

# Graphical Representation of data

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Bar plots

Pie Diagrams

Box plots

Scatter Diagrams

Histograms

## Bar Plots:

- ✓ A bar chart is constructed to show frequencies of different categories of categorical variables in a given data.
  - ✓ The horizontal axis represents the different categories and in vertical axis is used to show the number of cases(frequency)
  - ✓ Code: `barplot()`
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## Example

Draw Bar plot of the following data

Year	Sales
1995	15.0
1996	25.0
1997	27.0
1998	28.0
1999	26.0
2000	26.6

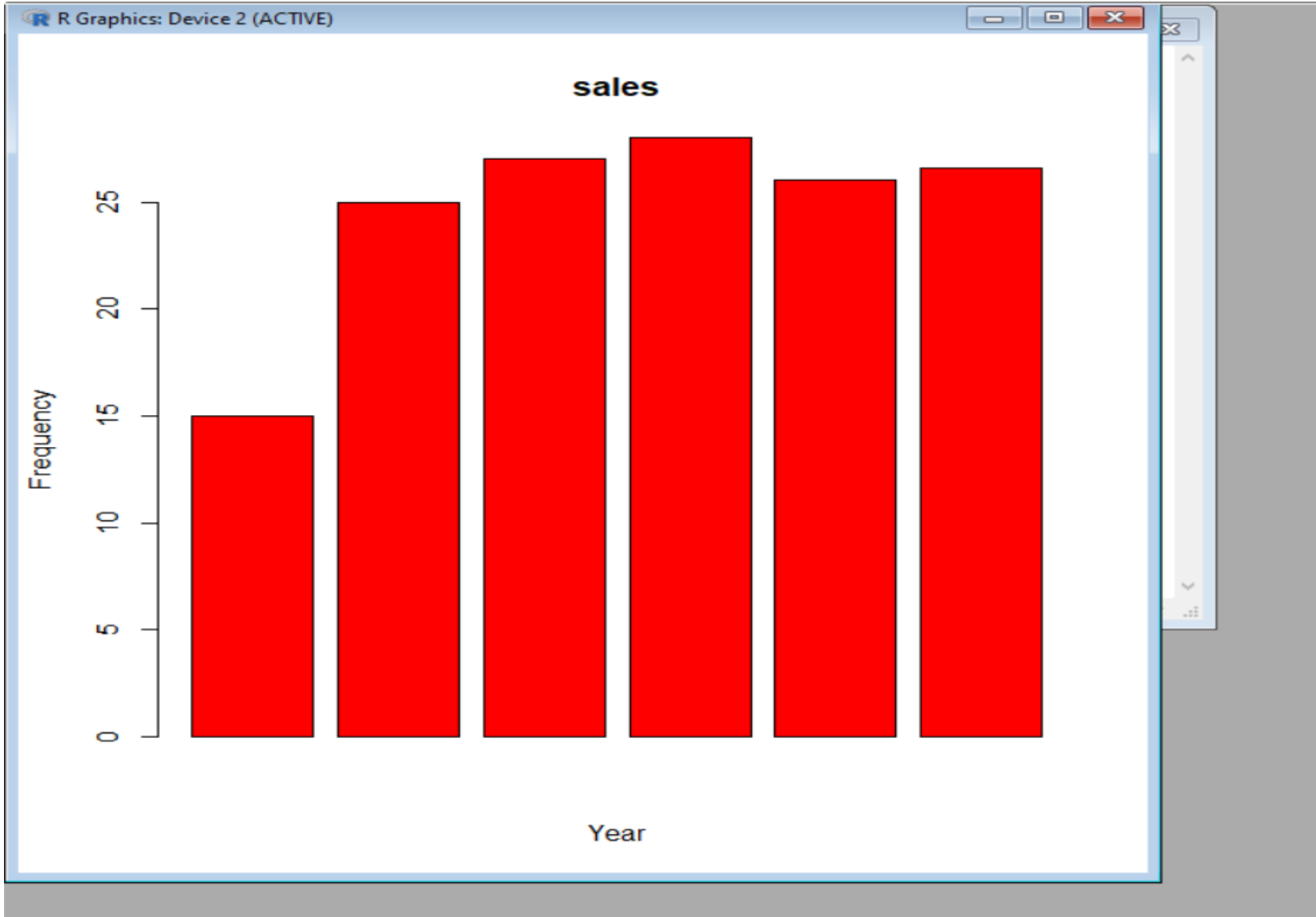


R Console

```
> year=c(1995,1996,1997,1998,1999,2000)
