R语言基础

第三讲

R 语言画图

描述性作图

- 点图
- 线状图(Line Charts)
- 条形图(Barplots)
- 饼图(Pie Charts)
- 直方图(Histogram)
- 箱形图(Boxplot)
- 散点图(Scatter plots)

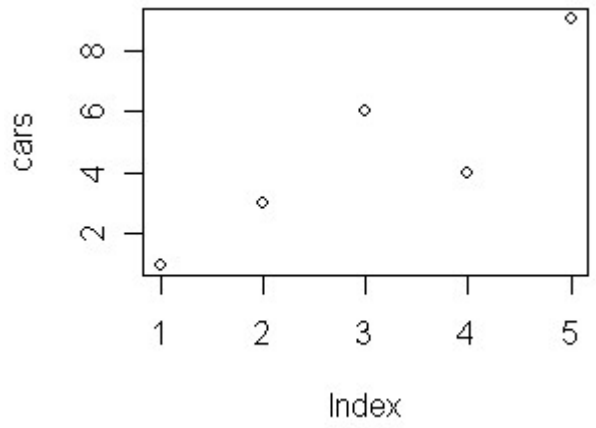
常用统计学作图

- 热图（Heatmap）

点图&线状图(Line Charts)

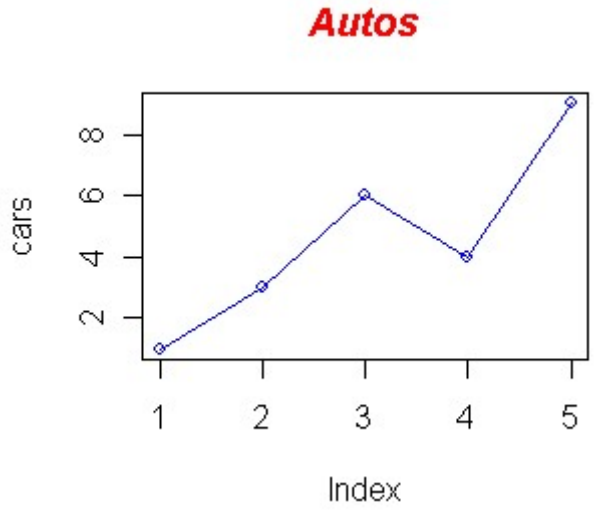
先画一个简单的点状图

```
# Define the cars vector with 5 values
cars <- c(1, 3, 6, 4, 9)

# Graph the cars vector with all defaults
plot(cars)
```



在图上加上标题、连线以及一些颜色

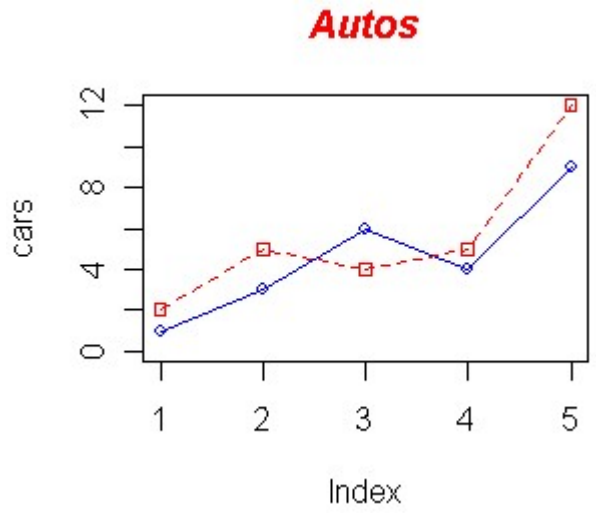
```
# Define the cars vector with 5 values
cars <- c(1, 3, 6, 4, 9)

# Graph cars using blue points overlayed by a line
plot(cars, type="o", col="blue")

# Create a title with a red, bold/italic font
title(main="Autos", col.main="red", font.main=4)
```



线状图(Line Charts)

为trucks数据加上红色的虚线，定义Y轴的范围，使y轴长度能覆盖trucks数据

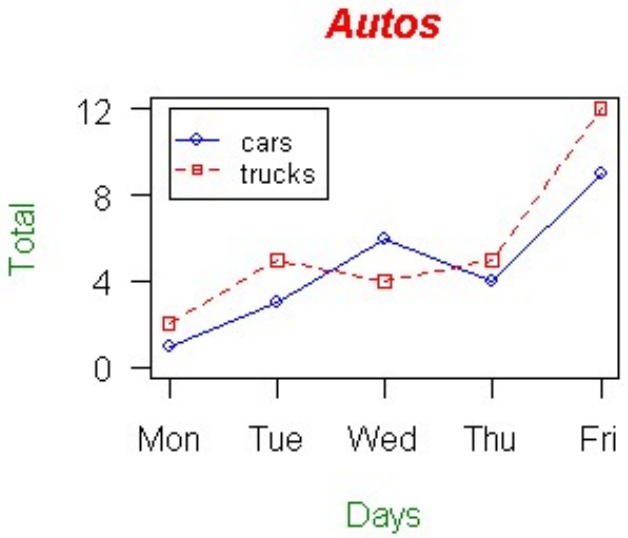
```
# Define 2 vectors
cars <- c(1, 3, 6, 4, 9)
trucks <- c(2, 5, 4, 5, 12)

# Graph cars using a y axis that ranges from 0 to 12
plot(cars, type="o", col="blue", ylim=c(0,12))

# Graph trucks with red dashed line and square points
lines(trucks, type="o", pch=22, lty=2, col="red")

# Create a title with a red, bold/italic font
title(main="Autos", col.main="red", font.main=4)
```



