

2018.1.9 - Circular permutations

George has just learned about the binary (basis 2) representation system. George finds the binary representation interesting and has invented the game CP (circular permutations), which he intends playing with his friend Armin. George tells Armin a non-zero natural number n , given in basis 10 representation (decimal); the number must be transformed in binary representation. One obtains a sequence of binary digits (bits), which must start with 1 (the first bit at left in the binary representation of the number n should be 1).

The idea of the game George invented was to apply one or several circular permutations on the binary representation of number n . In a *circular permutation*, all the digits of the given sequence, except the last, are shifted one position to the right, and the last digit becomes the first digit.

For instance, if $n=107$, its basis 2 (binary) representation is 1101011. By successive circular permutations one obtains, in order, the binary sequences:

```
1110101
1111010
0111101
1011110
0101111
...
```

Each such sequence represents the transcription in base 2 (binary representation) of a natural number m , which has a certain value as decimal number (basis 10). George wants to write a software that will compute the natural number m in his place. Your task is to help George write the software.

Requirement

Find the greatest natural decimal number m , for which the binary representation can be obtained by one, or several circular permutations of the binary representation of the input number n .

Input data

One will read from the keyboard (the standard input stream, *stdin*) on a single line, the non-zero natural number n , written in decimal, which is compliant to the requirement of the problem description (the left-most bit of its binary representation is 1).

Output data

The program will display on the console (the standard output stream, *stdout*), on a single line, the natural number m , that is computed according to the requirements above.

ATTENTION to the compliance to the problem requirements: the display of results must be done EXACTLY as required! In other words, on the standard output stream there will be nothing displayed in addition to the problem requirements; following the automatic evaluation, any supplemental character displayed, or any display different than the requirements, will produce an erroneous result and will lead to the „Reject” of the solution.

Restrictions and remarks

1. $0 < n \leq 100000$
2. **Warning:** According to the chosen programming language, the file containing the code must have one of the extensions .c, .cpp, .java, or .m. The web editor does not add automatically these extensions and the lack of the extensions leads to the impossibility of program compilation!
3. **Warning:** The source file must be named by the candidate as: <name>.<ext> where name is the family name (last name) of the candidate and the extension is the one chosen according to the previous warning. Attention to the restrictions imposed by the Java language regarding the class name and the file name!

Examples

Input	Output	Explanations
13	14	<p>The binary representation of the number 13 is 1101. It follows that the number of bits used for data processing is 4. Out of the 4 circular permutations of this binary string:</p> <p>1101 1110 0111 1011</p> <p>The permutation that generates the maximal decimal number is 1110, which is the decimal number 14.</p>

Worktime: 120 minutes