

Statistical Graphics

Graphic Representation of Data

- Bar Plot
- Histogram
- Scatter Plot
- Density Plot
- Box Plot

Bar Plot

- Bar chart can be drawn with the help of function **barplot()**

Syntax : `barplot(height, horiz = FALSE, main = NULL, sub = NULL, xlab = NULL, ylab = NULL,...)`

Where `height` : A vector / matrix

`horiz` : logical; If TRUE then graph results in
horizontal bar graph

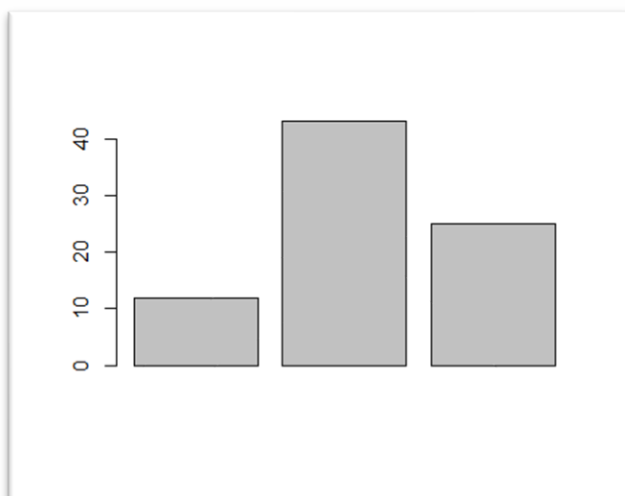
`main` : Title of Graph

`xlab` : X-axis label

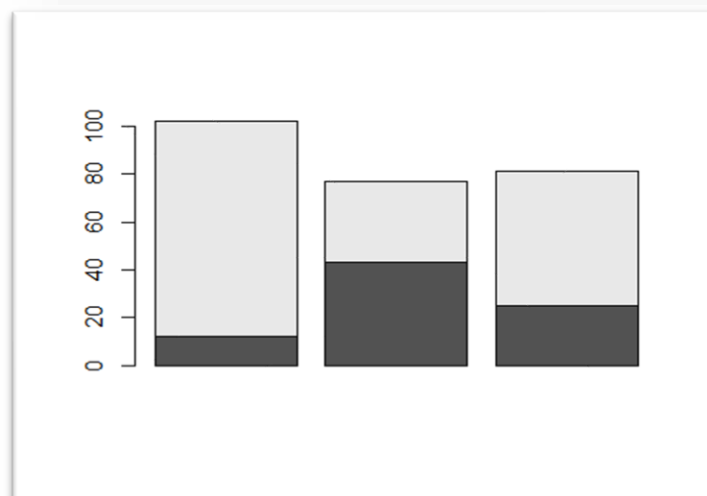
`ylab` : Y-axis label

Bar Plot Examples

```
> ProductA <- c(12,43,25)  
> barplot(ProductA)
```

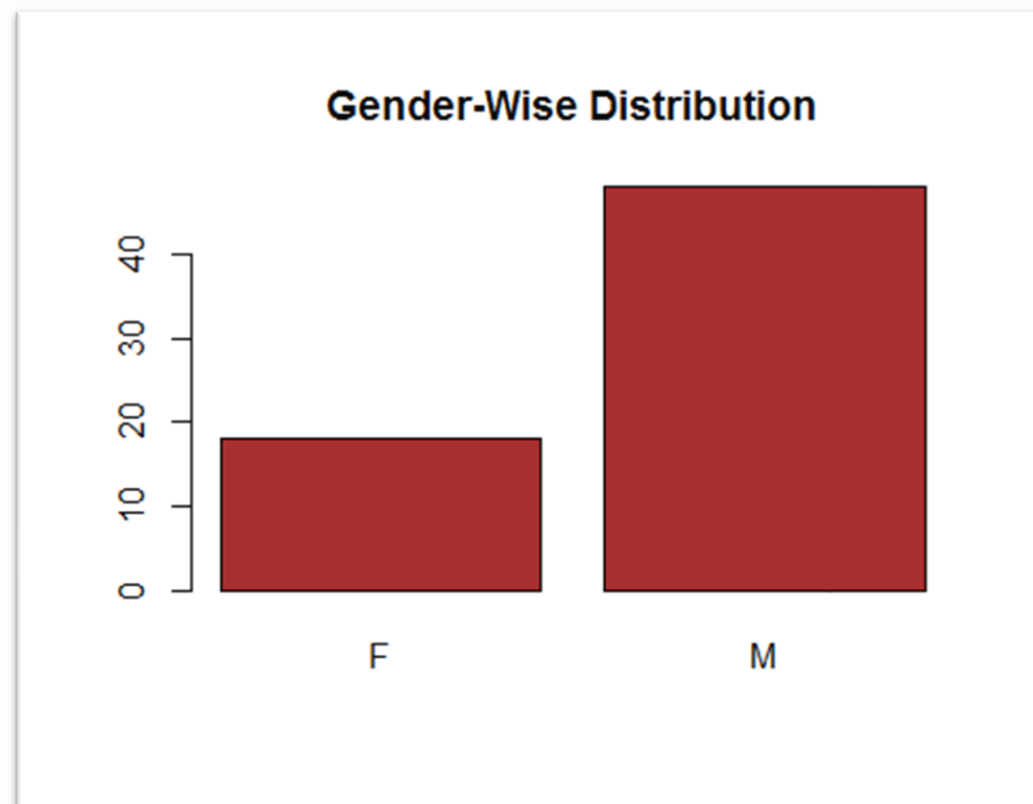


```
> ProductA <- c(12,43,25)  
> ProductB <- c(90,34,56)  
> rb <- rbind(ProductA,ProductB)  
> barplot(rb)
```



