**Enumeration Permutations**

Let *S**n*be the set of permutations of [*n*] = { 1, 2, *…*, *n*}. We write a permutation as a sequence of elements in [*n*] such that each element appears exactly once. A *permutation enumeration* is to list all permutations in *S**n*. For example, there are 24 permutations of [[4](https://link.springer.com/referenceworkentry/10.1007/978-1-4939-2864-4_735#ref-CR16270)]: 1234, 1243, 1324, 1342, 1423, 1432, 2134, 2143, 2314, 2341, 2413, 2431, 3124, 3142, 3214, 3241, 3412, 3421, 4123, 4132, 4213, 4231, 4312, 4321. The enumeration of permutations is a basic and long-standing enumeration problem,