

# Assignment 1

August 26, 2013

Due date: 30th August

Marks: 20

1. Consider the following approximation algorithm for the unweighted vertex cover problem: Find a DFS tree of the given graph  $G$ . Let  $S$  be the set of all non-leaf vertices in the tree. Output  $S$  as a vertex cover of  $G$ .  
Prove that the algorithm described above is a 2-approximation algorithm.
2. In class, we have seen a 2-approximation algorithm for the Steiner tree problem. Prove that the approximation ratio of the same algorithm can be improved to  $2(1 - \frac{1}{|R|})$  where  $R$  is the set of required vertices.
3. Problem 2.11 from VV
4. Problem 3.8 from VV