Bar Plot Examples

```
> barplot(table(Gender),col = "brown",main = "Gender-Wise Distribution")
```



Histogram

- Bar Plot on binned data can be said to be a histogram
- Difference between histogram and bar plot is that in bar plot we are free to rearrange the bars whereas in histogram we are not
- We can know the distribution of any variable with histogram

Syntax : `hist(x, breaks = "", include.lowest = TRUE, main = paste("Histogram of" ,
xname), xlim = range(breaks), xlab = xname, ylab, ...)`

Where x : numeric vector or a function which can generate a numeric
vector

breaks : specifying the number of breaks or a numeric vector of breaks

xlim : Scale of limits on X axis

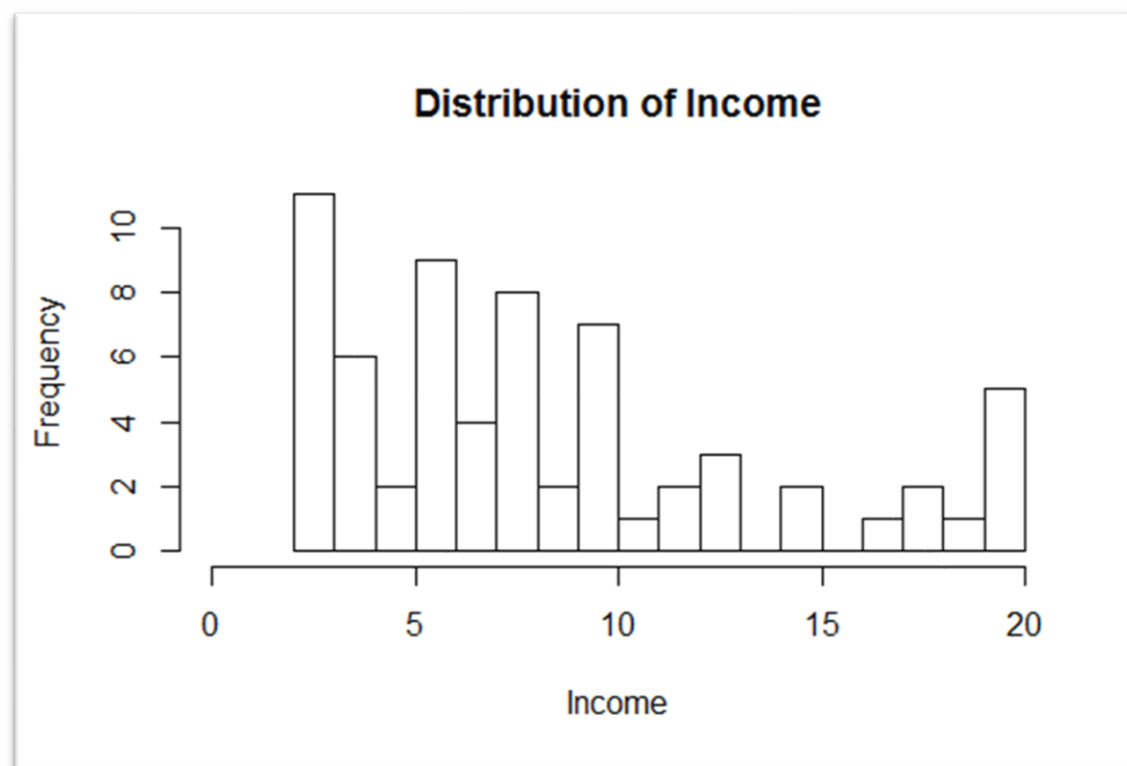
Histogram Examples

```
> hist(Income)
```