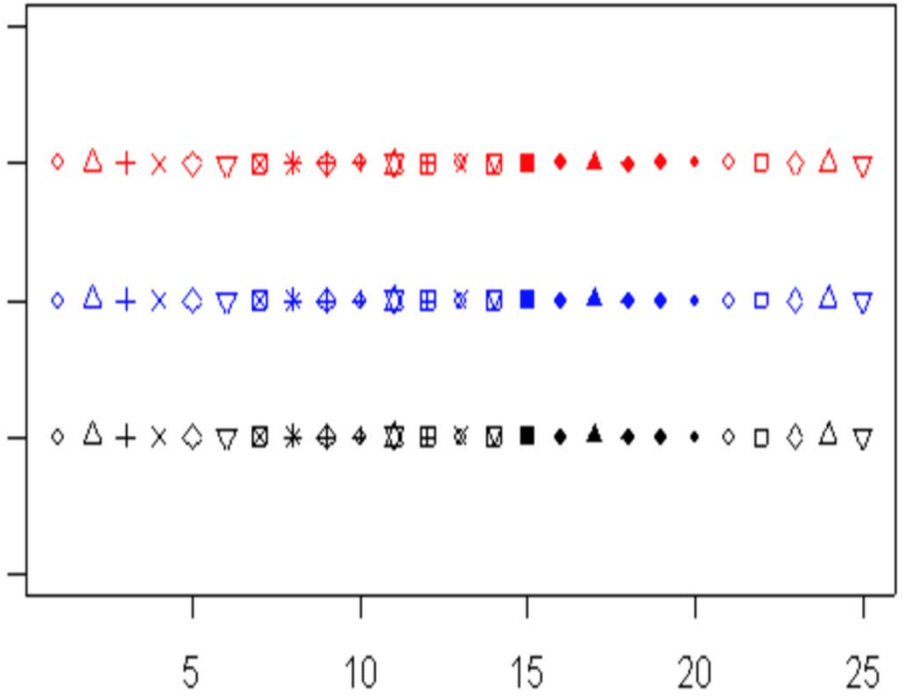
线状图(Line Charts)

```
# Define 2 vectors
cars <- c(1, 3, 6, 4, 9)
trucks <- c(2, 5, 4, 5, 12)

# Calculate range from 0 to max value of cars and trucks
g_range <- range(0, cars, trucks)

# Graph autos using y axis that ranges from 0 to max
# value in cars or trucks vector.  Turn off axes and
# annotations (axis labels) so we can specify them ourself
plot(cars, type="o", col="blue", ylim=g_range,
   axes=FALSE, ann=FALSE)

# Make x axis using Mon-Fri labels
axis(1, at=1:5, lab=c("Mon","Tue","Wed","Thu","Fri"))

# Make y axis with horizontal labels that display ticks at
# every 4 marks. 4*0:g_range[2] is equivalent to c(0,4,8,12)
axis(2, las=1, at=4*0:g_range[2])

# Create box around plot
box()

# Graph trucks with red dashed line and square points
lines(trucks, type="o", pch=22, lty=2, col="red")

# Create a title with a red, bold/italic font
title(main="Autos", col.main="red", font.main=4)
```

```
# Label the x and y axes with dark green text
title(xlab="Days", col.lab=rgb(0,0.5,0))
title(ylab="Total", col.lab=rgb(0,0.5,0))

# Create a legend at (1, g_range[2]) that is slightly smaller
# (cex) and uses the same line colors and points used by
# the actual plots
legend(1, g_range[2], c("cars","trucks"), cex=0.8,
   col=c("blue","red"), pch=21:22, lty=1:2);
```



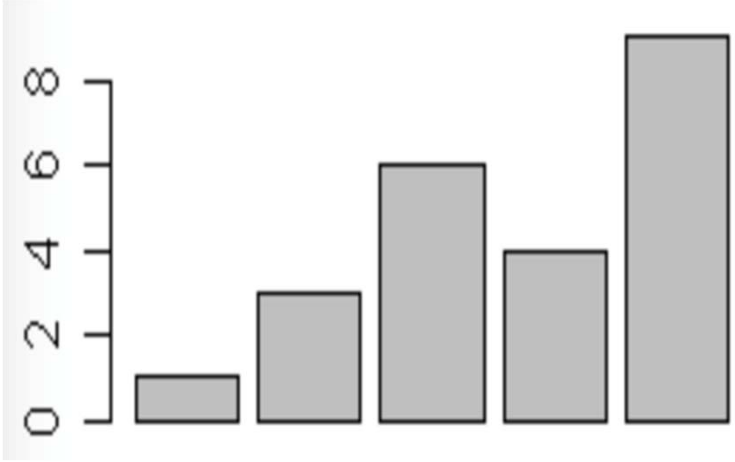
pch参数代码



长条图(Bar Charts)

