

## Problem 5 – Emergency Repairs

Bai Ivan has a nice wall around his garden, but moles keep burrowing under it and destroying it. Just last night he had to fend off a mole attack on his wall and today he came to town to buy materials to repair it. However he forgot how many holes there were in the wall, you as a talented bit programmer offer to reconstruct the condition of his wall with bit representation based on his account of the story.

On the first line you will receive a **64 bit number** representing the condition of Bai Ivan’s wall before the attack. **Zero bits (0)** represent holes in the wall, while **one bits (1)** represent unbroken parts of the wall. On the second line you will receive a number representing Bai Ivan’s **emergency repair kits**. **One emergency repair kit can fix exactly one hole (one zero bit)**. On the third line you will receive a number **N** representing the **number of attacks** the moles did on Bai Ivan’s wall. On each of the next **N** lines will be a number representing which **bit of the wall the attack targeted**. If the bit is a **one (1) it gets destroyed (set to 0)**, if it is **zero (0) – nothing happens**. **After all the attacks pass** Bai Ivan will pass through the wall **from right to left** to perform emergency repairs using his emergency repair kits, however since Bai Ivan has bad eyesight he doesn’t see the smallest holes and will thus try to fix only the bigger ones (bigger holes are **at least 2 or more consecutive zero bits**). If Bai Ivan **runs out of emergency repair kits before he finishes repairing the wall** he will just leave the rest of the holes unfixed. Your task is to print the condition of the wall represented as a number after the attacks pass and Bai Ivan finishes applying his emergency repairs.

### Input

The input data should be read from the console.

- On the first input line you will receive a 64 bit number representing Bai Ivan’s wall before the attack.
- On the second line you will receive a number representing the amount of emergency kits Bai Ivan has.
- On the third line you will receive a number **N** representing the number of attacks.
- On each of the next **N** lines you will receive a number representing which bit is attacked (bits are counted from right to left starting at 0).

The input data will always be valid and in the format described. There is no need to check it explicitly.

### Output

The output should consist of only one line – the number representing the condition of the wall after the attacks and Bai Ivan’s emergency repairs printed as a positive whole number.

### Constraints

- The **number representing the wall** will be a valid integer between **[0...18,446,744,073,709,551,615]**.
- The number of emergency repair kits will be between **[0...64]**.
- The number of attacks will be between **[0...64]**.
- The numbers representing the attacks will be valid integers between **[0...63]**.
- Allowed working time for your program: 0.1 seconds. Allowed memory: 16 MB.

### Examples

Input	Output	Comments
23555678	6778838	23555678-> 001011001110110111001011110
2		We get 2 emergency kits and 3 attacks.
3		First attack => 63 <sup>th</sup> bit =>
63		001011001110110111001011110
3		It’s already empty so we leave it.
24		Second attack => 3 <sup>rd</sup> bit => 00101100111011011100101110
		The 3 <sup>rd</sup> bit was a 1 so we set it to 0.
		Third attack => 24 <sup>th</sup> bit =>

		<p>00011001110110111001010110</p> <p>The 24<sup>th</sup> bit was a 1 so we set it to 0.</p> <p>Bai Ivan performs emergency repairs now =&gt;</p> <p>00011001110110111110101110</p> <p>Since both the 0<sup>th</sup> the 3<sup>rd</sup> and the 5<sup>th</sup> bits have no neighbors who are zeroes Bai Ivan doesn't see them and instead fixes <b>bits 7 and 8</b> who are 2 consecutive zeroes, using both his emergency repair kits in the process.</p> <p>Notice that even though fixing the 7<sup>th</sup> bit makes the 8<sup>th</sup> an alone zero bit, since Bai Ivan has already seen it he will still fix it.</p>
Input	Output	Comments
<p>6564654864521654</p> <p>5</p> <p>2</p> <p>4</p> <p>52</p>	2061055237676990	<p>6564654864521654-&gt;</p> <p>0000000000010111010100101000010011010001010001011101100110110110</p> <p>We get 5 emergency repair kits and 2 attacks.</p> <p>First attack =&gt; 4<sup>th</sup> bit =&gt;</p> <p>000000000001011101010010100001001101000101000101110110011010110</p> <p>The 4<sup>th</sup> was 1 so we set it to 0.</p> <p>Second attack =&gt; 52<sup>nd</sup> bit =&gt;</p> <p>0000000000001111010100101000010011010001010001011101100110100110</p> <p>The 52<sup>nd</sup> was 1 so we set it to 0.</p> <p>Bai Ivan performs emergency repairs =&gt;</p> <p>00000000000011101010010100001001101000101001101110111011101111011110</p> <p>We miss the 0<sup>th</sup>, 6<sup>th</sup>, 13<sup>th</sup> and 17<sup>th</sup> bit because they have no neighbors who are zeroes and we fix the 3<sup>rd</sup>,4<sup>th</sup>,9<sup>th</sup>,10<sup>th</sup> and 19<sup>th</sup> bits.</p>