Histogram Examples

```
> hist(Income,breaks = 20,xlab="Income",  
+      main="Distribution of Income", xlim = c(0,20))
```



Scatter Plot

- Scatter Plot can be understood as plot of points on 2-dimensional space of XY-plane
- Scatter plot gives us the information about correlation between the two variables plotted

Syntax : `plot(x, y, type, col, pch...)`

Where x , y : numeric vector or a function generating numerical vector

type : p for points, l for lines, b for both, s for stair steps etc.

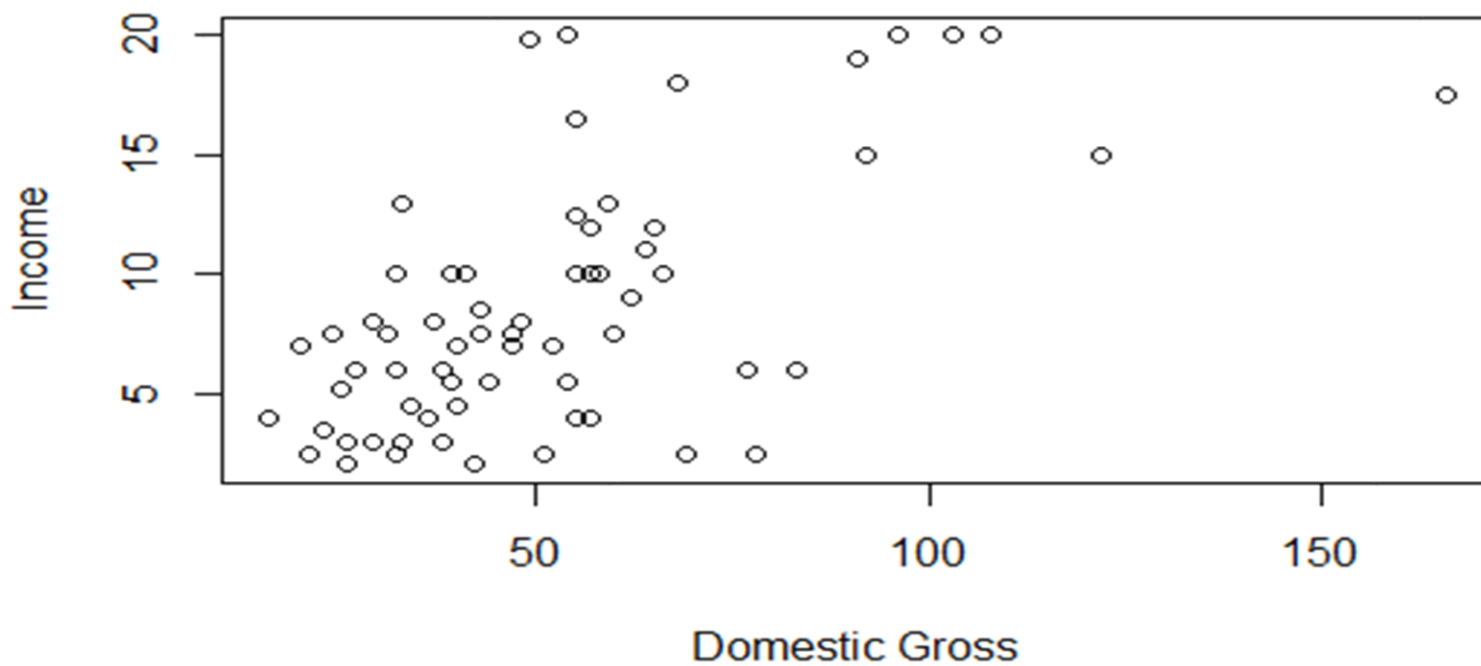
col : Colour of plotting character

pch : Plotting character



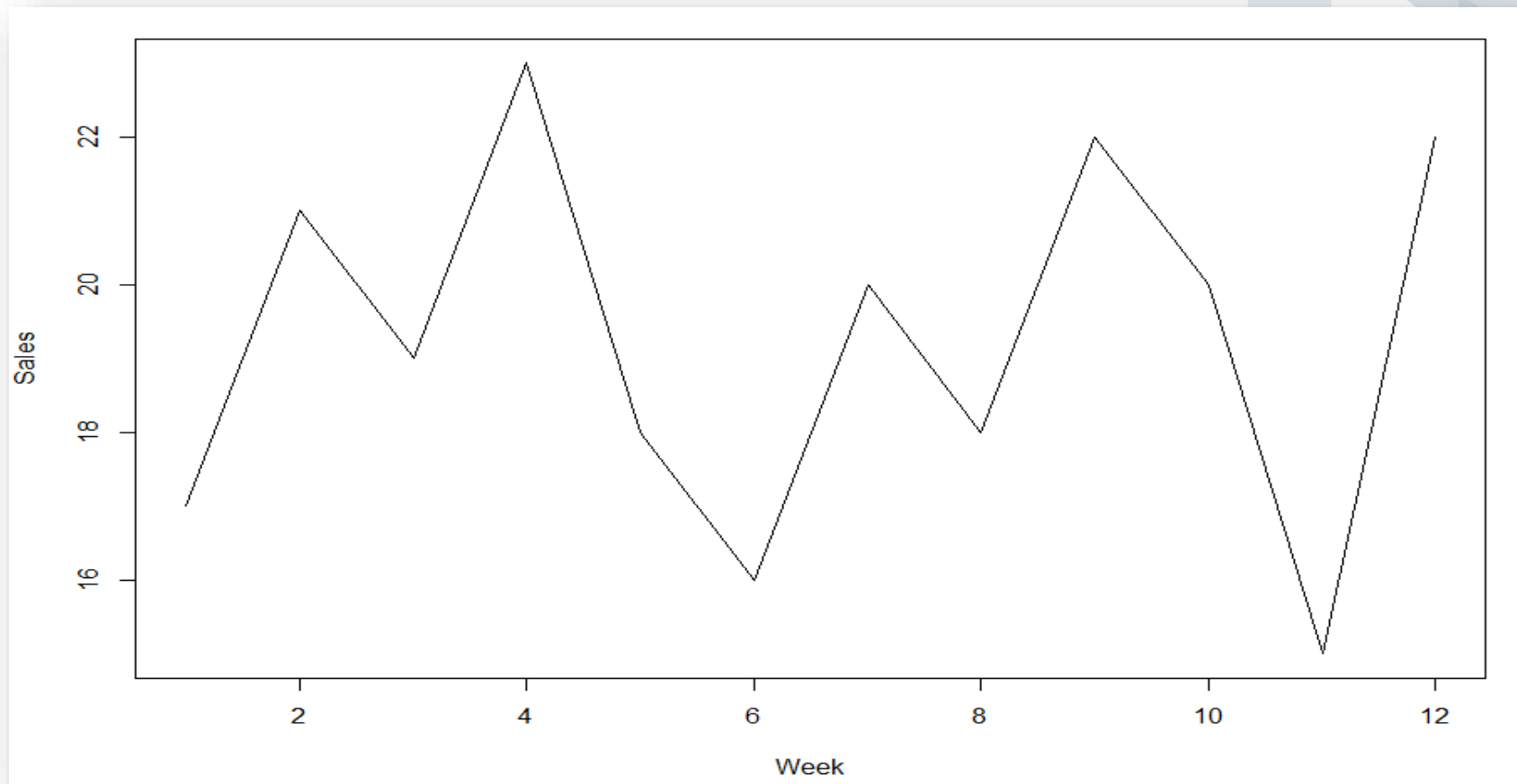
Scatter Plot Examples

```
> plot(Domestic.Gross,Income,xlab="Domestic Gross",ylab="Income")
```