简单的长条图

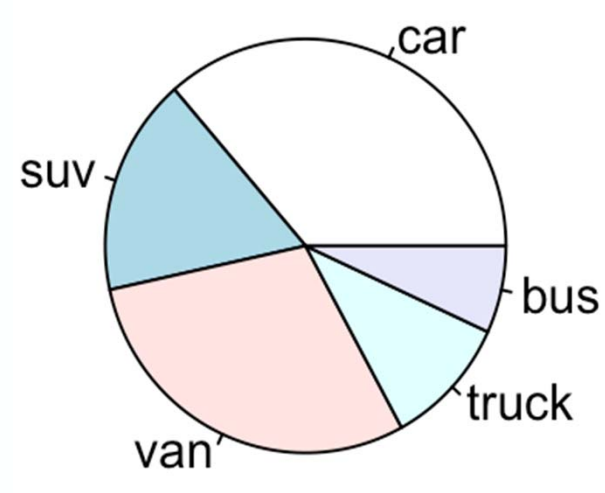
```
# Define the cars vector with 5 values
cars <- c(1, 3, 6, 4, 9)
# Graph cars
barplot(cars)
```



饼图(Pie Charts)

某机动车租赁公司有五个种类的机动车，生成数据并画饼图

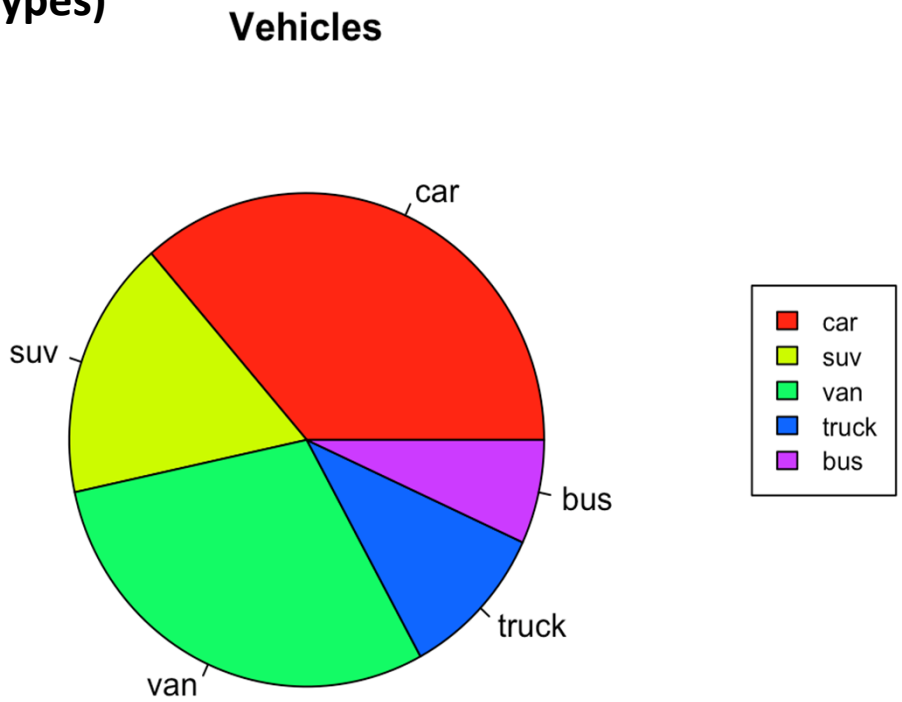
```
vehicles <- c(32, 15, 26, 9, 6)
pie(vehicles, labels = c("car", "suv", "van", "truck", "bus"))
```



饼图(Pie Charts)

该换颜色并在图旁标注说明框

```
lab <- c("car", "suv", "van", "truck", "bus")
color.types <- rainbow(length(vehicles))
pie(vehicles, main="Vehicles", col=color.types, labels=lab)
legend(1.5, 0.5, lab, cex=0.8, fill=color.types)
```



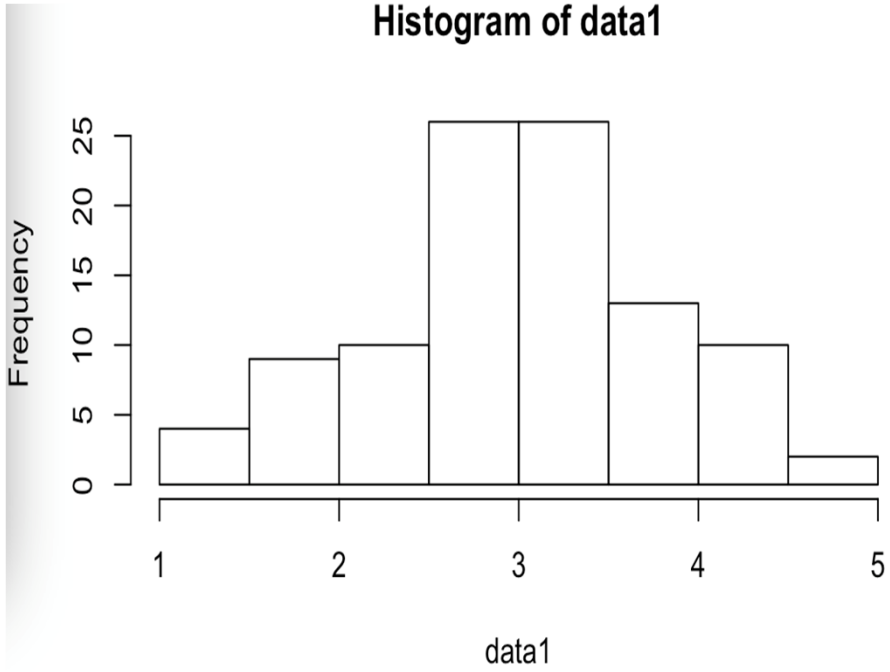
直方图(Histogram)

