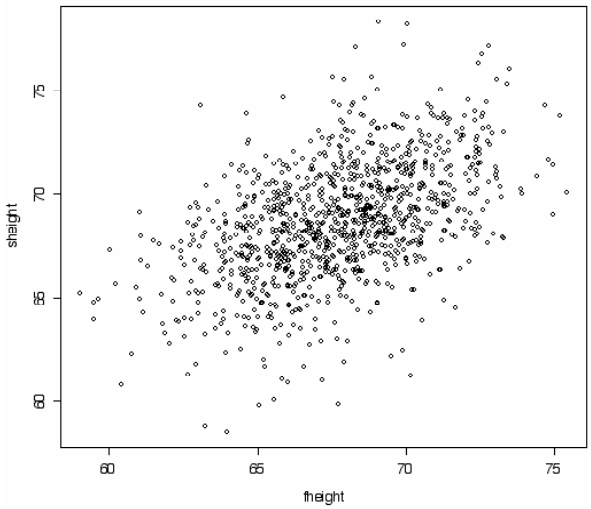
Two-variable Relations

EXAMPLE 1: Galton's Father/Son Data.

n = 1078

source("father.son.R.html")

```
> attach(father.son)
> names(father.son)
[1] "fheight" "sheight"
> plot(fheight,sheight)
```

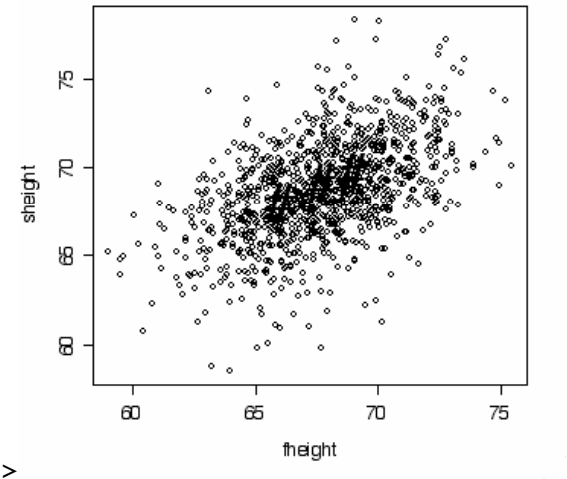



```
> summary(fheight)
   Min. 1st Qu.  Median    Mean 3rd Qu.    Max.
  59.01   65.79   67.77   67.69   69.60   75.43
> sd(fheight)
[1] 2.744868
> summary(sheight)
   Min. 1st Qu.  Median    Mean 3rd Qu.    Max.
  58.51   66.93   68.62   68.68   70.47   78.36
> sd(sheight)
[1] 2.814702

> cor(fheight, sheight)
[1] 0.5013383


son.66 <- sheight[fheight>65.5 & fheight < 66.5]
> length(son.66)
[1] 138
> mean(son.66)
[1] 67.66685
> son.favg <- sheight[fheight>67.2 & fheight < 68.2]
```

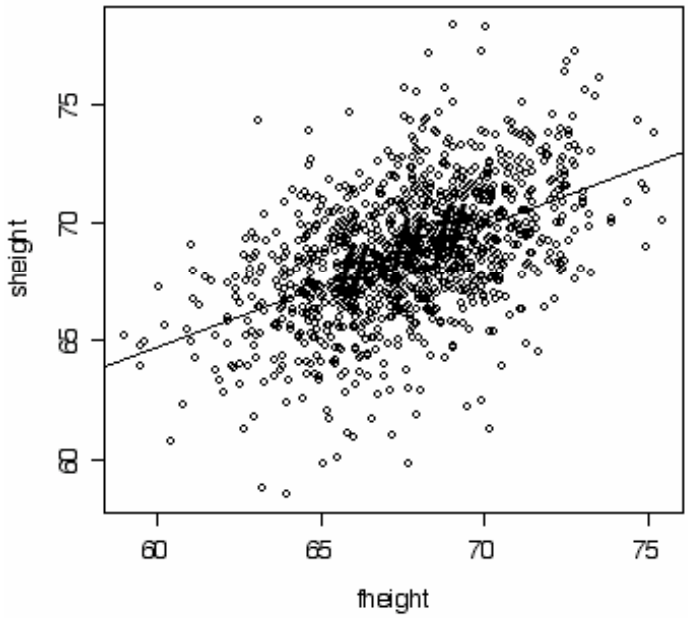
```
> length(son.favg)
[1] 152
> mean(son.favg)
[1] 68.84971
> mean(fheight)
[1] 67.6871
> mean(sheight)
[1] 68.68407
> son.69 <- sheight[fheight>68.5 & fheight < 69.5]
> length(son.69)
[1] 142
> mean(son.69)
[1] 69.44397
> points(c(66,67.7, 69), c(mean(son.66), mean(son.favg), mean(son.69)),
pch="#", cex=3)
```