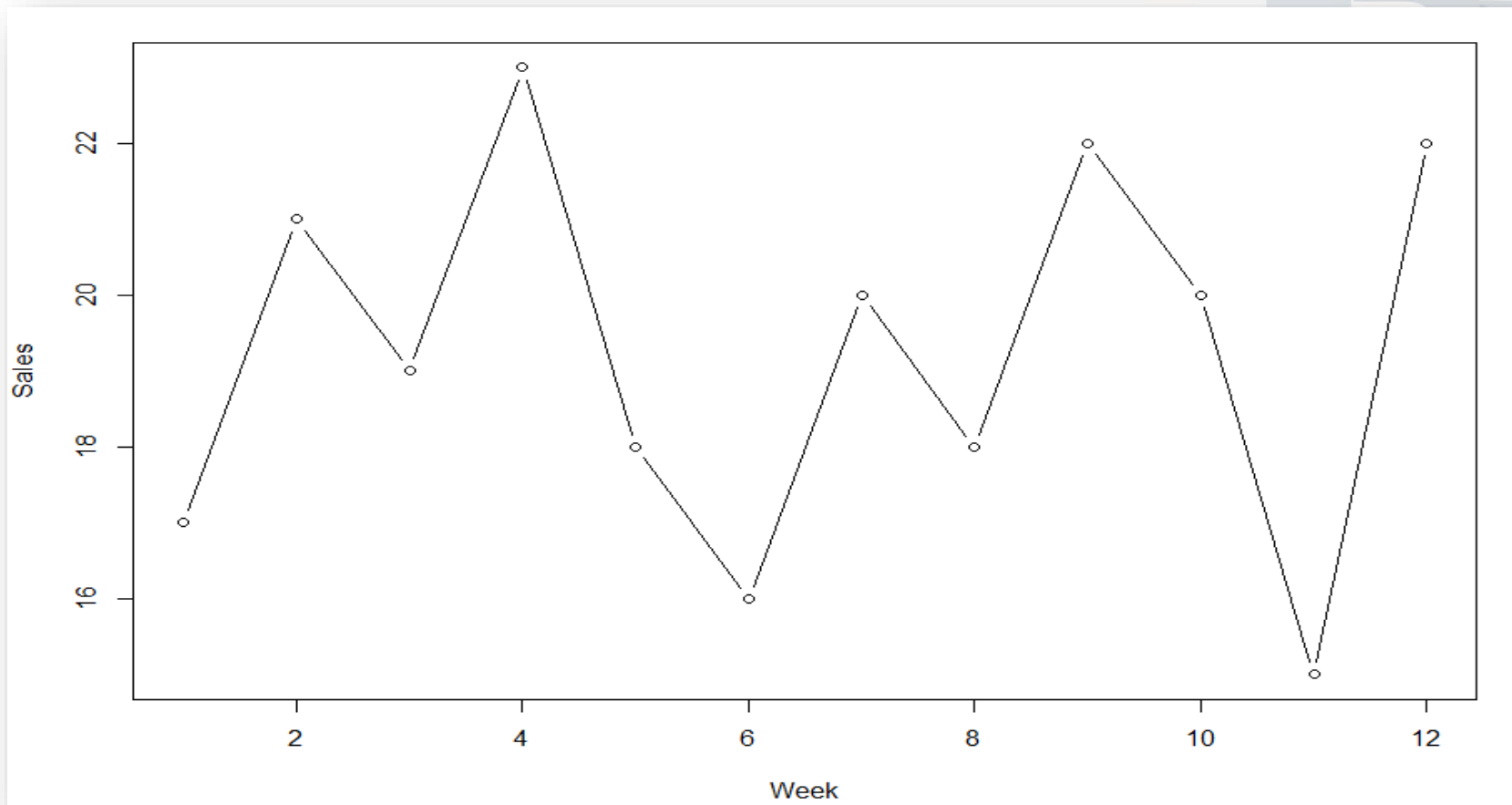
Line Plot using plot()

```
plot(gasoline$week,gasoline$Sales,xlab = "week",ylab = "Sales",type = 'l')
```



Line graph using plot()

