Homework #4

1. 1. By knowing the algorithm *A*, we claim that CIRCUIT-SAT belongs to BPP, and it also belongs to NPC class. So, .

To proof our argument, first, define a new algorithm *A’* as follows

We use *A* to estimate *A’*. The expected time of running the algorithm *A* is polynomial, by Markov Inequality

We take k = 4 and get

Take x as the running time of the algorithm *A*, the inequality (4.1.2) show that even x bigger than four times of expected running time in polynomial, the probability is last than equal to 1/4. Therefore, we know at least 3/4 percent of paths can solve in polynomial time with the correct answer. Thus CIRCUIT-SAT belongs to BBP.

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