Sereja and GCD

Problem code: SEAGCD

Read problems statements in Mandarin Chinese and Russian.

In this problem Sereja is interested in the number of arrays of integers, $A_1, A_2, ..., A_N$, with $1 \le A_i \le M$, such that the greatest common divisor of all of its elements is equal to a given integer **D**.

Find the sum of answers to this problem with **D = L, D = L+1, ..., D = R**, modulo 10^9+7.

Input

The first line of the input contains an integer **T** - the number of test cases. **T** tests follow, each containing a single line with the values of **N, M, L, R**.

Output

For each test case output the required sum, modulo 10^9+7.

Constraints

- $1 \le T \le 10$
- $1 \le L \le R \le M$

Subtasks

- Subtask #1: $1 \le N, M \le 10$ **(10 points)**
- Subtask #2: $1 \le N, M \le 1000$ **(30 points)**
- Subtask #3: $1 \le N, M \le 10^7$ **(60 points)**

Example

Input:
2
5 5 1 5
5 5 4 5

Output:
3125
2

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Date Added:	21-10-2014
Time Limit:	1 - 15 sec
Source Limit:	50000 Bytes