

- Let  $D_n = (-n, \frac{1}{n}) = \{x \in \mathbb{R} : -n < x < \frac{1}{n}\}$ . Compute  $\bigcup_{n=1}^{\infty} D_n$  and  $\bigcap_{n=1}^{\infty} D_n$ .
- Give an example of an indexed collection  $\{A_1, A_2, A_3, \dots\}$  such that each  $A_n \subseteq \mathbb{Z}$  and for all positive integers  $m$  and  $n$ , the pairwise intersection  $A_m \cap A_n$  is nonempty, but whose collective intersection  $\bigcap_{n=1}^{\infty} A_n$  is empty.