随机生成正态分布数据，有100个元素，均值为3, 标准差为0.9

```
data1 <- rnorm(100, mean=3, sd=.9)
```

画一个简易的直方图

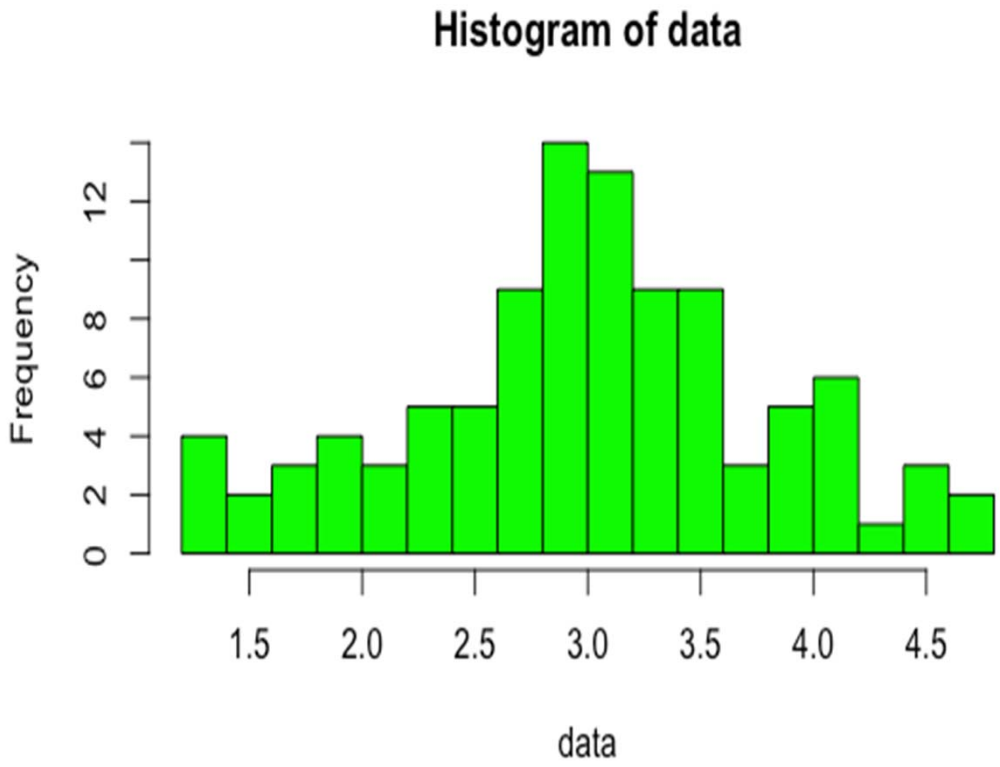
```
hist(data1)
```



直方图(Histogram)

使直方图间隔更密集并填充颜色

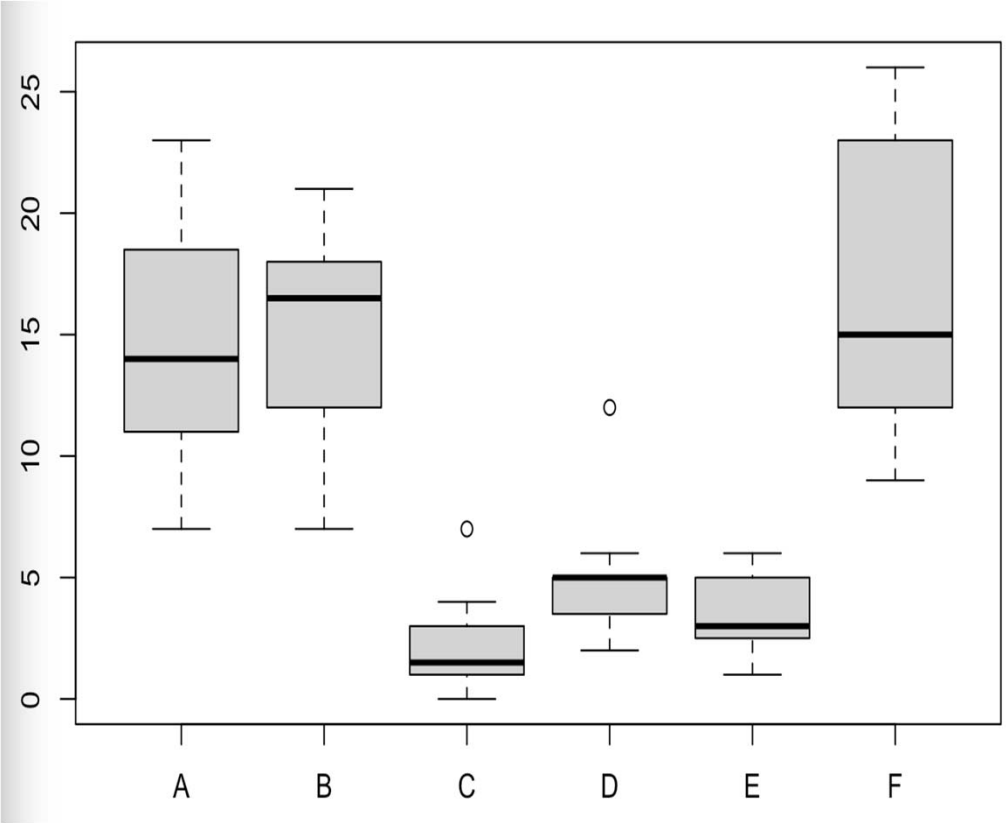
hist(data1, breaks = 20, col = "green")