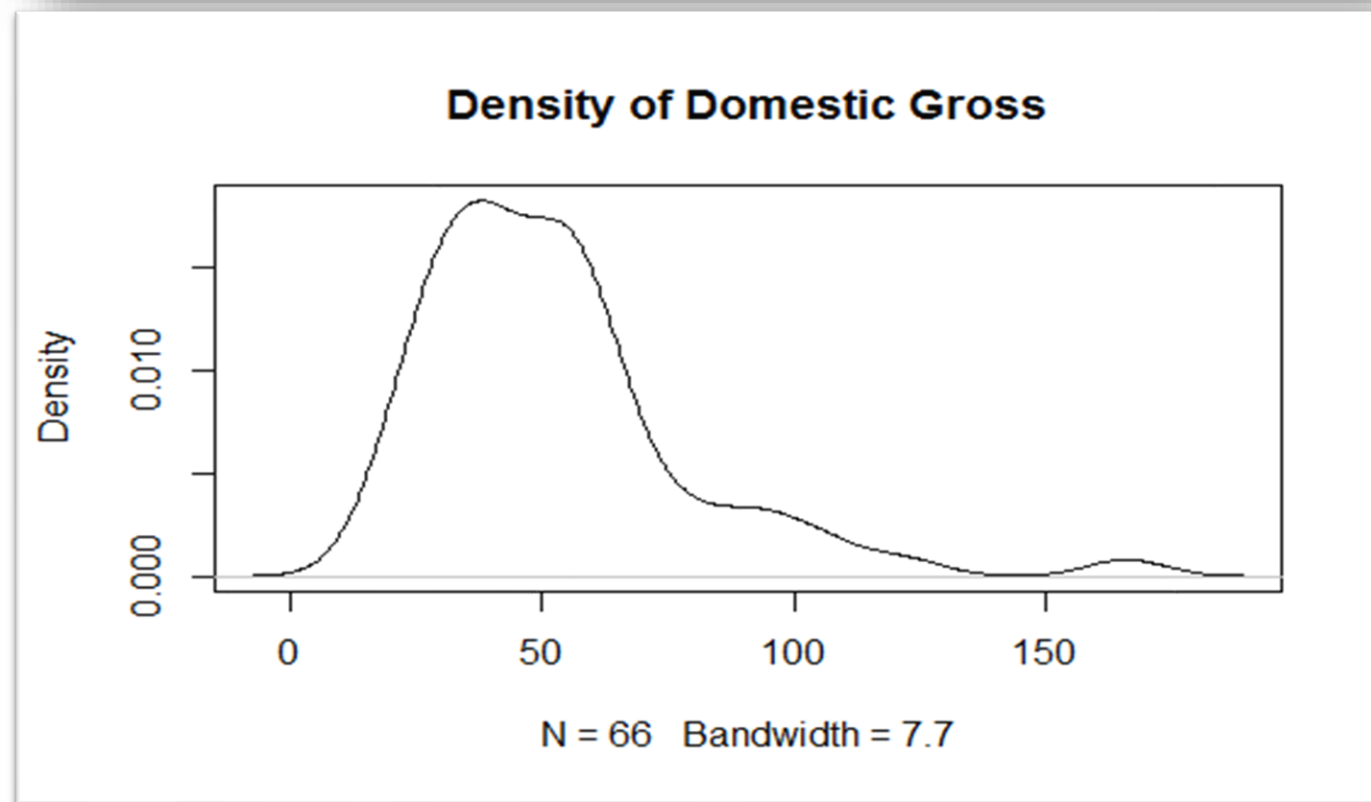
```
plot(gasoline$week,gasoline$sales,xlab = "week",ylab = "sales",type = 'b')
```



Density Plot

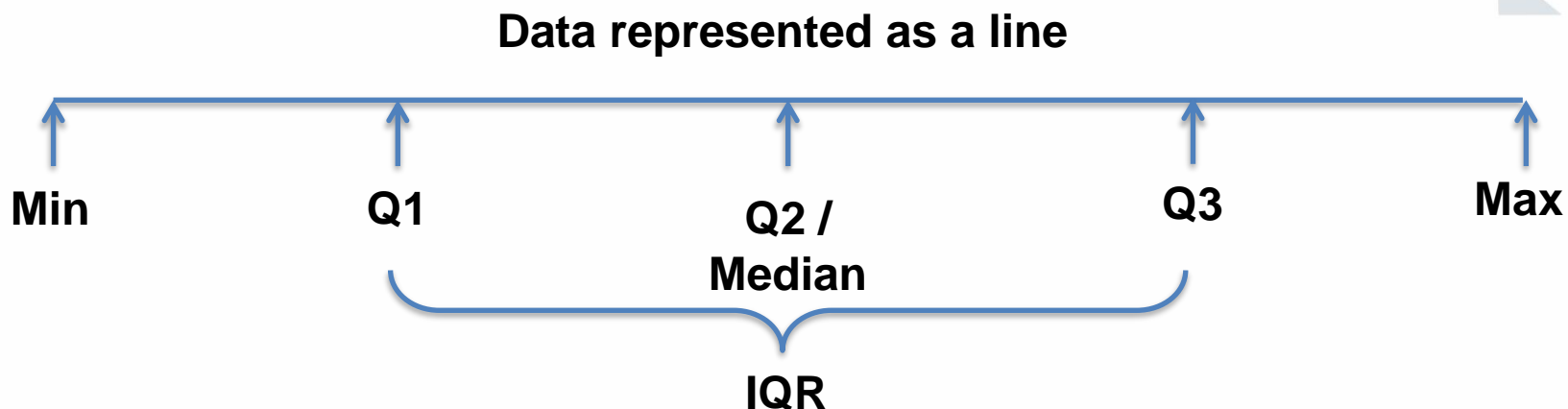
- Density plot is smoothened form of histogram
- Density plot can be plotted with function `plot()` by calling density function

```
> plot(density(Domestic.Gross),main="Density of Domestic Gross")
```



