Words 1 X11585_en

Nucleic acid sequences are labeled over the alphabet $\{A, C, G, T\}$, and there are 4^n possible genomic sequences of length n. Amino acid sequences, on the other hand, are labeled over the alphabet $\{A, C, D, E, F, G, H, I, K, L, M, N, P, Q, R, S, T, V, W, Y\}$, and there are 20^n possible proteomic sequences of length n. An interesting problem is the generation of all the genomic sequences with n nucleotides or all the proteomic sequences with n amino acids, that is, the generation of all the words of length n over an alphabet Σ.

Write pseudocode, Python code, and C++ code for the words problem. The program must implement and use the words function in the pseudocode, which must be iterative and is not allowed to perform input/output operations. Make two submissions, including the pseudocode as a comment to both the Python and the C++ code.

Input

The input is an integer n and an alphabet Σ.

Output

The output is a sorted list of all the words of length n over the alphabet Σ.

Sample input 1

```
1
G T A C
```

Sample output 1

```
A
C
G
T
```

Sample input 2

```
2
G T A C
```

Sample output 2

```
AA
CA
GA
TA
AC
CC
GC
TC
AG
CG
GG
TG
AT
CT
GT
TT
```

Sample input 3

```
3
G T A C
```

Sample output 3

```
AAA
CAA
GAA
TAA
```

ACA
CCA
GCA
TCA
AGA
CGA
GGA
TGA
ATA
CTA
GTA
TTA
AAC
CAC
GAC
TAC
ACC
CCC
GCC
TCC
AGC
CGC
GGC
TGC
ATC
CTC
GTC
TTC
AAG
CAG
GAG
TAG
ACG
CCG
GCG
TCG
AGG
CGG
GGG
TGG
ATG
CTG
GTG
TTG
AAT
CAT
GAT
TAT
ACT
CCT
GCT
TCT
AGT
CGT
GGT
TGT
ATT
CTT
GTT
TTT

Problem information

Author : Gabriel Valiente
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