

## DIGITAL ASSIGNMENT 2

### (Correlation)

#### (MAT2001-ELA DA1)

#### Question:

**Example:** The following table gives the weight ( $x$ ) (in 1000 lbs.) and highway fuel efficiency ( $y$ ) (in miles/gallon) for a sample of 13 cars.

Vehicle	$X$	$Y$
Chevrolet Camaro	3.545	30
Dodge Neon	2.6	32
Honda Accord	3.245	30
Lincoln Continental	3.93	24
Oldsmobile Aurora	3.995	26
Pontiac Grand Am	3.115	30
Mitsubishi Eclipse	3.235	33
BMW 3-Series	3.225	27
Honda Civic	2.44	37
Toyota Camry	3.24	32

Hyundai Accent	2.29	37
Mazda Protégé	2.5	34
Cadillac DeVille	4.02	26

Find the Correlation between X and Y

### R code:

```
> x=c(3.545,2.6,3.245,3.93,3.995,3.115,3.235,3.225,2.44,3.24,2.29,2.5,4.0)
> y=c(30,32,30,24,26,30,33,27,37,32,37,34,26)
> cor.test(x,y,method="pearson")
```

Pearson's product-moment correlation

```
data: x and y
t = -6.7598, df = 11, p-value = 3.116e-05
alternative hypothesis: true correlation is not equal to 0
95 percent confidence interval:
 -0.9692870 -0.6862219
sample estimates:
      cor
-0.8977642
```

```
> cor.test(x,y,method="spearman")
```

Spearman's rank correlation rho

```
data: x and y
S = 672.99, p-value = 0.0002426
alternative hypothesis: true rho is not equal to 0
sample estimates:
      rho
-0.8488611
```

Warning message:

```
In cor.test.default(x, y, method = "spearman") :
  Cannot compute exact p-value with ties
> cor.test(x,y,method="kendall")
```

Kendall's rank correlation tau

```
data: x and y
z = -3.3361, p-value = 0.0008495
alternative hypothesis: true tau is not equal to 0
sample estimates:
```

```
tau  
-0.7205767
```

