Problem 3.1 [Thinking Outside The Box]. The orthogonal range query data structure described in Lecture 4 supports the following operation:

\textit{inside}(p, q): return all \( k \) points \textit{inside} the bounding box spanned by points \( p \) and \( q \).

Implement the following operation using \( O(d) \) calls to \textit{inside}():

\textit{outside}(p, q): return all \( k \) points \textit{outside} the bounding box spanned by points \( p \) and \( q \).

Other than the black-box calls to \textit{inside}(), the running time of your algorithm should be \( O(d + k) \). You will receive partial credit if you use \( O(c^d) \) calls to \textit{inside}() for some constant \( c \).

You can assume that all coordinates, including those of queries, are distinct.