

Problem Set 4

This problem set is due Wednesday, October 12 at noon.

1.
 - (a) Show that if C is the vertex set of a clique in a graph G , then the treewidth of G is at least $|C| - 1$.
 - (b) Show that if the treewidth of a graph G is k , then G has a vertex of degree at most k .
2. In class we presented Baker's technique using minimum vertex cover as an example. In this problem we fill in the missing details.
 - (a) Show that minimum vertex cover is fixed-parameter tractable with respect to branch-width by describing a dynamic program (give pseudo-code).
 - (b) Recall that G_{ij} is the graph induced by vertices at breadth-first-search levels $jk+i$ through $(j+1)k+i$. Explain why a solution to the first part can be used to find a minimum vertex cover of G_{ij} in $2^{O(k)}n$ time.