BITSEQ

You're given two sequences of n nonnegative integer numbers: $a_1, a_2, \ldots, a_n$ and $c_1, c_2, \ldots, c_n$. The sequence of m integer numbers $i_1, i_2, \ldots, i_m$ is called *beautiful* if it meets with the following criteria:

- $1 \leq i_1 < i_2 < \ldots < i_m \leq n$. In other words, sequence must be increasing.
- $cntbit(a_{i_{j-1}} \text{ AND } a_{i_j}) = c_{i_j}$ for all $1 < j \leq m$.

Find longest *beautiful* sequence.

Note

$cntbit(x)$ — number of ones in binary representation x, e.g. $cntbit(5_{10}) = cntbit(101_2) = 2$, $cntbit(0) = 0$, $cntbit(8) = 1$.

AND — is a binary operation, which takes two equal-length binary representations and performs the logical AND operation on each pair of the corresponding bits, e.g. 11_{10} AND $13_{10} = 1011_2$ AND $1101_2 = 1001_2 = 9$, 7_{10} AND $16_10 = 111_2$ AND $10000_2 = 0_2 = 0_10$.

Implementation Details

```
int[] bitseq(int[] a, int[] c)
```

- a, c: arrays of length n.

Constraints

- $1 \leq n \leq 10^5$
- $0 \leq a_i < 2^{20}$
- $0 \leq c_i \leq 20$

Examples

Example 1

Analyze this function call:

```
int[] bitseq(4, [1, 2, 3, 4], [2, 0, 1, 0])
```

The sequence a from the input is itself a *beautiful* sequence because:

- $cntbit(a_1 \text{ AND } a_2) = cntbit(1_{10} \text{ AND } 2_{10}) = cntbit(001_2 \text{ AND } 010_2) = 0 = c_2$
- $cntbit(a_2 \text{ AND } a_3) = cntbit(2_{10} \text{ AND } 3_{10}) = cntbit(010_2 \text{ AND } 011_2) = 1 = c_3$

- $cntbit(a_3 \text{ AND } a_4) = cntbit(3_{10} \text{ AND } 4_{10}) = cntbit(011_2 \text{ AND } 100_2) = 0 = c_4$

Therefore, the resulting longest *beautiful* sequence is the sequence a itself, $[1, 2, 3, 4]$.

Example 2

Analyze this function call:

```
int[] bitseq(5, [9, 7, 9, 7, 9], [3, 1, 4, 1, 4])
```

The resulting longest *beautiful* sequence are sequences $[1, 2]$ and $[1, 4]$, any of the two solutions is valid.

Subtasks

1. (7 points): $1 \leq n \leq 15, 0 \leq a_i < 2^{20}$
2. (16 points): $1 \leq n \leq 5000, 0 \leq a_i < 2^{20}$
3. (17 points): $1 \leq n \leq 10^5, 0 \leq a_i < 2^8$
4. (60 points): No additional constraints.

Sample Grader

The sample grader reads in the input in the following format:

- line 1: n
- line 2: $a_1\ a_2\ \ldots\ a_n$
- line 3: $c_1\ c_2\ \ldots\ c_n$

The sample grader prints your answers in the following format:

- line 1: Length of the longest *beautiful* sequence.
- line 2: The longest sequence returned from `bitseq`.