Computational Complexity - Homework III

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1 Instructions

1. The homework is due on April 17, in class.
2. Each question is worth 3 points.
3. Attempt as many problems as you can. You will be given partial credit, as per the policy discussed in class.

2 Problems

1. Argue that the CIRCUIT VALUE problem is **P-complete**, even if the circuit is planar. Recall that a planar circuit is one tha can be laid out on a plane without its wires crossing.
2. In class we showed that HORNSAT and 2SAT were solvable in polynomial time. In the HORN$\oplus$2SAT problem, we are are asked to check the satisfiability of a CNF formula in which every clause is either Horn or contains at most two literals. What can you say about the complexity of this problem?
3. Show that the INDEPENDENT SET problem can be solved in polynomial time, when the input graph is bipartite.
4. In the ANOTHER-HAMILTON-CYCLE problem, you are given a graph $\mathbf{G}$ and a Hamilton cycle C in $\mathbf{G}$ and asked whether $\mathbf{G}$ contains another Hamilton cycle. What is the complexity of this problem?
5. Show that the complexity class **PP** is closed under complementation and symmetric difference.