Problem E

Awesome Cipher Machine

After World War II, a certain group of people in the south Atlantic which are known as Atlantic Community of Machine Lover – abbreviated as ACM Lover – built an amazing oracle machine which is able to decipher any kind of encrypted messages, regardless of the encryption method used in the encrypted message; imagine how amazing it is! Nobody understands how this machine works, even the inventors themselves. Last month, our secret agents managed to obtain this astounding machine. After some studies and thorough investigations, we are confident to say that we have fully understood on how to operate this machine and trained some of our agents to be the machine's operators.

This machine has 40 empty slots in which a resistor can be plugged in each one of them. Whenever a collection of resistors is plugged, this machine will count how many ways to select those resistors such that the total target resistance is equal to a certain value; the selected resistors are arranged in a serial manner, thus the total resistance is just the sum of resistance from each selected resistor.

For example, let there be 5 plugged resistors: A = 10 Ω, B = 20 Ω, C = 20 Ω, D = 30 Ω, and E = 50 Ω.

- If the total target resistance is 40 Ω, then there are two ways to accomplish that:
  - A and D : 10 Ω + 30 Ω
  - B and C : 20 Ω + 20 Ω
- If the total target resistance is 50 Ω, then there are four ways to accomplish that:
  - A, B, and C : 10 Ω + 20 Ω + 20 Ω
  - B and D : 20 Ω + 30 Ω
  - C and D : 20 Ω + 30 Ω
  - E : 50 Ω

Note: Ω (ohm) is an electrical resistance unit.

This machine also has a control setting which contains: N (target total resistance), M (modulo value, a prime number), and K (combination counter, modulo M). This sophisticated machine will function properly if and only if the control setting $\langle N, M, K\rangle$ is satisfied by the given collection of plugged resistors. A control setting $\langle N, M, K\rangle$ is satisfied if and only if there are exactly K ways (modulo M) to select resistors which total resistance is equal to N from the given collection of resistors.

Whenever an encrypted message is fed into this machine, it will do some pre-calculation and produce a control setting: $\langle N, M, K\rangle$. According to our scientists, the produced M is always a prime number (we've never seen a case where M is not a prime number). The operator then has to plug at most 40 resistors such that the $\langle N, M, K\rangle$ control is satisfied.

Understanding how this machine works is less attractive for us at the moment. Currently, we are much more interested on using the machine to decipher any secret encrypted messages intercepted by our spies. However, our operators are not as brilliant as you. Sometimes they have problem producing a collection of resistors which satisfying the $\langle N, M, K\rangle$ control. For each $\langle N, M, K\rangle$ control setting, your task is to find a collection of at most 40 resistors which is able to satisfy the given control. There might be a lot of correct collection, just produce any one of them.

Input

The first line of input contains T ($T \leq 100$) denoting the number of cases. Each case contains three integers N ($50 \leq N \leq 20{,}000$), M ($M < 2^{31}$), and K ($0 \leq K \leq 20{,}000$; $K < M$) representing the control setting in the problem description. M is guaranteed to be a prime number.

Output

For each case, output "`Case #X: Y`" (without quotes) in a line where `X` is the case number (starts from 1) and `Y` is an integer denoting the size of the plugged resistors collection in order to satisfy $\langle N, M, K\rangle$ for that particular case. The next line contains `Y` integers R_i separated by a single space denoting the plugged resistor's resistance. Note that `Y` should be strictly between 1 and 40 (inclusive) and R_i is an integer strictly between 1 and 20,000 (inclusive). Notice that there might be more than one correct resistors collection; you only need to output any one of them.

Sample Input	Output for Sample Input
4 50 1013 4 50 3 1 80 5 1 100 1000000007 13	Case #1: 5 10 20 20 30 50 Case #2: 5 10 20 20 30 50 Case #3: 8 10 20 30 40 50 60 70 80 Case #4: 11 12 18 20 13 41 30 15 11 11 250 28

Explanation for 1st sample case
This is the example from the problem statement

Explanation for 2nd sample case
The same collection also satisfy $\langle 50, 3, 1\rangle$. There are 4 ≡ 1 (mod 3) ways to produce total resistance of 50 Ω; the same way as in 1st sample input.

Explanation for 3rd sample case
In the given collection (output), there are 6 ≡ 1 (mod 5) ways to produce total resistance of 80 Ω. Let the resistors' resistance be: A, B, C, D, E, F, G, H = 10 Ω, 20 Ω, 30 Ω, 40 Ω, 50 Ω, 60 Ω, 70 Ω, 80 Ω respectively. The combinations are:

- A, B, and E : 10 Ω + 20 Ω + 50 Ω
- A, C, and D : 10 Ω + 30 Ω + 40 Ω
- A and G : 10 Ω + 70 Ω
- B and F : 20 Ω + 60 Ω
- C and E : 30 Ω + 50 Ω
- H : 80 Ω

Of course, there are other collections which also satisfy the given control, e.g., 7 resistors of: 10, 20, 20, 20, 30, 40, and 50 have 11 ≡ 1 (mod 5) ways to produce total resistance of 80 Ω.

Explanation for 4th sample case
There's no need to sort the output.