> sale=c(15.0,25.0,27.0,28.0,26.0,26.6)
> sales=data.frame(year,sale)
> attach(sales)
The following objects are masked _by_ .GlobalEnv:
    sale, year
> barplot(sale,xlab="Year",ylab="Frequency",main="sales",col="red")
> detach(sales)
> |
```

Untitled - R Editor

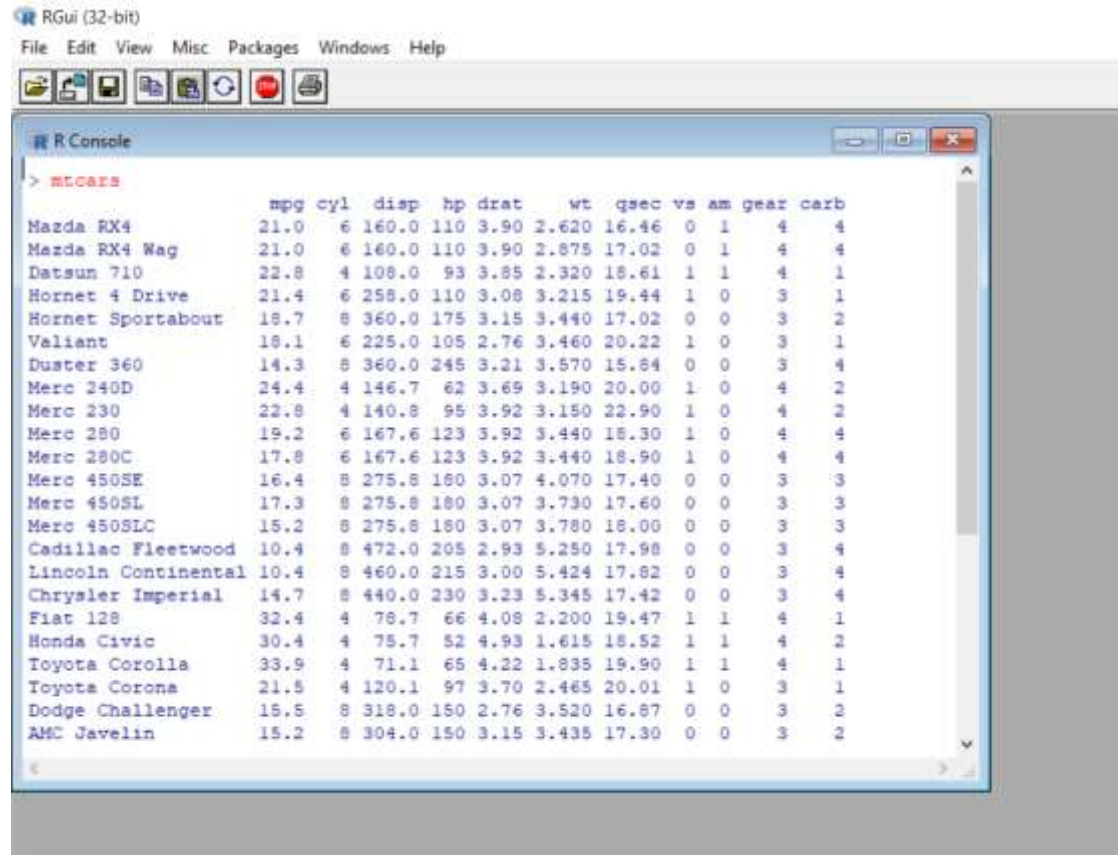
```
year=c(1995,1996,1997,1998,1999,2000)
sale=c(15.0,25.0,27.0,28.0,26.0,26.6)
sales=data.frame(year,sale)
attach(sales)
barplot(sale,xlab="Year",ylab="Frequency",main="sales",col="red")
detach(sales)|
```



## Subdivided Bar diagrams:

- ✓ It is used to represent data relating to brake up of one variable into several components.
- ✓ Here the bar is divided into segments, each segments representing a component of corresponding category.

