Permutations 2 X87168_en

Some genome rearrangements change the order of the nucleotides in a nucleic acid sequence, resulting in a permutation of the nucleic acid sequence. For example, TATATA is a frequent rearrangement of TATAAT. An interesting problem is the generation of all the permutations of a genomic sequence of length n.

Write code for the permutations problem. The program must implement and use the PERMUTATIONS function in the pseudocode discussed in class, which is recursive and is not allowed to perform input/output operations. Make one submission with Python code and another submission with C++ code.

Input

The input is a string s over the alphabet $\Sigma = \{A, C, G, T\}$.

Output

The output is a sorted list of all the permutations of s, without repetitions.

Sample input 1

```
ACGT
```

Sample output 1

```
ACGT
ACTG
AGCT
AGTC
ATCG
ATGC
CAGT
CATG
CGAT
CGTA
CTAG
CTGA
GACT
GATC
GCAT
GCTA
GTAC
GTCA
TACG
TAGC
TCAG
TCGA
TGAC
TGCA
```

Sample input 2

```
TATAAT
```

Sample output 2

```
AAATTT
AATATT
AATTAT
AATTTA
ATAATT
```

```
ATATAT
ATATTA
ATTAAT
ATTATA
ATTTAA
TAAATT
TAATAT
TAATTA
TATAAT
TATATA
TATTAA
TTAAAT
TTAATA
TTATAA
TTTAAA
```

Hint

There are at most $n!$ permutations of a genomic sequence of length n.

Problem information

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