CS–E4500 Advanced Course in Algorithms

Week 05 – Tutorial

We return to the satisfiability question. For the k-satisfiability (k-SAT) problem, the formula is restricted so that each clause has exactly k literals. Again, we assume that no clause contains both a literal and its negation, as these clauses are trivial. We prove that any k-SAT formula in which no variable appears in too many clauses has a satisfying assignment.

1. If no variable in a k-SAT formula appears in more than $T = 2^k/4k$ clauses, then the formula has a satisfying assignment.

2. Show that if

$$4\binom{k}{2}\binom{n}{k-2}2^{1-\binom{k}{2}} \leq 1\,,$$

then it is possible to 2-color the edges of K_n such that it has no monochromatic K_k as a subgraph.