For drawing subdivided bar diagram we explore data in R which is called `mtcars`



The screenshot shows the RGui (32-bit) interface with the R Console window open. The console displays the command `> mtcars` and the resulting data frame. The data frame has 11 columns: `mpg`, `cyl`, `disp`, `hp`, `drat`, `wt`, `qsec`, `vs`, `am`, `gear`, and `carb`. The rows represent various car models, including Mazda RX4, Datsun 710, Hornet 4 Drive, Valiant, Duster 360, Merc 240D, Merc 230, Merc 280, Merc 280C, Merc 450SE, Merc 450SL, Merc 450SLC, Cadillac Fleetwood, Lincoln Continental, Chrysler Imperial, Fiat 128, Honda Civic, Toyota Corolla, Toyota Corona, Dodge Challenger, and AMC Javelin.

```
> mtcars
      mpg  cyl  disp  hp drat   wt  qsec vs  am gear carb
Mazda RX4    21.0   6  160.0  110 3.90 2.620 16.46 0   1   4   4
Mazda RX4 Wag    21.0   6  160.0  110 3.90 2.875 17.02 0   1   4   4
Datsun 710     22.8   4  108.0   93 3.85 2.320 18.61 1   1   4   1
Hornet 4 Drive  21.4   6  258.0  110 3.08 3.215 19.44 1   0   3   1
Hornet Sportabout 18.7   8  360.0  175 3.15 3.440 17.02 0   0   3   2
Valiant       18.1   6  225.0  105 2.76 3.460 20.22 1   0   3   1
Duster 360    14.3   8  360.0  245 3.21 3.570 15.84 0   0   3   4
Merc 240D     24.4   4  146.7   62 3.69 3.190 20.00 1   0   4   2
Merc 230      22.8   4  140.8   95 3.92 3.150 22.90 1   0   4   2
Merc 280      19.2   6  167.6  123 3.92 3.440 18.30 1   0   4   4
Merc 280C     17.8   6  167.6  123 3.92 3.440 18.90 1   0   4   4
Merc 450SE    16.4   8  275.8  180 3.07 4.070 17.40 0   0   3   3
Merc 450SL    17.3   8  275.8  180 3.07 3.730 17.60 0   0   3   3
Merc 450SLC   15.2   8  275.8  180 3.07 3.780 18.00 0   0   3   3
Cadillac Fleetwood 10.4   8  472.0  205 2.93 5.250 17.98 0   0   3   4
Lincoln Continental 10.4   8  460.0  215 3.00 5.424 17.82 0   0   3   4
Chrysler Imperial 14.7   8  440.0  230 3.23 5.345 17.42 0   0   3   4
Fiat 128      32.4   4   78.7   66 4.08 2.200 19.47 1   1   4   1
Honda Civic   30.4   4   75.7   52 4.93 1.615 18.52 1   1   4   2
Toyota Corolla 33.9   4   71.1   65 4.22 1.835 19.90 1   1   4   1
Toyota Corona 21.5   4  120.1   97 3.70 2.465 20.01 1   0   3   1
Dodge Challenger 15.5   8  318.0  150 2.76 3.520 16.87 0   0   3   2
AMC Javelin   15.2   8  304.0  150 3.15 3.435 17.30 0   0   3   2
```

