



## Assignment 10, Complexity Theory, WS 13/14

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<http://www-cc.cs.uni-saarland.de/course/42/>

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**Exercise 10.1** A function  $f : \Sigma^* \rightarrow \mathbb{N}$  is in the class  $\#L$ , if there is a nondeterministic logarithmic space bounded Turing machine  $M$  such that  $f(x)$  is the number of accepting path of  $M$  on input  $x$  for all  $x$ . Prove that for all  $f \in \#L$ , there is a deterministic polynomial time bounded Turing machine  $N$  that computes  $f$  (in the usual sense).

**Exercise 10.2** Prove that the problem of counting the number of satisfying assignments of a formula in DNF is  $\#P$ -complete. Can it be complete under parsimonious reductions?

**Exercise 10.3** Prove that  $\#2SAT$  is  $\#P$ -complete. You may use the fact that computing the number of all (not necessarily perfect) matchings in a bipartite graph is  $\#P$ -complete.