Assignment 5

Deadline: August 24, 2006

Exercise 1: 23 Points

Given an undirected graph with $n$ nodes and $m$ edges devise two algorithms that determine if the input graph can be colored with two colors. If it is possible, i.e., the graph is 2-colorable, a valid coloring must be output. The first algorithm must be randomized and run in $O(sort(m + n))$ expected I/Os. The second algorithm must be deterministic and run in $O(sort(m + n) \cdot \max\{1, n \cdot B/m\})$ I/Os in the worst case.

Hint 1: Odd cycles are not 2-colorable. Graphs that contain an odd cycle as a subgraph are not 2-colorable as well.

Hint 2: In your algorithms you are allowed to use the results, mentioned in the lecture.