Exercises 1

Exercise 1:
Prove that for each graph $G$ the inequality $\tau(G) \leq 2\nu(G)$ holds and the inequality is sharp.

(4 points)

Exercise 2:
Let $G$ be a graph and $M_1, M_2$ two maximal matchings in $G$. Prove that $|M_1| \leq 2|M_2|$.

(4 points)

Exercise 3:
Let $G$ be a bipartite graph such that for each proper subset $F \subset E(G)$ and $G' := (V(G), F)$ we have $\tau(G') < \tau(G)$. Prove: $E(G)$ is a matching.

(4 points)

Exercise 4:
Prove that a $k$-regular bipartite graph has $k$ disjoint perfect matchings. Deduce from this that the edge set of a bipartite graph of maximum degree $k$ can be partitioned into $k$ matchings.

(4 points)

Deadline: Tuesday, October 19th, before the lecture.
First exercise class: Thursday 21st 16:00 - 17:30 s.t. (Seminarraum, 1st floor)