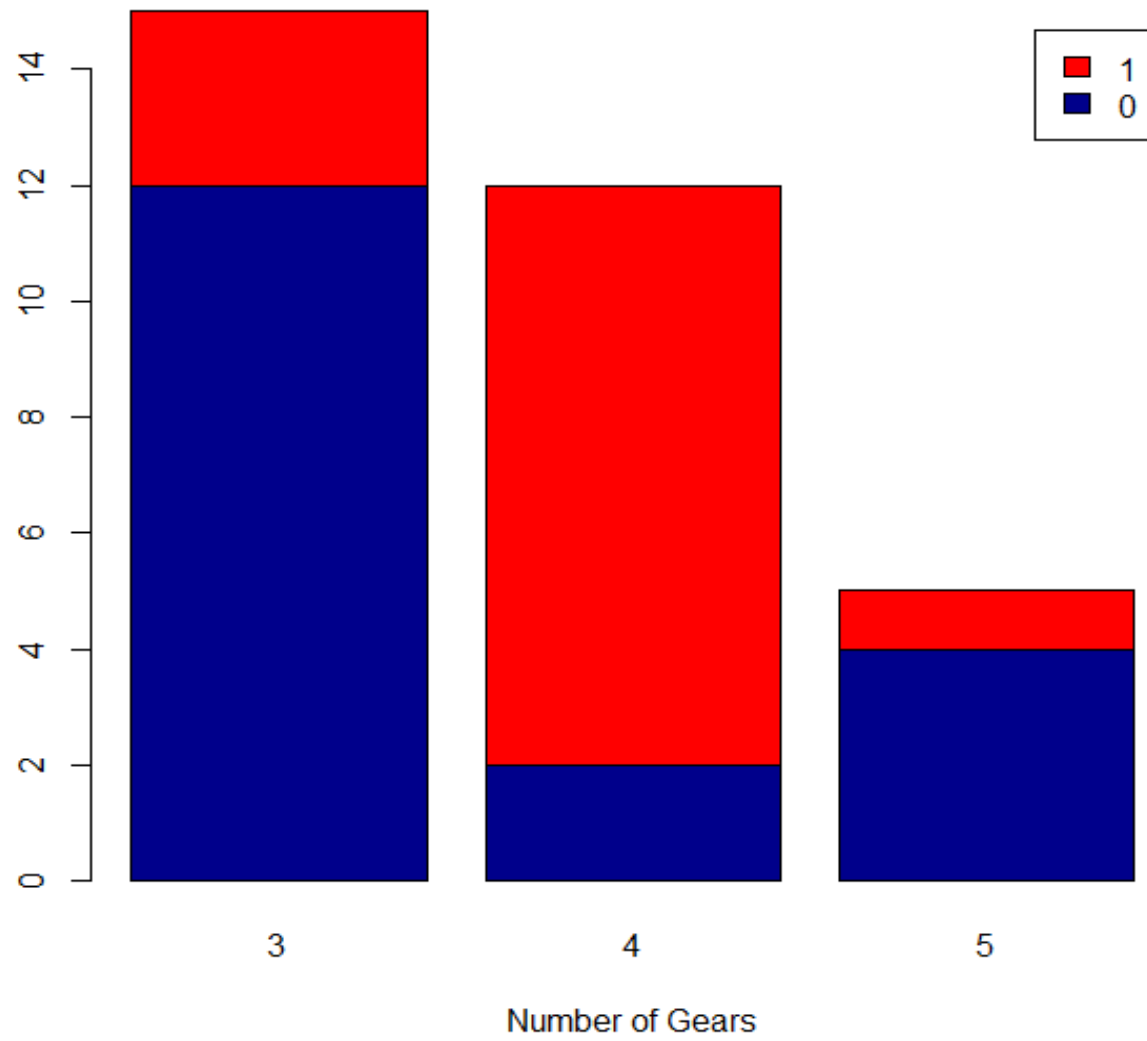


```
Merc 450SL      17.3   8 275.8 180 3.07 3.730 17.60  0  0   3  3
Merc 450SLC    15.2   8 275.8 180 3.07 3.780 18.00  0  0   3  3
Cadillac Fleetwood 10.4   8 472.0 205 2.93 5.250 17.98  0  0   3  4
Lincoln Continental 10.4   8 460.0 215 3.00 5.424 17.82  0  0   3  4
Chrysler Imperial 14.7   8 440.0 230 3.23 5.345 17.42  0  0   3  4
Fiat 128       32.4   4  78.7  66 4.08 2.200 19.47  1  1   4  1
Honda Civic    30.4   4  75.7  52 4.93 1.615 18.52  1  1   4  2
Toyota Corolla 33.9   4  71.1  65 4.22 1.835 19.90  1  1   4  1
Toyota Corona 21.5   4 120.1  97 3.70 2.465 20.01  1  0   3  1
Dodge Challenger 15.5   8 318.0 150 2.76 3.520 16.87  0  0   3  2
AMC Javelin   15.2   8 304.0 150 3.15 3.435 17.30  0  0   3  2
Camaro Z28    13.3   8 350.0 245 3.73 3.840 15.41  0  0   3  4
Pontiac Firebird 19.2   8 400.0 175 3.08 3.845 17.05  0  0   3  2
Fiat X1-9     27.3   4  79.0  66 4.08 1.935 18.90  1  1   4  1
Porsche 914-2 26.0   4 120.3  91 4.43 2.140 16.70  0  1   5  2
Lotus Europa  30.4   4  95.1 113 3.77 1.513 16.90  1  1   5  2
Ford Pantera L 15.8   8 351.0 264 4.22 3.170 14.50  0  1   5  4
Ferrari Dino  19.7   6 145.0 175 3.62 2.770 15.50  0  1   5  6
Maserati Bora 15.0   8 301.0 335 3.54 3.570 14.60  0  1   5  8
Volvo 142E    21.4   4 121.0 109 4.11 2.780 18.60  1  1   4  2
```

```
> counts <- table(mtcars$vs, mtcars$gear)
> barplot(counts, main="Car Distribution by Gears and VS",
+   xlab="Number of Gears", col=c("darkblue","red"),
+   legend = rownames(counts))
> |
```

```
mtcars
counts <- table(mtcars$vs, mtcars$gear)
barplot(counts, main="Car Distribution by Gears and VS",
  xlab="Number of Gears", col=c("darkblue","red"),
  legend = rownames(counts))
```

