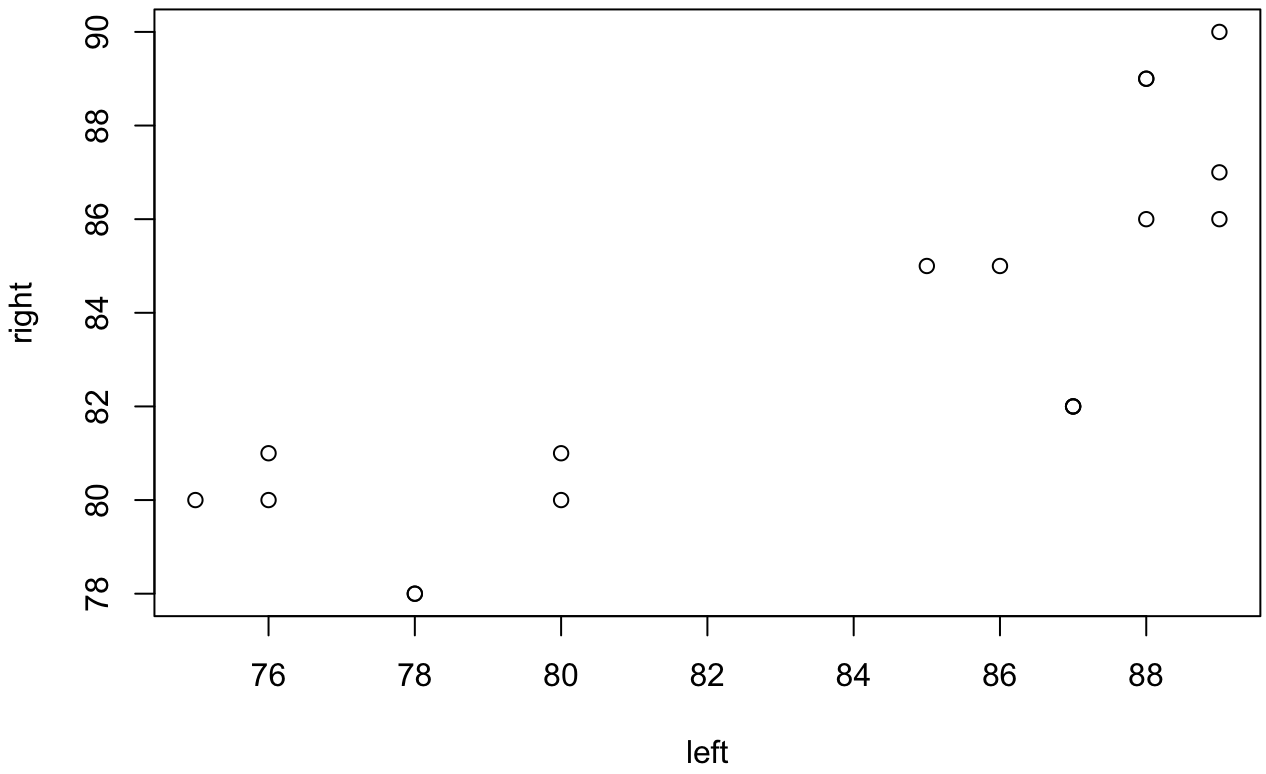
homework9

```
left = c(80,85,75,88,89,87,78,88,89,76,89,87,78,80,87,86,76,88)
right = c(80,85,80,86,87,82,78,89,90,81,86,82,78,81,82,85,80,89)
model = lm(right~left)
model
```

```
##
## Call:
## lm(formula = right ~ left)
##
## Coefficients:
## (Intercept)         left
##      33.775        0.593
```

```
plot(right~left)
```



A. Plot seems to be linear

B. Least squares line is y = 0.693x+33.775

C. around 1.186

D. 33.775+0.593*81 = 81.8

E.

```
x = right
y = left
n = length(y)
b1 = cor(x,y)*sd(y)/sd(x)
b0 = mean(y) - b1*mean(x)



yhat = b0 + b1*x
s2 =sum((y-yhat)^2)/(n-2)
B = 100000
Beta1s <- rep(NA, B)
for(i in 1:B) {
  sigma2 = (n-2) * s2 / rchisq(1, n-2)
  Ys = rnorm(n, b0 + b1 * x, sqrt(sigma2))
  Beta1s[i] <- cor(Ys, x) * sd(Ys) / sd(x)
}
b1ci = quantile(Beta1s, c(0.025, 0.975))
b1ci
```

```
##      2.5%     97.5%
## 0.6877275 1.5359559
```

1 - Conf.Interval is (0.1257,2.091)

```
beta1 <- 0
B <- 100000
Beta1s <- rep(NA, B)
for(i in 1:B) {
  sigma2 <- (n-2)*s2/rchisq(1, n-2)
  Y.simulated <- rnorm(n, b0+beta1*x, sqrt(sigma2))
  Beta1s[i] <- cor(Y.simulated, x) * sd(Y.simulated)/sd(x)
}
mean(Beta1s<b1)+mean(Beta1s>2*beta1-b1)
```

```
## [1] 1.99999
```

P = 1.9995, b1 = 0.