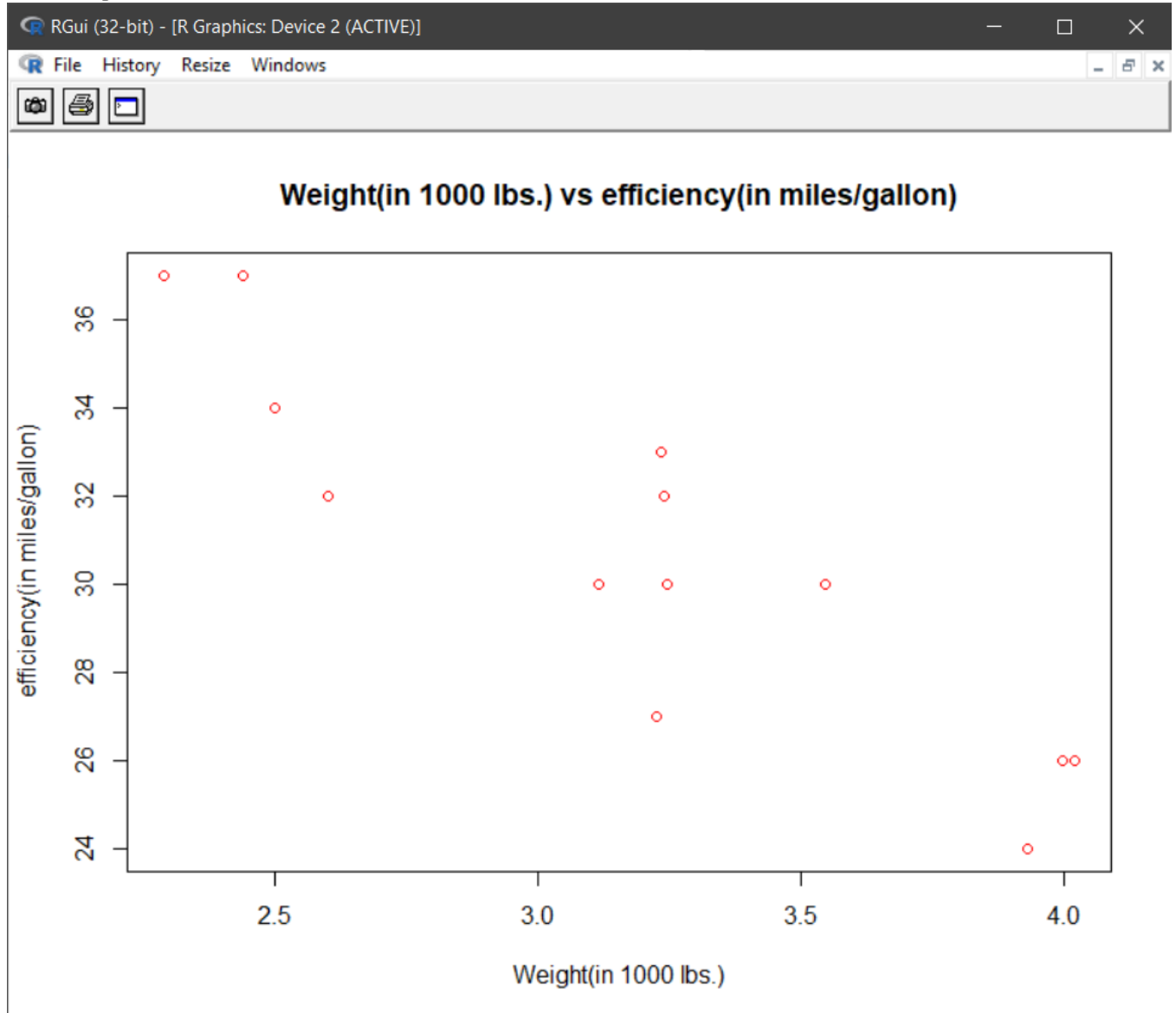
Warning message:

```
In cor.test.default(x, y, method = "kendall") :  
  Cannot compute exact p-value with ties
```

```
> cor(x,y)
```

```
[1] -0.8977642
```

```
> plot(x,y,main="Weight(in 1000 lbs.) vs efficiency(in  
miles/gallon),xlab="Weight(in 1000 lbs.)",ylab="efficiency(in  
miles/gallon)",col="red")
```



**Question:**

2. Find the Correlation between below data

ENJOY	BUY	READ
4	16	6
15	19	13
1	0	1
11	19	13
13	25	12
19	24	11
6	22	7
10	21	8
15	13	12
3	7	4
11	28	15
20	31	14
7	4	7
11	26	14
10	11	9
6	12	5
7	14	7
18	16	12
8	20	10
2	13	6
7	12	9
12	23	13
13	22	9
15	19	13
4	12	9
3	10	5
9	7	7
7	22	8
10	7	8
2	0	2
15	16	7
1	17	6

3	11	9
6	5	9
13	29	15
15	29	11
16	20	9
14	16	7
1	3	2
8	8	10

## R code:

```
>
enjoy=c(4,15,1,11,13,19,6,10,15,3,11,20,7,11,10,6,7,18,8,2,7,12,13,15,4,3,9
,7,10,2,15,1,3,6,13,15,16,14,1,8)
>
buy=c(16,19,0,19,25,24,22,21,13,7,28,31,4,26,11,12,14,16,20,13,12,23,22,19,
12,10,7,22,7,0,16,17,11,5,29,29,20,16,3,8)
>
read=c(6,13,1,13,12,11,7,8,12,4,15,14,7,14,9,5,7,12,10,6,9,13,9,13,9,5,7,8,
8,2,7,6,9,9,15,11,9,7,2,10)
> #correlation between enjoy and buy using Karl Pearson's method
> cor.test(enjoy,buy,method="pearson")
```

