7365 Compositions

A *composition* of an integer n is an ordered set of integers which sum to n. Two compositions with the same elements but in different orders are considered different (this distinguishes *compositions* from *partitions*).

For example, all the *compositions* of the first few integers are:

```
1: {1}
2: {1+1, 2}
3: {1+1+1, 1+2, 2+1, 3}
4: {1+1+1+1, 1+1+2, 1+2+1, 1+3, 2+1+1, 2+2, 3+1, 4}
```

Note that $1 + 2$ and $2 + 1$ each count as distinct compositions of 3. As you may have suspected, there are $2^{(n-1)}$ compositions of n.

In this problem, we set conditions on the elements of the *compositions* of n. A *composition* misses a set S if no element of the composition is in the set S.

For example, the *compositions* of the first few integers which miss the set of even integers are:

```
1: {1}
2: {1+1}
3: {1+1+1, 3}
4: {1+1+1+1, 1+3, 3+1}
```

No odd integer can have a *composition* missing the set of odd integers and any *composition* of an even integer consisting of only even integers must be 2 times a composition of $n/2$.

For this problem you will write a program to compute the number of compositions of an input integer n which miss the elements of the arithmetic sequence $\{m + i * k | i = 0, 1, \ldots\}$.

Input

The first line of input contains a single decimal integer P, $(1 \leq P \leq 10000)$, which is the number of data sets that follow. Each data set should be processed identically and independently.

Each data set consists of a single line of input. It contains the data set number, K, followed by the three space separated integers n, m and k with $(1 \leq n \leq 30)$ and $(0 \leq m < k < 30)$.

Output

For each data set there is one line of output. The single output line consists of the data set number, K, followed by a single space followed by the number of *compositions* of n which miss the specified sequence.

Sample Input

```
3
1 10 0 2
2 15 1 4
3 28 3 7
```

Sample Output

```
1 55
2 235
3 18848806
```