箱式图(Boxplots)

用R的自带数据InsectSprays画箱式图 :

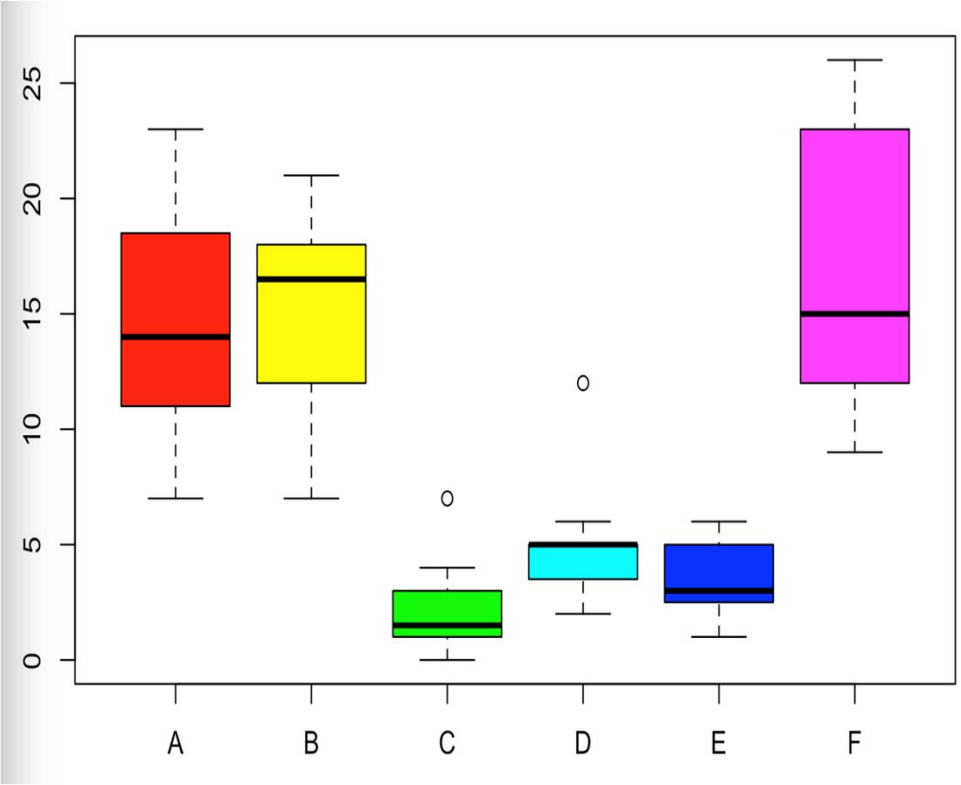
```
boxplot(count ~ spray, data = InsectSprays, col = "lightgray")
```



箱式图(Boxplots)

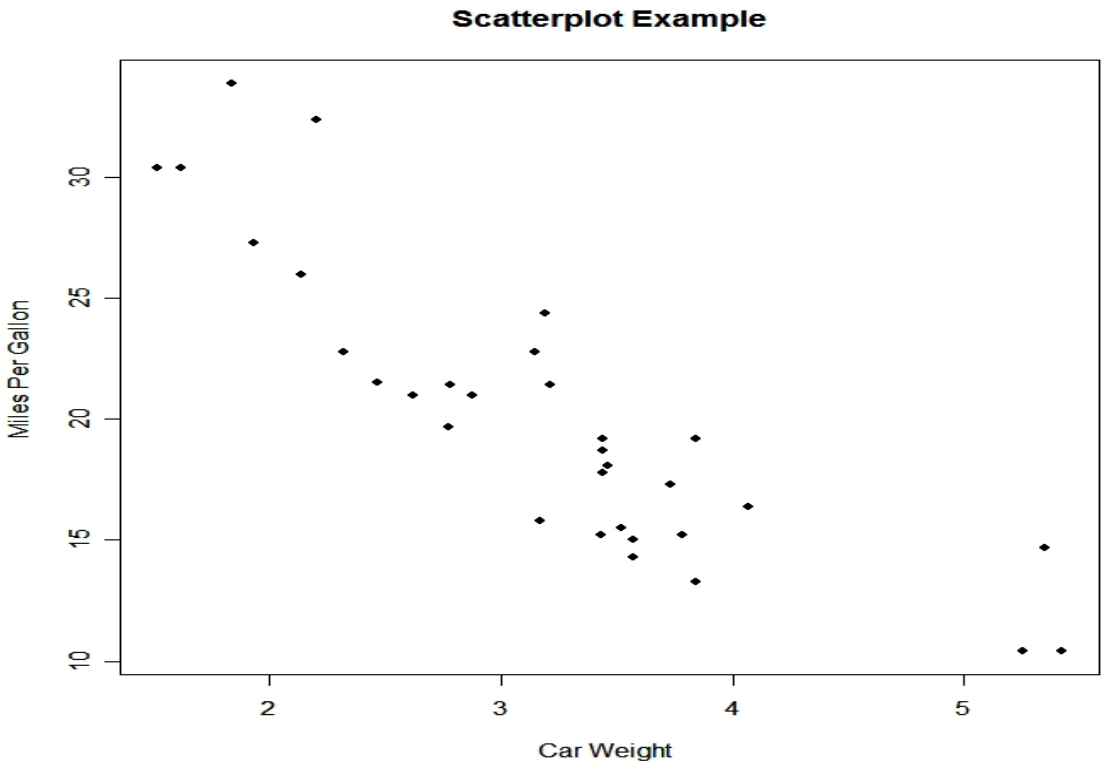
给每个box充填上不同的颜色

```
boxplot(count ~ spray, data = InsectSprays, col = rainbow(6))
```



