

## 4. Broken Address Bus (siin)

1 sec / 3 sec

50 points

The memory in Juku's computer has  $N$  cells, addressed by numbers  $0 \dots N - 1$ . To read the value from a cell, you first have to put the cell's address on the *address bus*. The address bus consists of 16 parallel wires—one for each bit of the address. E.g., to read the value at the address 19, you first write 19 out in binary— $19 = 2^4 + 2^1 + 2^0 = (10011)_2$ —and then put voltage on wires 4, 1, and 0. To read from the address 0, you don't put voltage on any of the wires.

However, some wires are broken—when you put voltage on any of them, the memory chip will not register it. E.g, if the wire 0 is broken, you cannot read from the address  $7 = 2^2 + 2^1 + 2^0$  because it requires voltage on the wire 0. On the other hand, you still can read from  $6 = 2^2 + 2^1$ .

Given the contents of the memory and the set of all intact wires, compute the sum of all the values you can read.

**Input.** The first line of the text file `siinsis.txt` contains  $N$  ( $1 \leq N \leq 2^{16}$ ), the number of values in memory, and  $Q$  ( $1 \leq Q \leq 10^5$ ), the number of queries. The next  $N$  lines contain the values in memory cells, from 0 to  $N - 1$ , one per line. Each value is a non-negative integer not larger than  $10^9$ . The last  $Q$  lines contain the queries. Each query gives the address  $X_i$  ( $0 \leq X_i < 2^{16}$ ) that you get when you put voltage on all the wires that are not broken.

**Output.** The text file `siinval.txt` must contain  $Q$  lines, each with the answer to the corresponding query: the sum of the values that can be read from the memory if the set of working address bus wires is as given in the query parameter  $X_i$ .

<b>Example.</b>	<code>siinsis.txt</code>	<code>siinval.txt</code>
	3 3	10
	10	18
	7	11
	1	
	0	
	15	
	2	

In the query '0', all wires are broken, and only the value 10 at address 0 is readable.

In the query '15', the first 4 wires are working and all values are readable.

In the last query, only the values 10 and 1 are readable.

### Grading.

In test cases worth 10 points in total,  $N \leq 1024$  and  $Q \leq 1000$ .

In test cases worth 10 points in total,  $N \leq 1024$ .

In test cases worth 5 points in total, all  $X_i$  are even.

In test cases worth 5 points in total, all  $X_i$  are odd.