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Summary: We consider the problem of performing predecessor searches in a bounded universe while achieving query times that depend on the distribution of queries. We obtain several data structures with various properties: in particular, we give data structures that achieve expected query times logarithmic in the entropy of the distribution of queries but with space bounded in terms of universe size, as well as data structures that use only linear space but with query times that are higher (but still sublinear) functions of the entropy. For these structures, the distribution is assumed to be known. We also consider individual query times on universe elements with general weights, as well as the case when the distribution is not known in advance.

MSC:
68P05 Data structures
68P10 Searching and sorting

Keywords:
data structures; predecessor search; biased search trees; entropy

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