Problem B. Binary vs Decimal

Input file: `binary.in`
Output file: `binary.out`

Bruce has recently got a job at NEERC (Numeric Expression Engineering & Research Center) facility, which studies and produces many kinds of curious numbers. His first assignment is to perform a study of bindecimal numbers.

A positive integer is called *bindecimal* if its decimal representation is a suffix of its binary representation; both binary and decimal representations are considered without leading zeros. For example, $10_{10} = 10\mathbf{10}_2$, thus, 10 is a bindecimal number. The numbers $1010_{10} = 111111\mathbf{0010}_2$ and $42_{10} = 1010\mathbf{10}_{10}$ are, evidently, not bindecimal.

First of all, Bruce is going to create a list of bindecimal numbers. Help him find the n-th smallest bindecimal number.

Input

The first and the only line contains one integer — n ($1 \le n \le 10\,000$).

Output

Print one integer — the n-th smallest bindecimal number in decimal notation.

Sample input and output

binary.in	binary.out
1	1
2	10
10	1100

Note

Here is a table with the first few numbers which contain only 0's and 1's in their decimal representation (it is clear that all other numbers are not bindecimal):

Decimal	Binary	Comment
1	**1**	1st bindecimal number
10	10**10**	2nd bindecimal number
11	10**11**	3rd bindecimal number
100	1100**100**	4th bindecimal number
101	1100**101**	5th bindecimal number
110	1101**110**	6th bindecimal number
111	1101**111**	7th bindecimal number
1000	111110**1000**	8th bindecimal number
1001	111110**1001**	9th bindecimal number
1010	111111**0010**	Not a bindecimal number
1011	111111**0011**	Not a bindecimal number
1100	1000100**1100**	10th bindecimal number