CS105L: Discrete Structures
I semester, 2006-07

Tutorial Sheet 11: Graph Theory: Matchings

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November 2, 2006

1. If $|N(S)| \geq |S| - d$ for every set $S \subset A$ of a bipartite graph $G = ((A, B), E)$ for some fixed natural number d, show that G contains a matching of cardinality $|A| - d$.
2. Show that every regular graph of non-zero even degree has a 2-factor.

   (**Hint.** Split each vertex into 2 and try to find a perfect matching.)
3. Show that every bridgeless 3-regular graph has a 1-factor.