Definitions

Desired operations: predecessor/successor.

Variables:

- $W$: Word Size
- $U$: Universe ($2^W$)
- $N$: Number of items

Emde Boas trees

Find, Predecessor, Successor, Insert, Delete: $O(\log \log U)$
Min, Max: $O(1)$

Simple Tree view

Another view of vEB
Predecessor, Successor: $O(\log \log U)$
Insert, Delete: $O(\log U)$
Indirection: Reduce number of insertions/deletions

Space reduction

Simple: vEB with hashing $O(N)$ w.h.p
X-Fast Tree: Simple Tree view with hashing.
Y-Fast Tree: X-Fast Tree with indirection

Fusion Tree

$W^{1/5}$-ary B-Tree
Static
Predecessor, Successor: $O(\log W N)$
**Sketching**: Reducing to important bits

**Approximate sketch**: Fast (but not optimal) sketching.
Usage of multiplication.

**Parallel Comparison**: Fast search for first lowest sketch.

**Most Significant Bit**: $O(1)$ with basic instructions