**Car Distribution by Gears and VS**



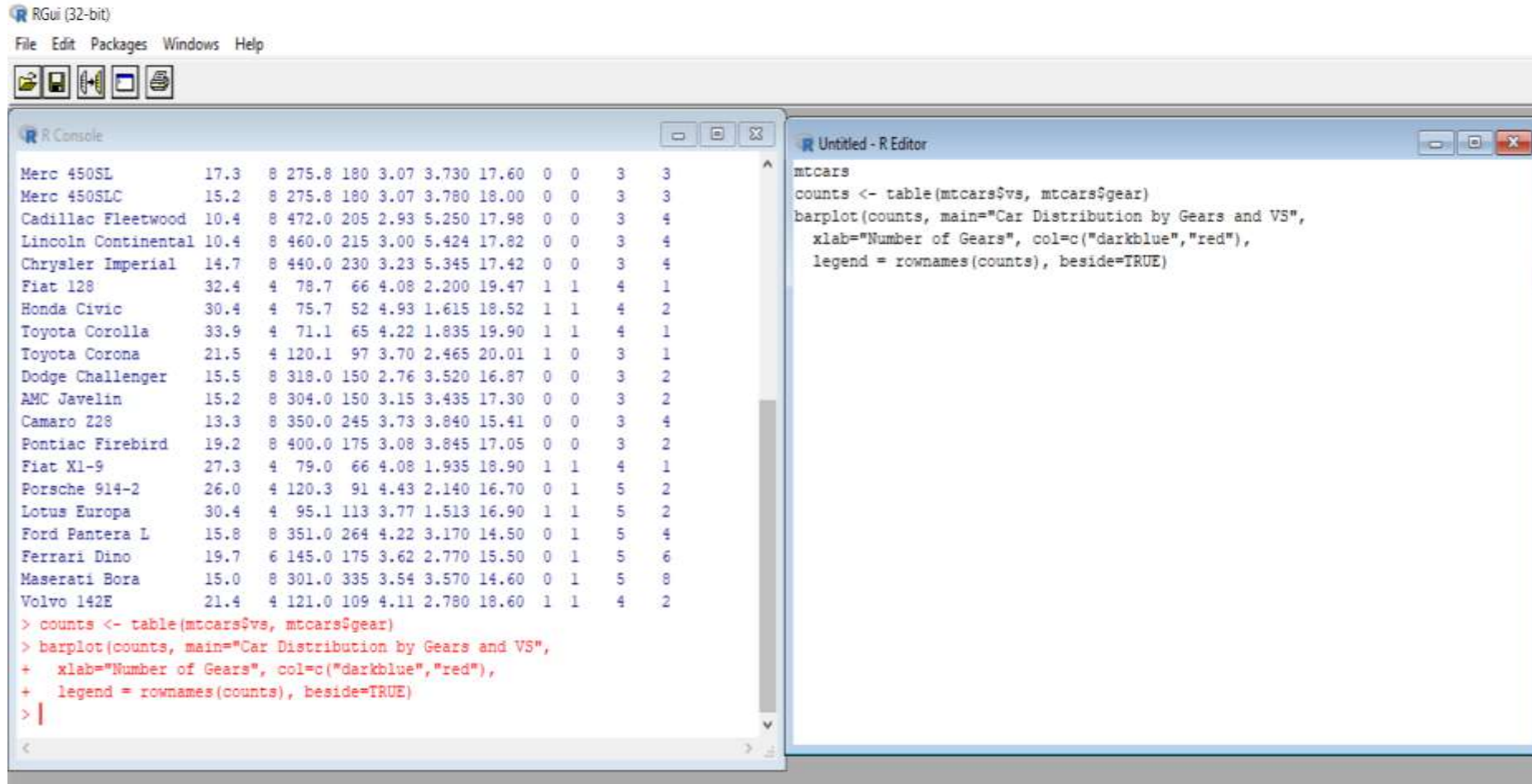
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## Multiple Bar diagrams:

