

Intricate Instrument

Input file: **standard input**
Output file: **standard output**
Time limit: 2 seconds
Memory limit: 1024 megabytes

Dorijan gifted Mr. Nežmah a very intricate instrument. The instrument can play m different notes numbered from 0 to $m - 1$. Interestingly, it can play a tune of n notes s_0, \dots, s_{n-1} only when n is **prime** and the following is true

- the sequence is increasing i.e. $s_i < s_{i+1}$ for all $0 \leq i < n - 1$
- there exist a, b, c and d such that $s_{(a+b \cdot i) \bmod n} = (c + d \cdot i) \bmod m$ for all $0 \leq i < n$, where $0 \leq a < n$, $1 \leq b < n$ and $0 \leq c < m$, $1 \leq d < m$.

Notice that such a, b, c and d uniquely define the given sequence. Nežmah is currently composing a new tune, and he has already filled up some positions with notes. Help him finish the tune! It is enough to output any a, b, c and d which define a valid sequence that matches in the positions Nežmah has already set. It is guaranteed that a solution exists.

Input

The first line contains a single integer t ($1 \leq t \leq 2 \cdot 10^4$), the number of test cases.

The first line of each test case contains 2 integers n and m ($3 \leq n \leq 3 \cdot 10^5$, n is prime, $n \leq m \leq 10^9$).

The second line of each test case contains the resulting array ($-1 \leq u_i < m$, where $u_i = -1$ if Nežmah hasn't yet decided which note should be played in this position).

It is guaranteed that the sum of n over all test cases does not exceed $3 \cdot 10^5$.

Output

For each test case, output 1 line with 4 integers: the required values of a, b, c , and d . If there are multiple possible answers, output any of them.

Example

standard input	standard output
8	3 4 5 7
7 12	2 2 7 8
0 2 4 5 7 9 11	2 1 5 3
5 19	0 1 2 5
-1 4 -1 12 -1	1 4 1 13
3 7	0 1 0 1
1 4 -1	0 1 0 1
7 35	1 3 1 9
2 -1 12 -1 -1 27 -1	
5 14	
0 -1 11 -1 -1	
3 6	
-1 -1 2	
3 16	
-1 -1 -1	
5 14	
-1 1 -1 9 -1	