Boxplot

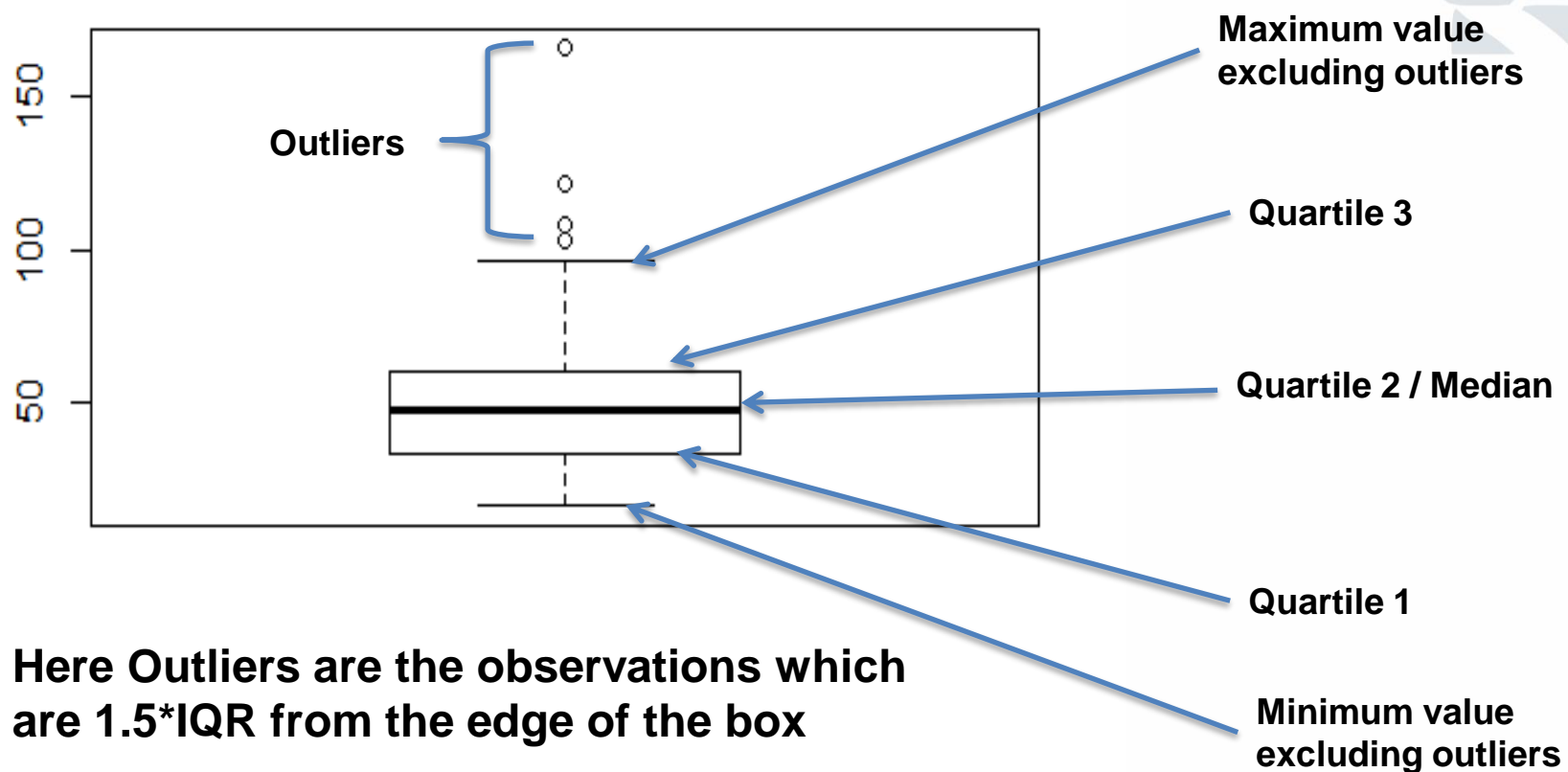
- Before we understand box plot we need to understand the quartiles
- Quartiles divide the given data into four equal parts.



