

```
#Stacked Bar Plot with Colors and Legend
barplot(mytable, main="Car Distribution by Gears and VS", xlab="Number of Gears", col=c("darkblue","red"),
        legend = rownames(mytable))

# multiple Bar Plot
barplot(mytable, main="Car Distribution by Gears and VS",
        xlab="Number of Gears", col=c("darkblue","red"), legend = rownames(mytable) ,beside=TRUE)
legend = rownames(counts), beside=TRUE)
```

## Lab Exercise

### **Load the dataset “Class” dataset.**

a) Perform univariate analysis for the variables, gender, ethnicity, degree type and class using appropriate graphical methods. Interpret the graphs.

b) Suppose that the administration department is interested in determining the following.

- The proportion of male first-class receivers
- The class distribution for Sinhala graduates

Explain how you would determine the above mentioned. Obtain the answers for the above to help the administration department.

c) Graduates believe that a better class could be received if they followed a general degree instead of a special degree. Do you agree with the graduates' belief? Justify your answer using suitable graphical methods.

d) The administration claims that females have performed better than males. Do you agree with this claim? Justify.