

1. Plain TeXnology

Theorem T. *All things are not necessarily the same*

2. Permutations

TAoCP* 1.2.5 gives two methods to generate all permutations of a given ordered set. Quantities of permutations are considered with relevance to computing efficiencies.

3. The Wide-Awake example Group

We re-think, re-word, and re-start with a set of attributes, elements or objects, $W = \{\textit{woozy}, \textit{vacuous}, \textit{sleepy}, \textit{wide} - \textit{awake}\}$. These elements are used to generate all possible arrangements η which are ordered n -tuples with $1 \leq n \leq 4$. For example, $\eta = (\textit{woozy}, \textit{wide} - \textit{awake})$ is a 2-tuple. Now the set $Woozy$ is the set of all permutations that jumble such elements like η

Let $(Woozy, \circ, 0, -)$ be the group with the set $Woozy$, a binary operation \circ , a neutral element 0 , and for each element $\pi \in Woozy$ there is an inverse element $-\pi \in Woozy$ such that $\pi \circ -\pi = 0$.

For now, here, we call this group's binary operation *composition*. Given two elements $\pi, \eta \in Woozy$, then $\pi \circ \eta \in Woozy$ and $\eta \circ \pi \in Woozy$.

* <https://www-cs-faculty.stanford.edu/%7Eknuth/taocp.html>