Prof. Andreas Orth
High Integrity Systems, 2nd semester: Data Mining
Assignment 4 week 4

Exercise 1:
Use lm ( ) -function to model the connection between shoe-size and body-size:

```
> shoesize<-c(38,38,39,39,40,40,41,41,42,42)
> bodysize<-c(153,161,167,169,173,176,182,181,188,189)
> bspl<-data.frame(shoesize,bodysize)
```

What are the coefficients of the model?
Plot the points and the model in one plot.
Hint: Use the functions

```
> summary( )
> plot( )
> coef( )
> abline( )
```

Exercise 2:
Modify the model by
(A) fitting the model to the log of body-size, i.e. `log(bodysize)`
(B) adding a square term to the model

Hint:
To transform back in the plot use:
`linesformula=exp(fitted(...`*`model-name`*`...))~schuhgröße,data=bspl)`
To add the square term use:

```
lm(bodysize ~ shoesize + I(shoesize^2), data=bspl)
```

Exercise 3:
Usig the `lm( )`-function in R fit the 2-factor-model of the first lecture in linear modelling:

x_1	x_2	y	^y	res
-1	-1	3	2,5	0,5
1	-1	5	5,5	-0,5
-1	1	7	7,5	-0,5
1	1	11	10,5	0,5

Calculate coefficients, predictions, residuals for the linear model.
Then calculate coeffients for the interaction model.

What happens if you change x values to 20 instead of -1 and 40 instead of +1 for x_1 and to 20 instead of -1 and 30 instead of +1 for x_2?

Have the coefficients changed? Have the predictions changed?