- ✓ Used for two or three dimensional comparisons.
- ✓ chart with the group variable side by side.

Here also we use the data of mtcars



The screenshot shows the RGui (32-bit) interface. The R Console window displays the following data table:

Merc 450SL	17.3	8	275.8	180	3.07	3.730	17.60	0	0	3	3
Merc 450SLC	15.2	8	275.8	180	3.07	3.780	18.00	0	0	3	3
Cadillac Fleetwood	10.4	8	472.0	205	2.93	5.250	17.98	0	0	3	4
Lincoln Continental	10.4	8	460.0	215	3.00	5.424	17.82	0	0	3	4
Chrysler Imperial	14.7	8	440.0	230	3.23	5.345	17.42	0	0	3	4
Fiat 128	32.4	4	78.7	66	4.08	2.200	19.47	1	1	4	1
Honda Civic	30.4	4	75.7	52	4.93	1.615	18.52	1	1	4	2
Toyota Corolla	33.9	4	71.1	65	4.22	1.835	19.90	1	1	4	1
Toyota Corona	21.5	4	120.1	97	3.70	2.465	20.01	1	0	3	1
Dodge Challenger	15.5	8	318.0	150	2.76	3.520	16.87	0	0	3	2
AMC Javelin	15.2	8	304.0	150	3.15	3.435	17.30	0	0	3	2
Camaro Z28	13.3	8	350.0	245	3.73	3.840	15.41	0	0	3	4
Pontiac Firebird	19.2	8	400.0	175	3.08	3.845	17.05	0	0	3	2
Fiat X1-9	27.3	4	79.0	66	4.08	1.935	18.90	1	1	4	1
Porsche 914-2	26.0	4	120.3	91	4.43	2.140	16.70	0	1	5	2
Lotus Europa	30.4	4	95.1	113	3.77	1.513	16.90	1	1	5	2
Ford Pantera L	15.8	8	351.0	264	4.22	3.170	14.50	0	1	5	4
Ferrari Dino	19.7	6	145.0	175	3.62	2.770	15.50	0	1	5	6
Maserati Bora	15.0	8	301.0	335	3.54	3.570	14.60	0	1	5	8
Volvo 142E	21.4	4	121.0	109	4.11	2.780	18.60	1	1	4	2

The R Editor window shows the following R code:

```
mtcars
counts <- table(mtcars$vs, mtcars$gear)
barplot(counts, main="Car Distribution by Gears and VS",
        xlab="Number of Gears", col=c("darkblue","red"),
        legend = rownames(counts), beside=TRUE)
```

The R Console shows the following R code and output:

```
> counts <- table(mtcars$vs, mtcars$gear)
> barplot(counts, main="Car Distribution by Gears and VS",
+         xlab="Number of Gears", col=c("darkblue","red"),
+         legend = rownames(counts), beside=TRUE)
> |
```



### Car Distribution by Gears and VS

