From Mathematics to Generic Programming

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Solution.

The symmetric group S_n is the set of all permutations on n elements. A permutation presents the opportunity to choose n elements which will be assigned the *first* position in the shorthand notation for permutations (e.g., $(2 \quad 4 \quad 1 \quad 3)$), $n-1$ elements for the second position, $n-2$ elements for the third, and so on until we reach $n-(n-1)=1$ choices for the *last* element.

Since each choice is independent of the other, we may multiply these choices in what might be visualized as a tree-like structure with $n!$ leaves. There are $n!$ elements in the symmetric group S_n.