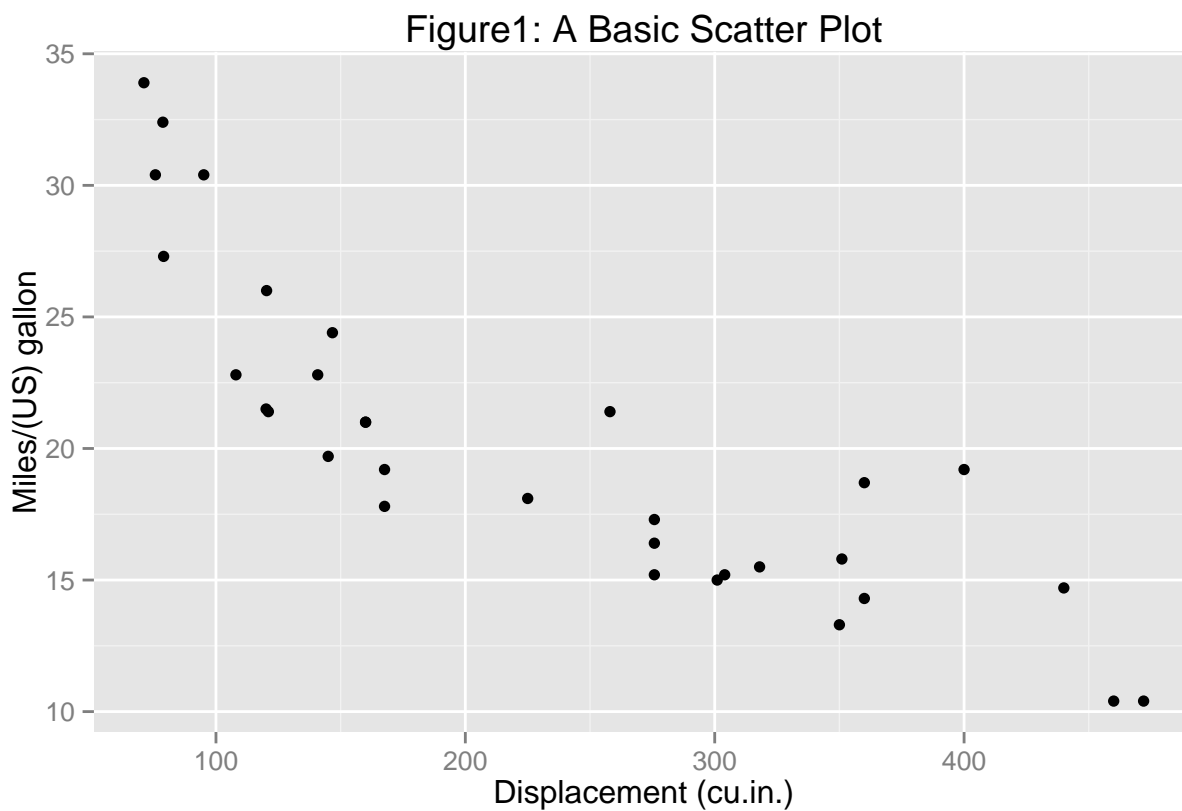# Scatter Plot Using R and SAS

*Shu Guo*

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## Introduction

Scatter plots are used to display the relationship between two variables. From the scatter plots we can see if the two variables are (positive or negative) linearly related, and whether the relationship is strong or weak.

## Making Scatter Plots

```
## Load the data
data(mtcars)
library(ggplot2)
p <- ggplot(mtcars, aes(x = disp, y = mpg))
p + geom_point() +
    labs(title = "Figure1: A Basic Scatter Plot",
    x = "Displacement (cu.in.)", y = "Miles/(US) gallon")
```



Figure1: A Basic Scatter Plot

SAS Code to create the same scatter plot

```
** Read the data;
Data mtcars;
    INFILE 'C:\Books\GitHub\SAS_and_R_Graphics\Data\mtcars.txt' FIRSTOBS = 2 DLM =',' DSD;
    INPUT Name $ mpg cyl disp hp drat wt qsec vs am gear carb;
RUN;

*Make the plot using PROC SGPLOT;
PROC SGPLOT DATA = mtcars  ;
    TITLE "Figure1: A Basic Scatter Plot";
    SCATTER y = mpg x = wt / markerattrs=(symbol=circlefilled color=black);
    XAXIS LABEL = "Displacement (cu.in.)";
    YAXIS LABEL = "Miles/(US) gallon";
RUN;

*Make the same plot using PROC TEMPALTE AND PROC SGRENDER;
PROC TEMPLATE;
    DEFINE STATGRAPH Classscatter;
        BEGINGRAPH;
            ENTRYTITLE "Figure1: A Basic Scatter Plot";
            LAYOUT OVERLAY /
                XAXISOPTS = (LABEL = "Displacement (cu.in.)")
                YAXISOPTS = (LABEL = "Miles/(US) gallon");
                SCATTERPLOT y = mpg x =wt /
                                markerattrs= (symbol=circlefilled color=black);
            ENDLAYOUT;
        ENDGRAPH;
    END;
RUN;
PROC SGRENDER DATA = mtcars TEMPLATE = Classscatter;
RUN;
```
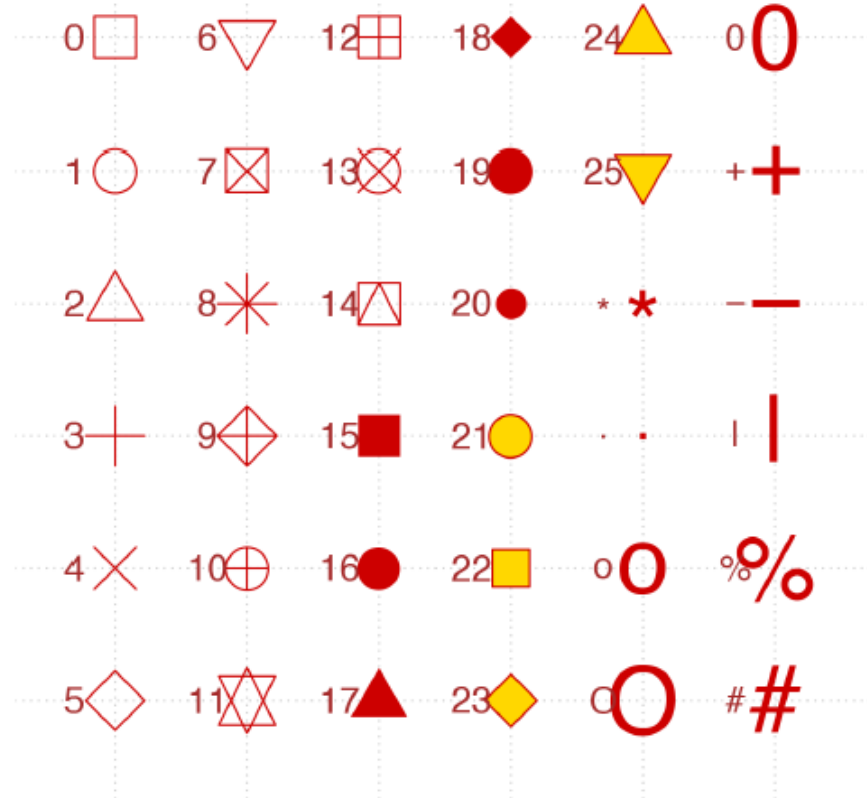
## Using Different Shape and Color

