Exercise 3

1. Estimate all effects in the following 3×3 designs. Do interactions exist?

a)

		B		
		1	2	3
	1	10	15	20
A	2	10	15	20
	3	10	15	20

b)

		B		
		1	2	3
	1	26	22	21
A	2	23	19	18
	3	17	13	12

c)

		B		
		1	2	3
	1	26	23	20
A	2	18	19	23
	3	13	15	14

2. Factors affecting drills are investigated in an experiment. The response variable Y is drill in inches. The factors are:
A = load on drill (high/low)
B = flow rate (high/low)
C = rotational speed(high/low)
D = type of mud used

The data are in the file `drill.txt`.

```
drill<-read.table("http://stat.ethz.ch/Teaching/Datasets/drill.txt",header=TRUE)
```

a) Plot the data.

b) Do an analysis with all main effects and all interactions.

c) Do an analysis with all main effects and all 2-fold interactions.

d) Check the residuals and improve your model if necessary.

3. Four factors are supposed to influence the flavor of softdrinks: sugar, carbonation, sirup concentration and temperature. The four factors were investigated in an experiment with two levels each. Therefore 16 different products were tested. Each product was assessed by 20 persons with a score between 1 and 20. The response variable is the total score of the 20 persons. There are two replicates of the 2^4 design. The data are in `softdrinkANOVA.txt`.

```
soft<-read.table("http://stat.ethz.ch/Teaching/Datasets/softdrinkANOVA.txt",header=TRUE)
```

a) Plot the data.

b) Analyze the data. Which factors are important?