Problem K. Khoshaf

Input file:	`khoshaf.in`
Output file:	`standard output`
Balloon Color:	`Black`

The judges were sitting and they wanted to try Khoshaf (Mix of dried fruits soaked in Apricot juice). They went to a restaurant to order it, however, they found that there is only one dish remaining, so they decided to make a problem, and the first to solve it will have this remaining dish.

The problem is as follows: Given four integers N, K, L, and R, count the number of arrays of length N that contains integer values within the range $[L, R]$ inclusively and has exactly K continuous sub-intervals with sum divisible by 3. The output answer should be taken modulo $10^9 + 7$. Please note that the sub-intervals may **overlap**. Can you help the chief judge to have the final dish?

Input

The first line contains a single integer T specifying the number of test cases.

Each test case consists of a single line containing four integers N, K, L, and R ($1 \leq N, K \leq 10^4$, $1 \leq L \leq R \leq 10^9$), as described in the problem statement.

Output

For each test case, print a single line containing the number of arrays of length N that contains integer values within the range $[L, R]$ inclusively and has exactly K continuous sub-intervals with sum divisible by 3. The output answer should be taken modulo $10^9 + 7$.

Example

khoshaf.in	standard output
3 3 2 1 3 4 3 1 3 5 4 4 8	6 20 1808

Note

In the first test case, any of the following arrays will contain exactly two sub-intervals whose sums are divisible by 3:

[1,2,1] → The sub-intervals are [1,2] and [2,1] with indices [0,1] and [1,2] respectively.

[1,3,2] → [3], [1,3,2]

[2,1,2] → [2,1], [1,2]

[2,3,1] → [3], [2,3,1]

[3,1,3] → [3], [3]

[3,2,3] → [3], [3]