We can change the shape and color on the points in the scatter plots, or group points by another categorical variable using different shape and color. The following table shows the available shapes in R graphics.
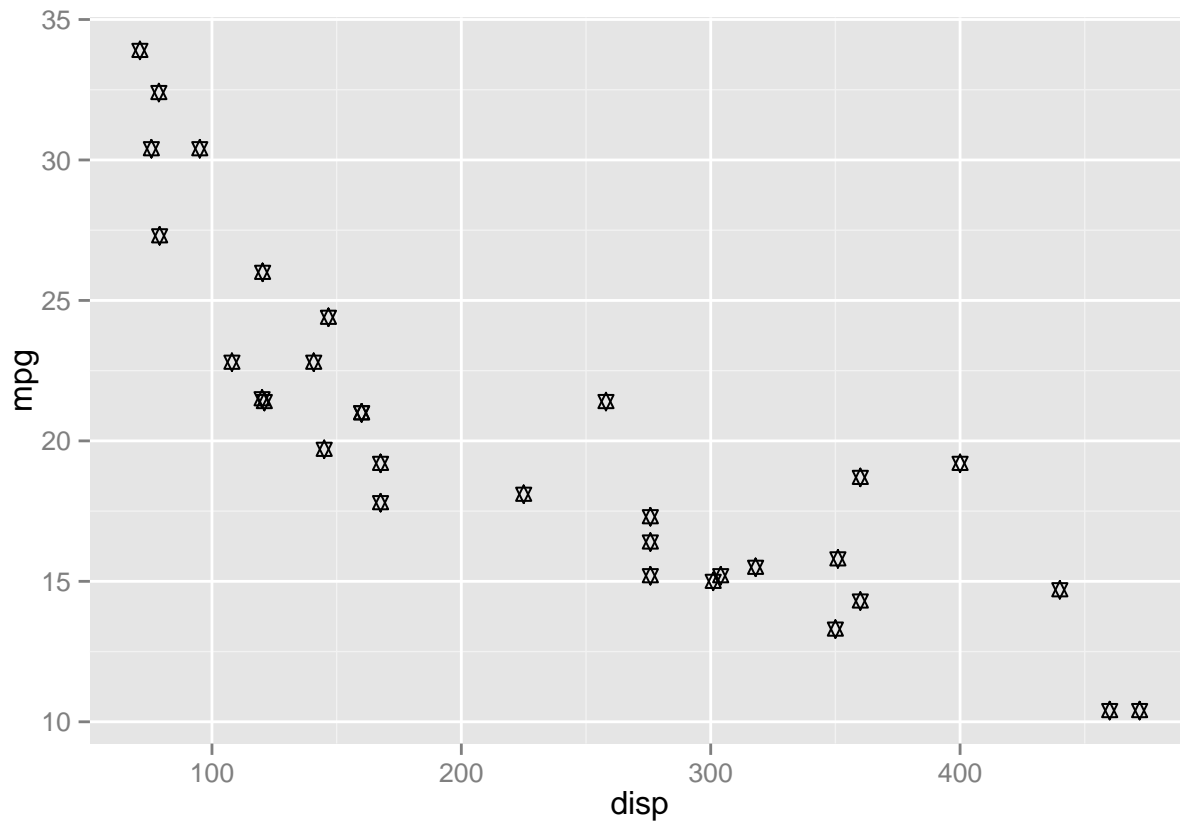
plot symbols : points (... pch = *, cex = 3 )

```
# Change the shape of the points
library(ggplot2)
ggplot(mtcars, aes(x = disp, y = mpg)) + geom_point(shape = 11)
```

```
# Create two factor variables for shape and color
mtcars$cyl <- factor(mtcars$cyl)
mtcars$am <- factor(mtcars$am)

# Use two factor variables for shape and colour
ggplot(mtcars, aes(x = disp, y = mpg, shape = cyl, colour = am)) +
  geom_point(size = 3) + scale_shape_manual(values = c(15, 17, 19))
```