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Trimming and gluing Gray codes

Consider the algorithmic problem of generating each subset of $[n] := \{1, 2, ..., n\}$ whose size is in some interval $[a, b]$, $0 \leq a \leq b \leq n$, exactly once by repeatedly adding/removing or exchanging a single element. For $a = 0$ and $b = n$ this is the classical problem of generating all 2^n subsets of $[n]$ by element additions/removals, and for $a = b$ this is the classical problem of generating all $\binom{n}{a}$ subsets of $[n]$ by element exchanges. We construct efficient algorithms for such Gray codes for a large range of n, a, and b, improving upon several previous results.

Joint work with Petr Gregor (Charles University).