

## Problem 12.1 in Python

1. Import the "scipy" module so we can access some statistics functionality.

```
>>> import scipy
```

2. Enter data for two variables.

```
>>> x = [4,6,7,11,14,17,21]
```

```
>>> y = [18,12,13,8,7,7,4]
```

3. Calculate basic statistics for x and y (mean, median, standard deviation).

```
>>> scipy.mean(x)
```

```
11.428571428571429
```

```
>>> scipy.median(x)
```

```
11.0
```

```
>>> scipy.std(x)
```

```
5.7782138331876247
```

```
>>> scipy.mean(y)
```

```
9.857142857142857
```

```
>>> scipy.median(y)
```

```
8.0
```

```
>>> scipy.std(y)
```

```
4.3892261416392051
```

4. Import the "stats" module and calculate the Pearson Correlation Coefficient.

```
>>> import scipy.stats as stats
```

```
>>> stats.pearsonr(x,y)
```

```
(-0.92698953702675413, 0.0026589803215800443)
```

5. Setup and run linear regression.

```
>>> lr = stats.linregress
```

```
>>> slope,intercept,rvalue,pvalue,stderr = lr(x,y)
```

6. Display slope, intercept and calculate r-squared

```
>>> slope
```

```
-0.70415647921760383
```

```
>>> intercept
```

```
17.904645476772615
```

```
>>> rsq = rvalue**2
```

```
>>> rsq
```

```
0.85930960175707571
```

7. Set an x value and calculate y-hat using the new linear equation.

```
>>> xval = 10
```

```
>>> yhat = slope*xval+intercept
```

```
>>> yhat
```

```
10.863080684596577
```