

# Intro to base R graphics and hw1

Here are some tips on working with a built in data set.

Some R data sets are built in for educational and learning purposes. One of them is the `cars` data set, which just has two variables, *speed* and *dist*.

Here is an example of working with it:

# Intro to base R graphics and hw1

```
> data(cars)
> head(cars)
  speed dist
1     4    2
2     4   10
3     7    4
4     7   22
5     8   16
6     9   10
> names(cars)
[1] "speed" "dist"
> class(cars)
[1] "data.frame"
> cars$dist
 [1]  2 10  4 22 16 10 18 26 34 17 28 14 20 24 28 20
[20] 26 36 60 80 20 26 54 32 40 32 40 50 42 56 76 80
[39] 32 48 52 56 64 66 54 70 92 93 120 85
```

# Intro to base R graphics and hw1

So that I don't do the homework for you, lets try another data set, Fisher's Iris data set.

```
> data(iris)
```

```
> head(iris)
```

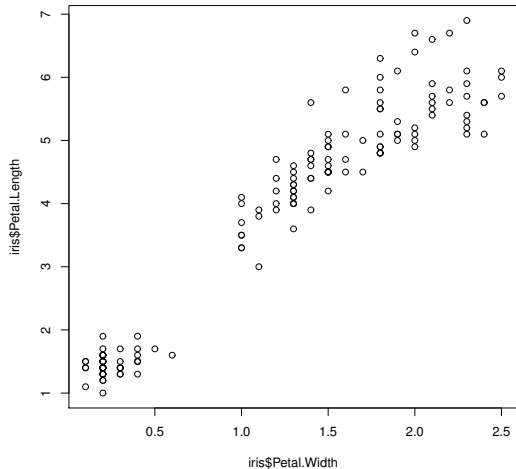
	Sepal.Length	Sepal.Width	Petal.Length	Petal.Width	Species
1	5.1	3.5	1.4	0.2	setosa
2	4.9	3.0	1.4	0.2	setosa
3	4.7	3.2	1.3	0.2	setosa
4	4.6	3.1	1.5	0.2	setosa
5	5.0	3.6	1.4	0.2	setosa
6	5.4	3.9	1.7	0.4	setosa

```
> cor(iris$Petal.Width,iris$Petal.Length)
```

```
[1] 0.9628654
```

```
> plot(iris$Petal.Width,iris$Petal.Length)
```

# Intro to base R graphics and hw1



# Intro to base R graphics and hw1

Here are some ways to potentially improve the plot or change it. Some things to try:

- ▶ make the axis labels bigger (easier to read for presentations)
- ▶ change axis labels
- ▶ change the plotting symbols
- ▶ color or shape code the points to represent the data (three different iris species)
- ▶ add a legend
- ▶ change axis ranges
- ▶ add text

# Intro to base R graphics and hw1

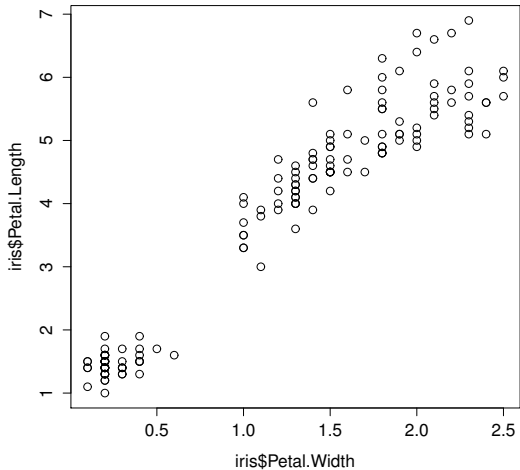
First increase font sizes

```
> plot(iris$Petal.Width,iris$Petal.Length,cex=1.3,  
cex.lab=1.3,cex.axis=1.3)  
> dev.off()  
quartz  
2
```