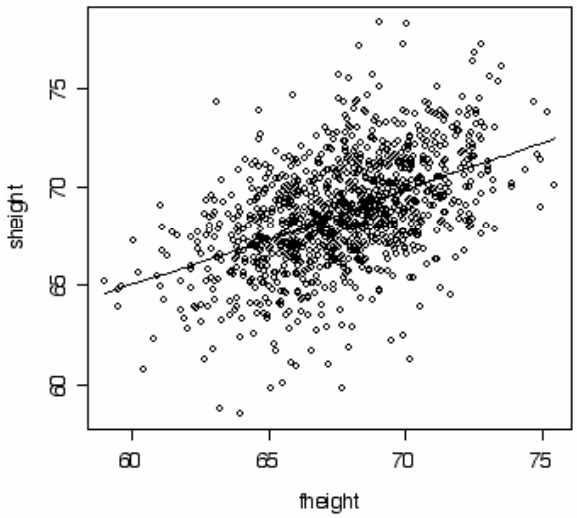

```
>
```

REGRESSION LINE

```
> output <- lsfit(fheight,sheight)
> abline(output)
```



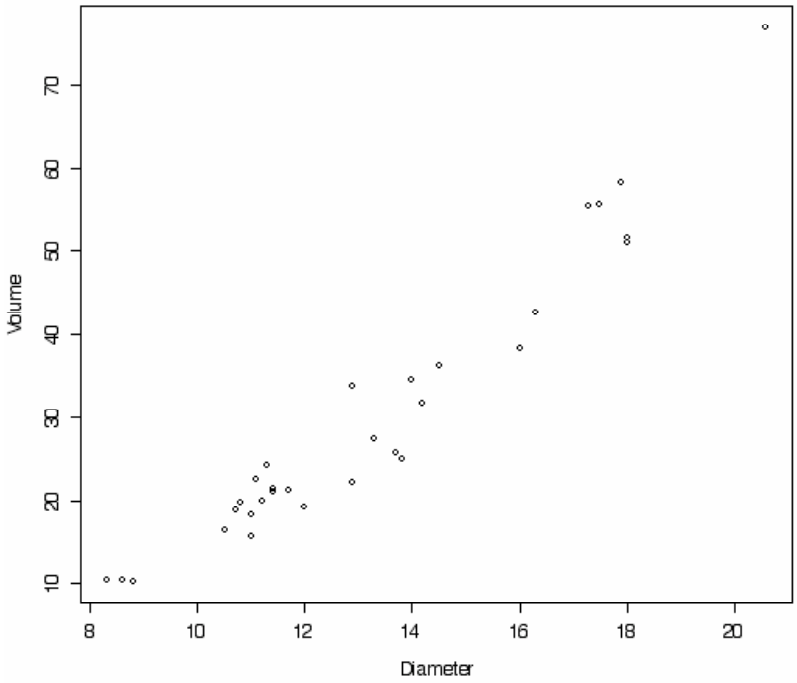

```
LOWESS LINE
lines(lowess(fheight,sheight))
```