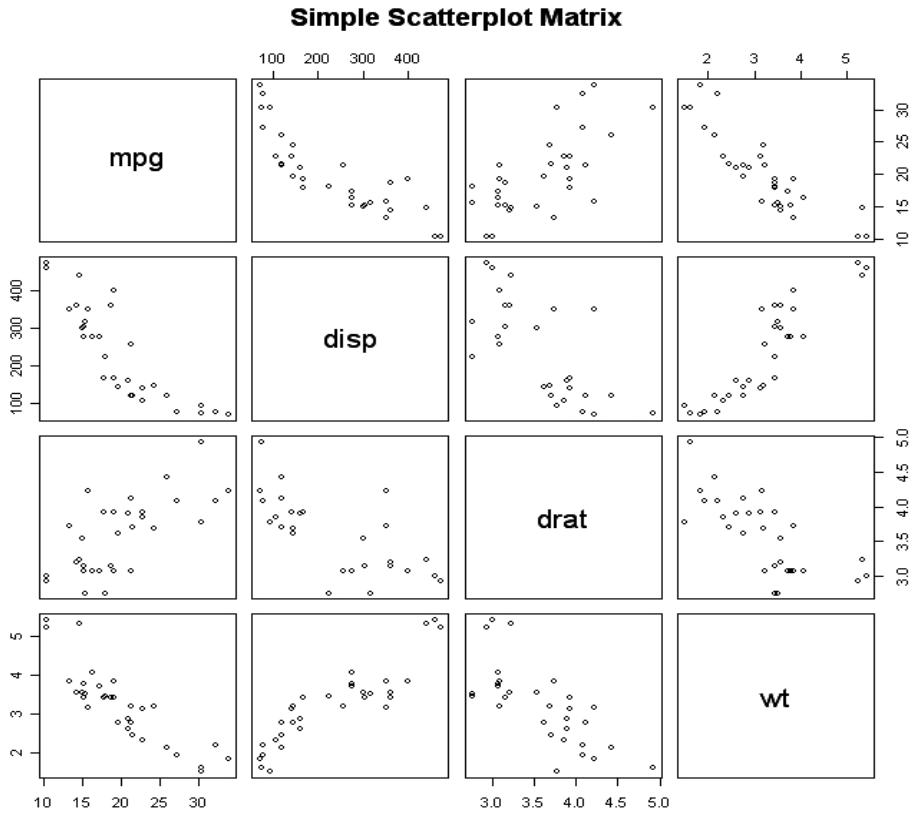
散点图(Scatterplots)

```
# Simple Scatterplot
attach(mtcars)
plot(wt, mpg, main="Scatterplot Example",
   xlab="Car Weight ", ylab="Miles Per Gallon ", pch=19)
```



散点图(Scatterplots)

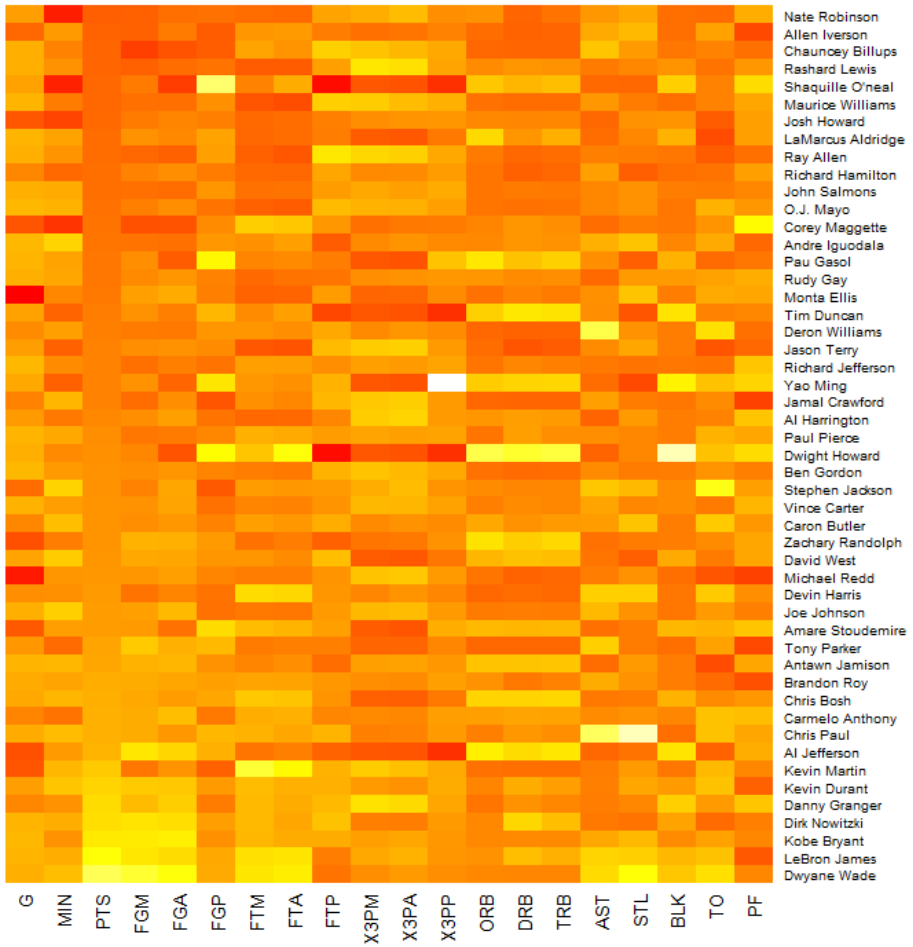
```
# Basic Scatterplot Matrix
pairs(~mpg+disp+drat+wt,data=mtcars,
   main="Simple Scatterplot Matrix")
```



