

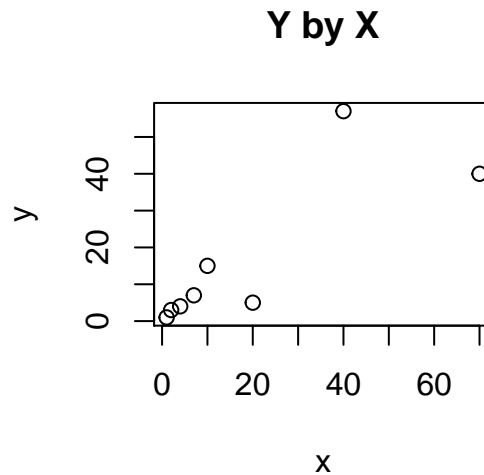
R Cov ex

Completely randomized design (CRD)

```
y=c(1,3,4,7,15,5,57,40); x=c(1,2,4,7,10,20,40,70)
group=c(rep(1,each=4),rep(2,each=4)); data=data.frame(group,x,y)
data # or View(data)
```

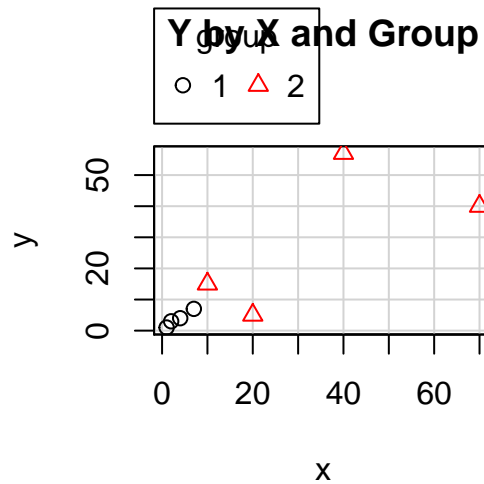
	group	x	y
1	1	1	1
2	1	2	3
3	1	4	4
4	1	7	7
5	2	10	15
6	2	20	5
7	2	40	57
8	2	70	40

```
plot(x,y); title('Y by X')
```

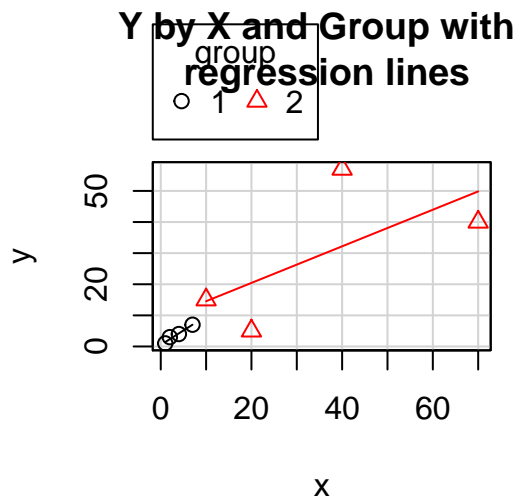


Now to do scatterplots with grouping. You will need to install the package `car`. Again, install it ONLY ONCE! :-)

```
# install.packages('car')
library(car)
# plot by group
scatterplot(y~x|group,reg.line=F,smoother=F); title('Y by X and Group')
```



```
scatterplot(y~x|group,smoother=F); title('Y by X and Group with \n regression lines')
```



Covariance calculations and correlation tests

```
cov(data[,-1]); cor(data[,-1])
```

```

      x      y
x 586.5000 408.7143
y 408.7143 428.0000

```

```

      x      y
x 1.0000000 0.8157629
y 0.8157629 1.0000000

```

```
by(data[,-1],group,cov,use='pairwise'); by(data[,-1],group,cor,use='pairwise')
```

```

group: 1
      x      y
x 7.0 6.50
y 6.5 6.25
-----

```

```

group: 2
      x      y

```

```
x 700.0000 411.6667
y 411.6667 558.9167
```

```
group: 1
```

```
      x      y
x 1.0000000 0.9827076
y 0.9827076 1.0000000
```

```
-----
group: 2
```

```
      x      y
x 1.0000000 0.6581474
y 0.6581474 1.0000000
```

```
cor.test(x,y,data=data)
```

Pearson's product-moment correlation

```
data: x and y
```

```
t = 3.4548, df = 6, p-value = 0.01355
```

```
alternative hypothesis: true correlation is not equal to 0
```

```
95 percent confidence interval:
```

```
0.2612934 0.9654505
```

```
sample estimates:
```

```
cor
```

```
0.8157629
```

```
cor.test(x[group==1],y[group==1],data=data);cor.test(x[group==2],y[group==2],data=data)
```

Pearson's product-moment correlation

```
data: x[group == 1] and y[group == 1]
```

```
t = 7.5056, df = 2, p-value = 0.01729
```

```
alternative hypothesis: true correlation is not equal to 0
```

```
95 percent confidence interval:
```

```
0.3893322 0.9996539
```

```
sample estimates:
```

```
cor
```

```
0.9827076
```

Pearson's product-moment correlation

```
data: x[group == 2] and y[group == 2]
```

```
t = 1.2363, df = 2, p-value = 0.3419
```

```
alternative hypothesis: true correlation is not equal to 0
```

```
95 percent confidence interval:
```

```
-0.8244086 0.9918516
```

```
sample estimates:
```

```
cor
```

```
0.6581474
```