Homework, the 4th series

Deadline: Monday 10 June, 2013, 23:59

We consider the following problem.

Given: An undirected graph G.
Find: A coloring of vertices by 2 colors with no monochromatic triangle (monochromatic edges are allowed).

Construct a randomized algorithm, which in polynomial time produces such a coloring whenever it exists, or gives an answer *No!*, with an error[1] probability $\leq \frac{1}{4}$. However, **we do not require that algorithms works correctly for all graphs**, but only for those 3-colorable in the usual sense (i.e., without monochromatic edges). On the remaining graphs, the algorithm can behave in an arbitrary way.

[1] Please note that we can exclude false positives, because the algorithm can check if the produced coloring satisfies the requirement.