Quantum Algorithms: Quiz 3 2021-02-18

Name: ______________________________

1. Define the complexity class BPP.

Solution: The class BPP is defined on page 37 of the textbook. Fix $\varepsilon \in [0, 1/2)$. A predicate L is in BPP if there exists a polynomial p and a probabilistic Turing machine $\mathcal{M}$ such that

- $L(x) = 0$ implies that $\mathcal{M}(x)$ answers "no" with probability $\geq 1 - \varepsilon$ and
- $L(x) = 1$ implies that $\mathcal{M}(x)$ answers "yes" with probability $\geq 1 - \varepsilon$.

Note that the definition given in the textbook incorrectly states the first item as

" $L(x) = 0$ implies that $\mathcal{M}(x)$ answers "no" with probability $\leq \varepsilon$. "

Either "no" should be replaced with "yes" or "$\leq \varepsilon$" should be replaced with $\geq 1 - \varepsilon$.