
Permutations and cycles (1)

P93873_en

Examen parcial d'Algorísmia, FME (2017-11-06)

Write a program to print all the permutations of $\{1, \dots, n\}$ with exactly k cycles, where $1 \leq k \leq n$. For exemple, consider the permutation $(4, 3, 2, 5, 1, 7, 6)$. At position 1 there is a 4, at position 4 there is a 5, and at position 5 there is a 1. Therefore, one of the cycles is $1 \rightarrow 4 \rightarrow 5 \rightarrow 1$. The other two cycles are $2 \rightarrow 3 \rightarrow 2$ and $6 \rightarrow 7 \rightarrow 6$. The permutation $(3, 2, 1)$ has the two cycles $1 \rightarrow 3 \rightarrow 1$ and $2 \rightarrow 2$, and the permutation $(3, 4, 5, 6, 7, 1, 2)$ only has the cycle $1 \rightarrow 3 \rightarrow 5 \rightarrow 7 \rightarrow 2 \rightarrow 4 \rightarrow 6 \rightarrow 1$.

Input

Input consists of n and k , with $1 \leq k \leq n$.

Output

Print all the permutations of $\{1, \dots, n\}$ with k cycles.

Information about the checker

You can print the solutions to this exercise in any order.

Hint

A possible program does not build the permutations consecutively from left to right, but jumping over the solution, using a function

```
void f(int i, int ini, int cells, int cycles);
```

where i is the next cell to fill, ini is where the current cycle—still to be closed—starts, $cells$ is the number of cells still free, and $cycles$ is the number of cycles yet to be created.

Sample input 1

3 1

Sample output 1

(2, 3, 1)
(3, 1, 2)

Sample input 2

3 2

Sample output 2

(2, 1, 3)
(1, 3, 2)
(3, 2, 1)

Sample input 3

3 3

Sample output 3

(1, 2, 3)

Problem information

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