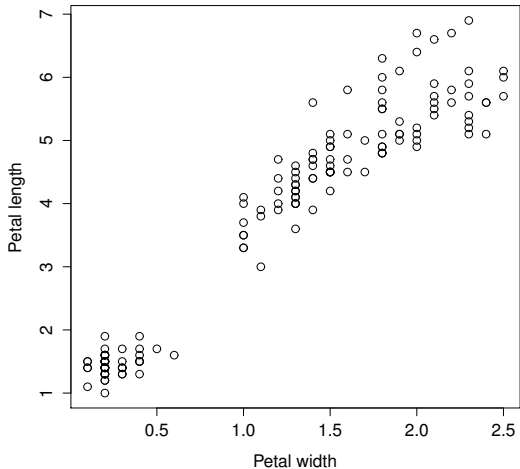
Now change axis labels

```
> postscript(file="iris3.eps",horiz=F,height=7,width=7)  
> plot(iris$Petal.Width,iris$Petal.Length,xlab="Petal width",  
ylab="Petal length",cex=1.3,cex.lab=1.3,cex.axis=1.3)  
> dev.off()  
quartz  
2
```

# Intro to base R graphics and hw1



# Intro to base R graphics and hw1





## Change the plotting symbol by species

The following is cutoff—there are 150 observations:

```
> iris$Species
 [1] setosa      setosa      setosa      setosa      setosa      setosa
 [7] setosa      setosa      setosa      setosa      setosa      setosa
[13] setosa      setosa      setosa      setosa      setosa      setosa
[19] setosa      setosa      setosa      setosa      setosa      setosa
[25] setosa      setosa      setosa      setosa      setosa      setosa
[31] setosa      setosa      setosa      setosa      setosa      setosa
[37] setosa      setosa      setosa      setosa      setosa      setosa
[43] setosa      setosa      setosa      setosa      setosa      setosa
[49] setosa      setosa      versicolor versicolor versicolor versicolor
[55] versicolor versicolor versicolor versicolor versicolor versicolor
[61] versicolor versicolor versicolor versicolor versicolor versicolor
[67] versicolor versicolor versicolor versicolor versicolor versicolor
[73] versicolor versicolor versicolor versicolor versicolor versicolor
[79] versicolor versicolor versicolor versicolor versicolor versicolor
[85] versicolor versicolor versicolor versicolor versicolor versicolor
[91] versicolor versicolor versicolor versicolor versicolor versicolor
```



## Change the plotting symbol by species

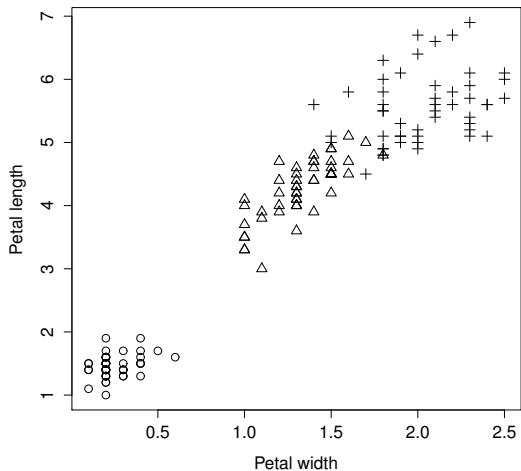
Now you can plot using

```
> plot(iris$Petal.Width,iris$Petal.Length,xlab="Petal  
width", ylab="Petal length",cex=1.3,cex.lab=1.3,  
cex.axis=1.3,pch=myplotchar)
```

