Algorithm Pseudocode

Algorithm for Generating and Sorting Subsets

We present the algorithm for generating and sorting all subsets of an n-set, ordered by size and lexicographically within sizes.

Algorithm 1: Algorithm for generating and sorting subsets of an n-set

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Input: An integer n representing the size of the set
Output: A list of all subsets of the n-set $\{1, 2, \ldots, n\}$, sorted by size and lexicographically

1 Function GenerateAndSortSubsets(n):
2   all_subsets $\leftarrow$ empty list
3   **for** $i \leftarrow 0$ **to** $2^n - 1$ **do**
4   subset $\leftarrow$ empty set
5   **for** $j \leftarrow 0$ **to** $n - 1$ **do**
6   **if** $i \mathbin{\&} (1 \ll j) \neq 0$ **then**
7   subset $\leftarrow$ subset $\cup \{j + 1\}$
8   **end**
9   **end**
10   all_subsets.append(subset)
11   **end**
12   sort all_subsets by CompareSubsets
13   **return** *all_subsets*
14 end
15 Function CompareSubsets(*subset_a, subset_b*):
16   size_a $\leftarrow$ size(subset_a)
17   size_b $\leftarrow$ size(subset_b)
18   **if** *size_a* $\neq$ *size_b* **then**
19   **return** *size_a - size_b*
20   **else**
21   **for** *index* $\leftarrow$ *0* **to** *size_a - 1* **do**
22   **if** *subset_a[index]* $\neq$ *subset_b[index]* **then**
23   **return** *subset_a[index] - subset_b[index]*
24   **end**
25   **end**
26   **return** *0*
27   **end**
28 end