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## Complexity of Boolean functions

### SS 2018 Homework 1

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#### Exercise 1:

- a) Prove Lemma 1.1 of the lecture.
- b) Show that  $C_{\Omega_0}^*(B_2) \leq 12$ .
- c) Show  $|B_n| = 2^{2^n}$  and  $|B_{n,m}| = 2^{m \cdot 2^n}$ .

#### Exercise 2:

Prove for  $n$  large enough that  $B_n^*$  contains a function which needs more than  $\frac{2^n}{n}$  gates.

#### Exercise 3:

For the lower bound proof (Theorem 1.1) we have chosen the base  $\Omega_0$ . Which lower bound could you prove if you would choose the base  $B_2$  instead of  $\Omega_0$ ?