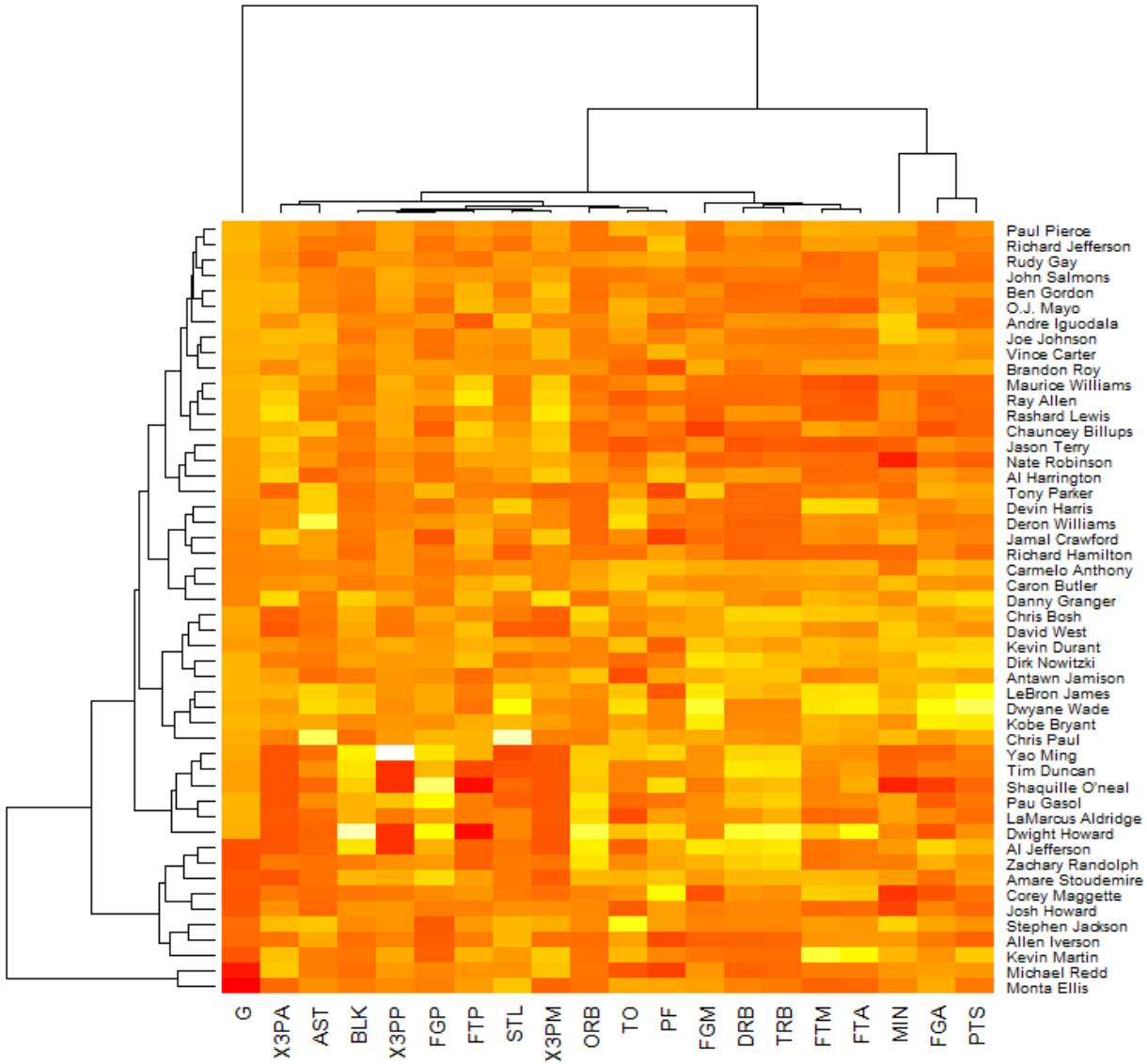
热图(Heatmap)

```
# Convert dataframe to numeric matrix
data1 <- as.matrix(nba[,-1])
class(data1) <- "numeric"
nba.matrix <- data.matrix(data1)

# Row names and Column names of the numeric matrix
row.names(nba.matrix) <- nba[,1]
colnames(nba.matrix) <- colnames(nba[,-1])

# Build a heatmap without dendrogram being computed and reordered
nba_heatmap <- heatmap(nba.matrix, Rowv=NA, Colv=NA, col = heat.colors(256),
scale="column", margins=c(5,10))
```

