B. Deja Vu

time limit per test: 2 seconds
memory limit per test: 256 megabytes

You are given an array a of length n, consisting of positive integers, and an array x of length q, also consisting of positive integers.

There are q modification. On the i-th modification ($1 \le i \le q$), for each j ($1 \le j \le n$), such that a_j is divisible by 2^{x_i}, you add 2^{x_i-1} to a_j. **Note that** x_i ($1 \le x_i \le 30$) is **a positive integer not exceeding 30**.

After **all** modification queries, you need to output the final array.

Input

The first line contains a single integer t ($1 \le t \le 10^4$) — the number of test cases. The description of the test cases follows.

The first line of each test case contains two integers n and q ($1 \le n, q \le 10^5$) —the length of the array a and the number of queries respectively.

The second line of each test case contains n integers $a_1, a_2, a_3, \ldots, a_n$ — the elements of the array a ($1 \le a_i \le 10^9$).

The third line of each test case contains q integers $x_1, x_2, x_3, \ldots, x_q$ — the elements of the array x ($1 \le x_i \le 30$), which are the modification queries.

It is guaranteed that the sum of n and the sum of q across all test cases does not exceed $2 \cdot 10^5$.

Output

For each test case, output the array after all of the modification queries.

Example

input Copy

```
4
5 3
1 2 3 4 4
2 3 4
7 3
7 8 12 36 48 6 3
10 4 2
5 4
2 2 2 2 2
1 1 1 1
5 5
1 2 4 8 16
5 2 3 4 1
```

output Copy

```
1 2 3 6 6
7 10 14 38 58 6 3
3 3 3 3 3
1 3 7 11 19
```

Note

In the first test case, the first query will add 2 to the integers in positions 4 and 5. After this addition, the array would be $[1, 2, 3, 6, 6]$. Other operations will not modify the array.

In the second test case, the first modification query does not change the array. The second modification query will add 8 to the integer in position 5, so that the array would look like this: $[7, 8, 12, 36, 56, 6, 3]$. The third modification query will add 2 to the integers in positions $2, 3$, 4 and 5. The array would then look like this: $[7, 10, 14, 38, 58, 6, 3]$.

Codeforces Round 907 (Div. 2)
Finished
Practice

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Start virtual contest

→ **Clone Contest to Mashup**

You can clone this contest to a mashup.

Clone Contest

→ **Submit?**

Language: GNU G++20 13.2 (64 bit, win

Choose file: Choose File No file chosen

Submit

→ **Last submissions**

Submission	Time	Verdict
231516927	Nov/06/2023 00:23	Accepted
231493719	Nov/05/2023 20:05	Accepted
231485109	Nov/05/2023 18:51	Accepted

→ **Problem tags**

brute force | math | sortings | *1100

No tag edit access

→ **Contest materials**

- Announcement
- Editorial