Problem E. Friends

Some people benefit from large and diverse networks of friends, while others prefer a smaller circle of friends and acquaintances. How about functions.

Consider several functions with coefficients p and μ ($0 \le \mu < p$), denoted by

$$f_0, f_1, \cdots, f_{p-1}.$$

Here p is a prime number and μ is an integer.

The value of function f_i at an integer $x \in \{0, 1, \cdots, p-1\}$ is defined as

$$f_i(x) = ((x^{i+1} \bmod p) + (\mu^{i+1} \bmod p)) \bmod 7.$$

We say a subset S of $\{0, 1, \cdots, p-1\}$ a circle of friends, if all functions in S share the same value at no less than half of positions in $\{0, 1, \cdots, p-1\}$. More specifically, a circle of friends is a subset $S = \{a_1, a_2, \cdots, a_u\}$ of $\{0, 1, \cdots, p-1\}$. It presents u functions $f_{a_1}, f_{a_2}, \cdots, f_{a_u}$, and they have the same value at v distinct locations in $\{0, 1, \cdots, p-1\}$ where $2v \ge p$.

Furthermore, we say a circle of friends is "valuable" if it is maximal. That is say that each bigger set containing a "valuable circle of friends" is not a circle of friends.

Please find and list all "valuable circles of friends".

Input

The inputs contains several test cases. The first line contains an integer T ($1 \le T \le 210$) which is the total number of test cases.

For each test case, a line contains two integers p and μ where p is a prime number and $p \le 100$.

Output

For each test case, if the total number of "valuable circles of friends" is F, output $F + 1$ lines.

Each of the first F lines outputs a subset of $\{0, 1, \cdots, p-1\}$, each of which should be a list of sorted numbers. All valuable circles of friends should be outputted according to the lexicographic order. The last line contains the string "END" as a terminator.

Example

standard input	standard output
2 5 3 7 4	0 4 1 2 3 END 0 3 6 1 4 2 5 END