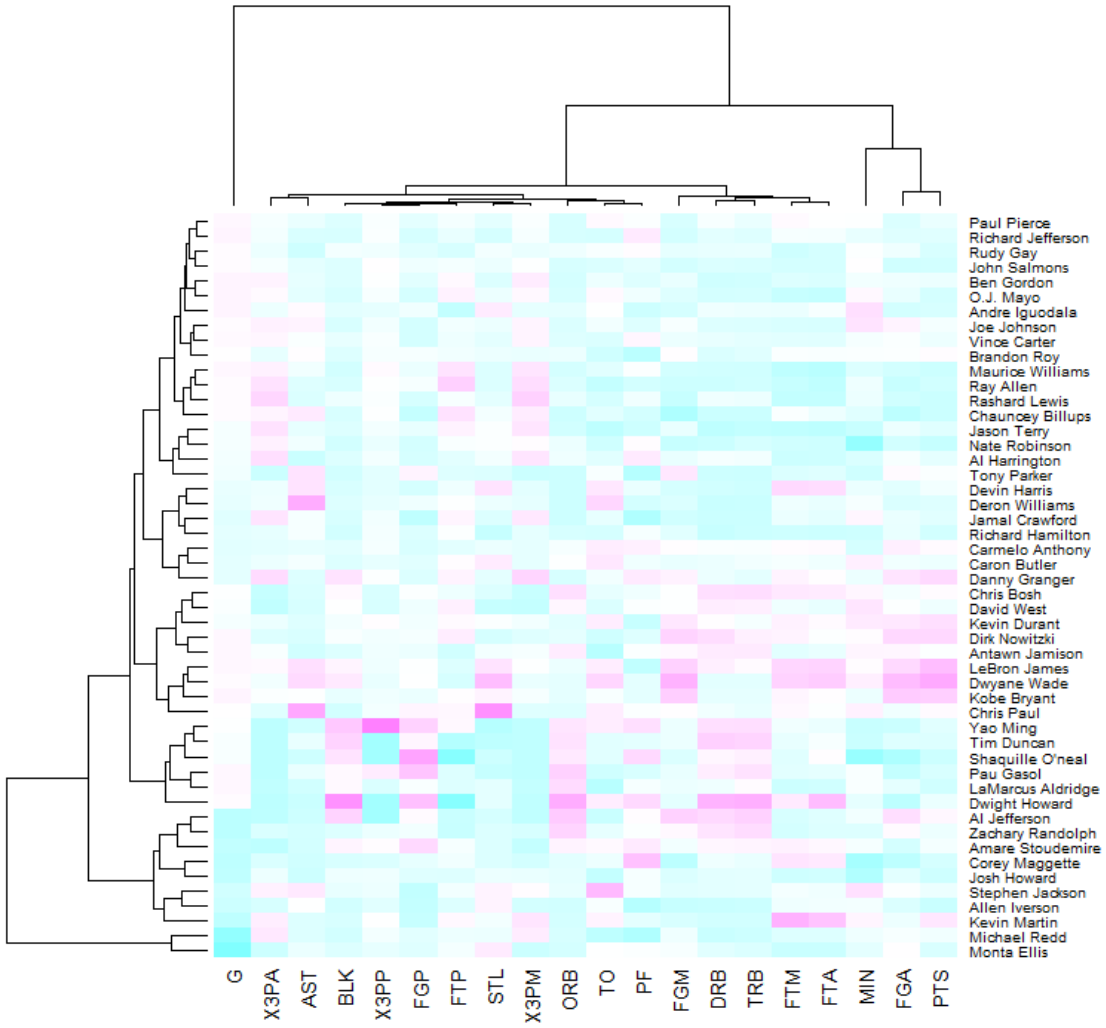
热图(Heatmap)


Nate Robinson
Allen Iverson
Chauncey Billups
Rashard Lewis
Shaquille O'neal
Maurice Williams
Josh Howard
LaMarcus Aldridge
Ray Allen
Richard Hamilton
John Salmons
O.J. Mayo
Corey Maggette
Andre Iguodala
Pau Gasol
Rudy Gay
Monta Ellis
Tim Duncan
Deron Williams
Jason Terry
Richard Jefferson
Yao Ming
Jamal Crawford
Al Harrington
Paul Pierce
Dwight Howard
Ben Gordon
Stephen Jackson
Vince Carter
Caron Butler
Zachary Randolph
David West
Michael Redd
Devin Harris
Joe Johnson
Amare Stoudemire
Tony Parker
Antawn Jamison
Brandon Roy
Chris Bosh
Carmelo Anthony
Chris Paul
Al Jefferson
Kevin Martin
Kevin Durant
Danny Granger
Dirk Nowitzki
Kobe Bryant
LeBron James
Dwyane Wade
G
MIN
PTS
FGM
FGA
FGP
FTM
FTA
FTP
X3PM
X3PA
X3PP
ORB
DRB
TRB
AST
STL
BLK
TO
PF

# Build a heatmap with dendrogram being computed and reordered
heatmap(nba.matrix, col=heat.colors(256), scale = "column")



# Change heatmap colors
heatmap(nba.matrix, col=cm.colors(256), scale = "column")



谢　　谢