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Let (W, S) be a Coxeter system and $T = \{wsw^{-1} : s \in S, w \in W\}$ be the corresponding set of reflections. Furthermore, let $u, v \in W$ with $u \leq v$ in Bruhat order. The Bruhat graph $B(u, v)$ of $[u, v]$ is a directed graph whose vertices are elements of W and whose edges correspond to elements of T . The longest u - v paths of $B(u, v)$ are well understood, but little is known about the other u - v paths. We present an algorithm that separates the paths of a fixed length in $B(u, v)$ into subsets, so that each subset has properties that resemble those of the set of longest u - v paths. (Received February 15, 2011)