

1. Exercise 3.4(a) of the CC Book: For $0 < \epsilon \leq \epsilon' < 1/2$, show that $R_\epsilon(f) \leq O(\log_{\epsilon'} \epsilon \cdot R_{\epsilon'}(f))$. Conclude that the error probability can be reduced with a small penalty in the communication complexity. Hint: Start by proving the same relation with respect to $R^1(f)$. Then use Chernoff inequality to generalize your proof for $R_\epsilon(f)$.

2. Exercise 3.6 of the CC Book: Prove that the following protocol for EQ achieves similar performance. Alice and Bob view their inputs a and b as n -bit integers (between 1 and 2^n). Alice chooses a prime number p at random among the first n^2 primes. She sends both p and $a \bmod p$ to Bob. Bob checks whether

$$a \bmod p = b \bmod p,$$

and if so he outputs 1, otherwise he outputs 0.

3. Exercise 3.10 of the CC Book: Show that $R(\text{GT}) = O(\log^2 n)$. In contrast, by Exercise 2.7, both $N^0(\text{GT})$ and $N^1(\text{GT})$ (and thus also $R^1(\text{GT})$ by Proposition 3.7) are linear.