P0017. Siracusa attacks again — P14410_en

Being n a natural number greater than zero. Consider this algorithm:

- If $n = 1$, stop.
- If n is an even number, divide it by 2.
- If n is an odd number, multiply it by 3 and add 1.

For instance, starting with 6 we obtain $6 \to 3 \to 10 \to 5 \to 16 \to 8 \to 4 \to 2 \to 1$.

The conjecture $3n + 1$ says that starting with any natural number $n > 0$, it always arrives to 1. Although it has not still been proved, using computers we know that is true for numbers $n \leq 4035225266123964416$.

Your task is to write a program that reads two natural numbers m and p and prints which natural numbers between 1 and m arrive to 1 in p or more steps. It must print also which is the greatest number contained in their steps.

Your program must implement and use the procedure

void *converge*(**int** *n*, **int**& *k*, **int**& *far*);

that, given an integer strictly positive |n|, stores at the parameter |k| the number of steps that needs |n| to arrive to 1, and at the parameter |far| the greatest number seen in the process. For instance, |converge(6, k, far);| stores an 8 at |k| and a 16 at |far|. Similarly, |converge(4, k, far);| stores a 2 at |k| and a 4 at |far|, and |converge(1, k, far);| stores a 0 at |k| and an 1 at |far|.

Input

The input is two natural numbers m and p, with $1 \leq m \leq 50000$.

Output

Your program must print all the numbers between 1 and m that arrive to 1 in p or more steps, one per line. Besides, print also the greatest produced number, following the format of the instances.

Sample input 1

```
6 7
```

Sample output 1

```
3
6
The greatest reached number is 16.
```

Sample input 2

```
16 0
```

Sample output 2

```
1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16
The greatest reached number is 160.
```

Sample input 3

```
1 0
```

Sample output 3

```
1
The greatest reached number is 1.
```

Sample input 4

```
2 1
```

Sample output 4

```
2
The greatest reached number is 2.
```

Sample input 5

```
30 200
```

Sample output 5

```
The greatest reached number is 9232.
```

Sample input 6

```
50000 323
```

Sample output 6

```
35655
The greatest reached number is 121012864.
```

Sample input 7

```
447 140
```

Sample output 7

```
327
The greatest reached number is 39364.
```

Problem information

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