1. Exercise 1.5 of the CC book: Alice and Bob hold subsets $x, y \subseteq \{1, 2, \ldots, n\}$, respectively, and they wish to compute $\mathsf{Avg}(x, y)$, which is defined as the average number in the multiset $x \cup y$. Prove that

$$D(\mathsf{Avg}) = O(\log n).$$

(Note that the average need not be an integer.)

2. Exercise 1.9 of the CC book: Show that for every function $f : X \times Y \to Z$,

$$D(f) \geq \log_2 \left|\mathsf{Range}(f)\right|,$$

where $\mathsf{Range}(f)$ is the set of all $z \in Z$ for which there exists a pair $(x, y) \in X \times Y$ such that $f(x, y) = z$. Plus: use it to show that $D(\mathsf{Avg}) = \Omega(\log n)$.