Pearson's product-moment correlation

```
data:  enjoy and buy
t = 5.1897, df = 38, p-value = 7.329e-06
alternative hypothesis: true correlation is not equal to 0
95 percent confidence interval:
 0.4159854 0.7958758
sample estimates:
      cor
0.6440382
```

```
> #correlation between enjoy and buy using Spearman's method
> cor.test(enjoy,buy,method="spearman")
```

Spearman's rank correlation rho

```
data:  enjoy and buy
S = 3935.2, p-value = 1.279e-05
alternative hypothesis: true rho is not equal to 0
sample estimates:
      rho
0.6308407
```

Warning message:

```
In cor.test.default(enjoy, buy, method = "spearman") :
  Cannot compute exact p-value with ties
```

```
> #correlation between enjoy and buy using Kendall's method
> cor.test(enjoy,buy,method="kendall")
```

Kendall's rank correlation tau

```
data:  enjoy and buy
z = 3.9707, p-value = 7.167e-05
alternative hypothesis: true tau is not equal to 0
sample estimates:
      tau
0.4520197
```

Warning message:

```
In cor.test.default(enjoy, buy, method = "kendall") :  
  Cannot compute exact p-value with ties
```

```
> #correlation between buy and read  
> #using Pearson's method  
> cor.test(buy,read,method="pearson")
```

Pearson's product-moment correlation

```
data: buy and read  
t = 6.9232, df = 38, p-value = 3.125e-08  
alternative hypothesis: true correlation is not equal to 0  
95 percent confidence interval:  
 0.5673263 0.8586028  
sample estimates:  
      cor  
0.7468472
```

```
> #using Spearman's method  
> cor.test(buy,read,method="spearman")
```

Spearman's rank correlation rho

```
data: buy and read  
S = 3435.1, p-value = 1.554e-06  
alternative hypothesis: true rho is not equal to 0  
sample estimates:  
      rho  
0.6777574
```

Warning message:

```
In cor.test.default(buy, read, method = "spearman") :  
  Cannot compute exact p-value with ties
```

```
> #using Kendall's method  
> cor.test(buy,read,method="kendall")
```

Kendall's rank correlation tau

```
data: buy and read  
z = 4.5829, p-value = 4.585e-06  
alternative hypothesis: true tau is not equal to 0  
sample estimates:  
      tau  
0.5271662
```

Warning message:

```
In cor.test.default(buy, read, method = "kendall") :  
  Cannot compute exact p-value with ties
```

```
> #correlation between enjoy and read  
> #using Pearson's method
```

```
> cor.test(enjoy,read,method="pearson")
```

```
Pearson's product-moment correlation
```

```
data:  enjoy and read
t = 6.6245, df = 38, p-value = 7.956e-08
alternative hypothesis: true correlation is not equal to 0
95 percent confidence interval:
 0.5448067 0.8497904
sample estimates:
      cor
0.732074
```

```
> #using Spearman's method
```

```
> cor.test(enjoy,read,method="spearman")
```

```
Spearman's rank correlation rho
```

```
data:  enjoy and read
S = 2821.8, p-value = 6.524e-08
alternative hypothesis: true rho is not equal to 0
sample estimates:
      rho
0.7352945
```

```
Warning message:
```

```
In cor.test.default(enjoy, read, method = "spearman") :
  Cannot compute exact p-value with ties
```

```
> #using Kendall's method
```

```
> cor.test(enjoy,read,method="kendall")
```

```
Kendall's rank correlation tau
```

```
data:  enjoy and read
z = 4.8955, p-value = 9.803e-07
alternative hypothesis: true tau is not equal to 0
sample estimates:
      tau
0.5675835
```

```
Warning message:
```

```
In cor.test.default(enjoy, read, method = "kendall") :
  Cannot compute exact p-value with ties
```