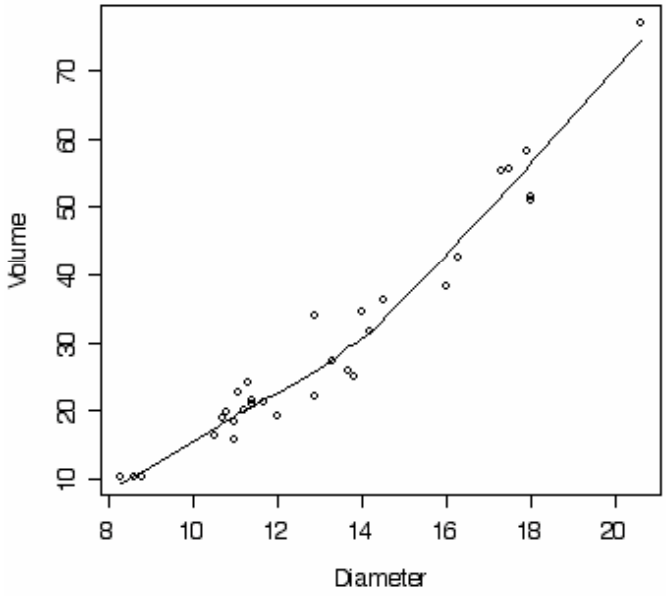
EXAMPLE II: TREES

```
> tree <- read.table("tree.txt", header=T, sep="\t")
> attach(tree)
> names(tree)
[1] "Diameter" "Height"   "Volume"
> plot(Diameter, Volume)
> summary(Diameter)
```

```
   Min. 1st Qu.  Median    Mean 3rd Qu.    Max.
   8.30   11.05   12.90   13.25   15.25   20.60
> sd(Diameter)
[1] 3.138139
> summary(Volume)
   Min. 1st Qu.  Median    Mean 3rd Qu.    Max.
  10.20   19.40   24.20   30.17   37.30   77.00
> sd(Volume)
[1] 16.43785
> cor(Diameter, Volume)
[1] 0.9671194
```

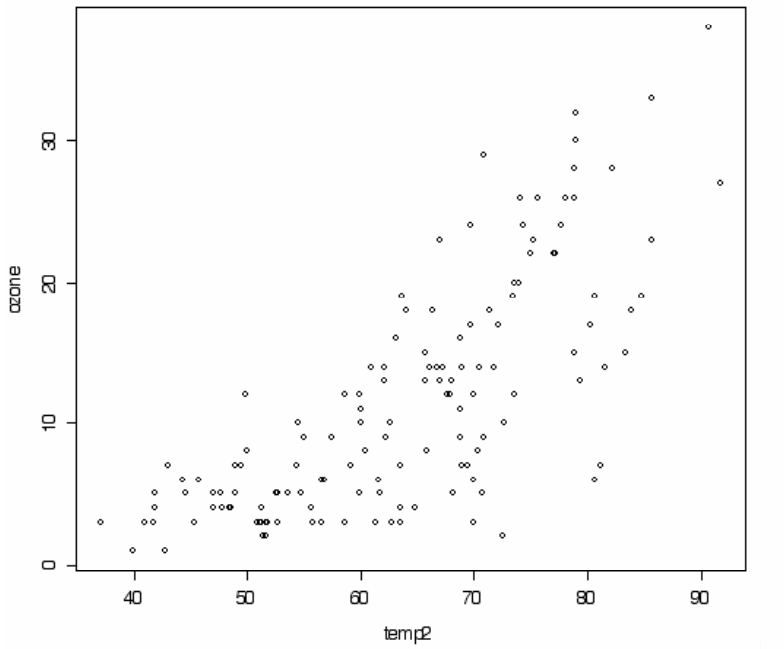



```
lines(lowess(Diameter, Volume))
```



EXAMPLE III: OZONE

```
> ozone2 <- read.table("ozone.txt", header=T, sep="\t")
> attach(ozone2)
> plot(temp2, ozone)
>
> summary(temp2)
   Min. 1st Qu.  Median    Mean 3rd Qu.    Max.
  37.04   52.70   63.68   63.52   72.14   91.76
> sd(temp2)
[1] 12.23686
> summary(ozone)
   Min. 1st Qu.  Median    Mean 3rd Qu.    Max.
   1.00    5.00    9.00   11.46   16.00   38.00
> sd(ozone)
[1] 8.222372
> cor(temp2, ozone)
[1] 0.7536845
>
```




```
lines(lowess(temp2,ozone))
```