- Inter-quartile range (IQR) is given by the formula:

$$IQR = Q3 - Q1$$

Describing with Box Plots



Boxplot

- Boxplot gives us the spread of the data

Syntax : `boxplot(x)`

Where `x` : numeric vector

OR

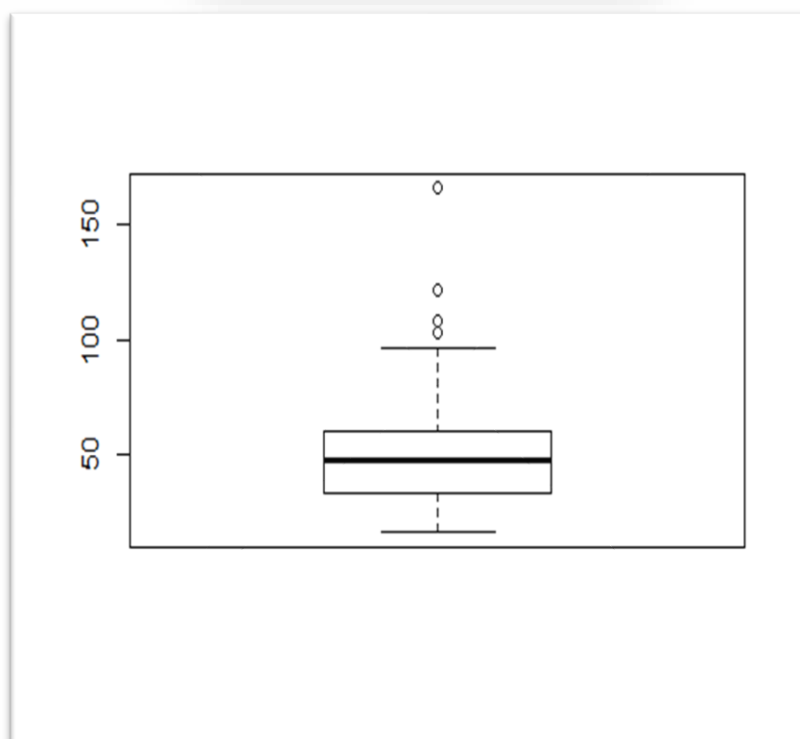
`boxplot(y ~ x)`

Where `y` : numeric vector

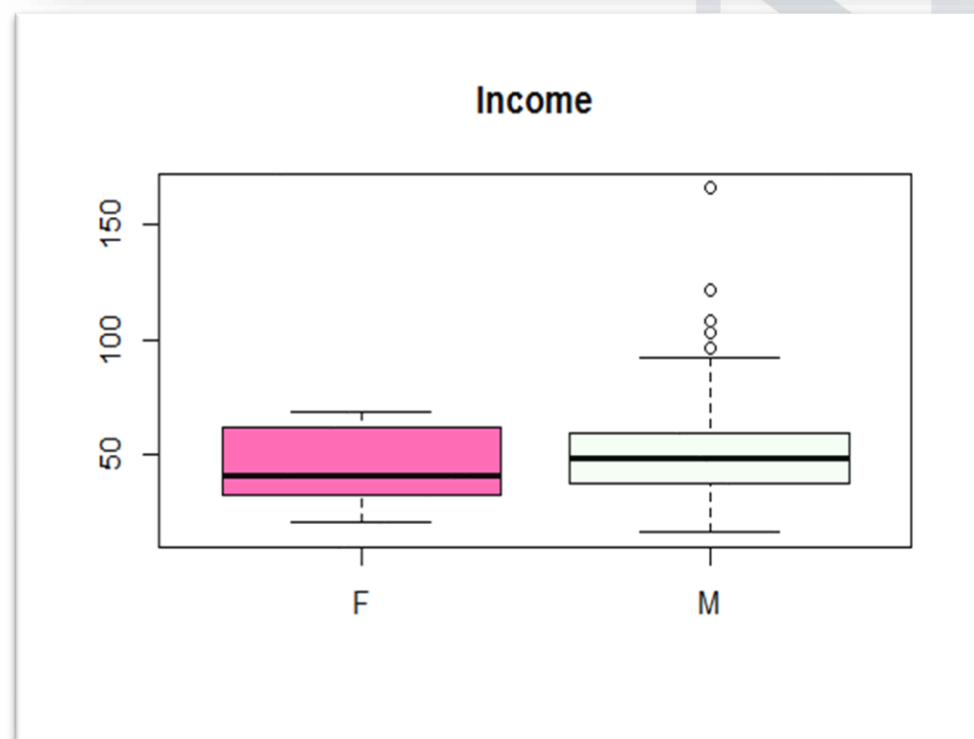
`x` : factor

Boxplot Examples

```
> boxplot(Domestic.Gross)
```



```
> boxplot(Domestic.Gross ~ Gender,  
+         col = c("hotpink", "honeydew1"), main="Income")
```



Boxplot Examples

```
> boxplot(Domestic.Gross,horizontal = TRUE,main="Domestic Gross")
```

