Exercise Set 4

Exercise 4.1. Prove or disprove that $\{XOR\}$ is a complete basis.

(3 points)

Exercise 4.2. Show that

$$\lim_{n\to\infty} \frac{|f \in B_n \colon S_{B_2}(f) \geq \frac{2^n}{n}|}{|B_n|} = 1$$

(4 points)

Exercise 4.3. Let $f \in B_n$ be a Boolean function given as an oracle (i.e. for each $x \in \{0,1\}^n$ the value $f(x)$ can be computed in $\mathcal{O}(1)$ time). Show that the set $PI(f)$ of all prime implicants can be computed in $\mathcal{O}(n^2 3^n)$ time.

(5 points)

Deadline: May 2, before the lecture. The websites for lecture and exercises can be found at:

> http://www.or.uni-bonn.de/lectures/ss23/chipss23_ex.html

In case of any questions feel free to contact me at drees@or.uni-bonn.de.