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Toufik Mansour, Howard Skogman and Rebecca Smith* (rnsmith@brockport.edu). *Stack sorting tiers and r -tiers.*

Knuth showed that a permutation π can be sorted by a stack (meaning that by applying push and pop operations to the sequence of entries $\pi(1), \dots, \pi(n)$ we can output the sequence $1, \dots, n$) if and only if π avoids the permutation 231, i.e., if and only if there do not exist three indices $1 \leq i_1 < i_2 < i_3 \leq n$ such that $\pi(i_1), \pi(i_2), \pi(i_3)$ are in the same relative order as 231.

When passing a permutation through a stack a single time, the priority of outputting the identity function aligns with not placing larger entries on top of smaller ones within the stack. However, if there is an opportunity to use the stack multiple times, this is no longer always the case. Our work considers algorithms that prioritize outputting the maximum number of entries towards obtaining the identity function without regard to the sequence formed within the stack. Depending on how we rerun the remaining entries, the enumeration of permutations sortable by k passes through the stack leads to some interesting combinatorial bijections involving integer sequences studied by Parker and alternating permutations. (Received September 25, 2018)