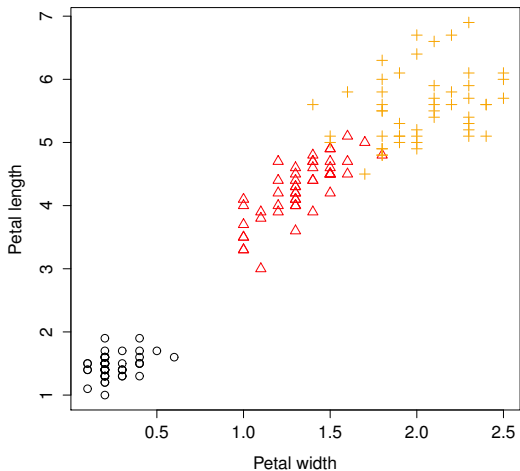
And add color

```
> mycol <- c(rep('black',50),rep('red',50),  
rep('orange',50))  
> plot(iris$Petal.Width,iris$Petal.Length,xlab=  
"Petal width", ylab="Petal length",cex=1.3,  
cex.lab=1.3,cex.axis=1.3,pch=myplotchar,col=mycol)
```

# Intro to base R graphics and hw1



# Intro to base R graphics and hw1

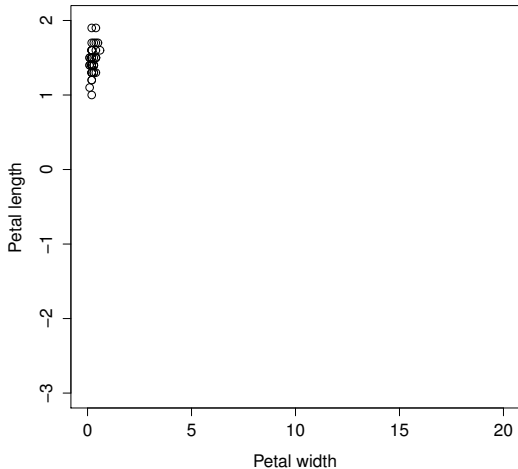


## Changing the axis limits

This can be done using `xlim` and `ylim`. Experiment with this by changing the axis limits to unreasonable numbers. The following is an example:

```
> plot(iris$Petal.Width,iris$Petal.Length,xlab="Petal width", ylab="Petal length",cex=1.3,xlim=c(0,20), ylim=c(-3,2),cex.lab=1.3,cex.axis=1.3,pch=myplotchar, col='mycol')
```

# Intro to base R graphics and hw1



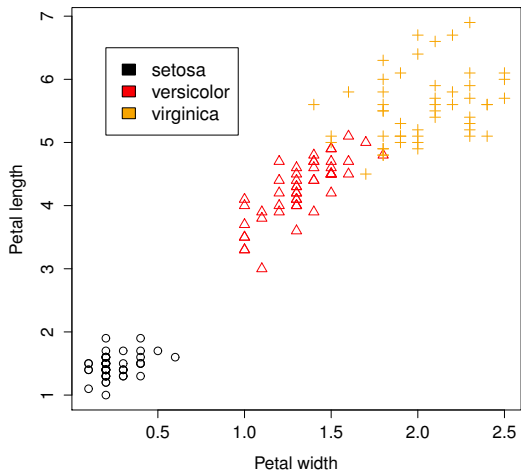
## Adding a legend

To add a legend, you specify the coordinates where you want the legend to appear. It is a separate command, outside of the `plot()` command.

```
> plot(iris$Petal.Width,iris$Petal.Length,xlab="Petal width", ylab="Petal length",cex=1.3,
cex.lab=1.3,cex.axis=1.3,pch=myplotchar,col=mycol)
> legend(.2,6.5,legend=c("setosa","versicolor",
"virginica"),fill=c("black","red","orange"),cex=1.4)
```



# Intro to base R graphics and hw1



# Intro to base R graphics and hw1

Note that the order of the colors in the legend is reversed from how they appear in the plot (black on top versus bottom). We can improve the plot one more time by reordering the legend.

```
> legend(.2,6.5,legend=c("setosa","versicolor","virginica"),
fill=c("black","red","orange"),cex=1.4)
> # versus
> legend(.2,6.5,legend=c("virginica","versicolor","setosa"),
fill=c("orange","red","black"),cex=1.4)
```

# Intro to base R graphics and hw1

