Cards, bags and coins

Problem code: ANUCBC

All submissions for this problem are available.

Read problems statements in Mandarin Chinese and Russian.

Statement

Yet another game from chef. Chef gives you **N** cards and **M** bags. Each of the **N** cards has an integer written on it. Now chef asks you to close your eyes and choose a subset of them. He then sums the numbers written on chosen cards, takes its absolute value and gives you those many coins. You win the game if you can divide these coins into **M** bags with each bag having equal share. As a first step to calculate the probability of winning, you would like to know the **number of different subsets which will make you win**. Note that all the cards are of different color, so even if 2 cards have the same number written on it, they are still considered as different cards.

Input

The first line of the input contains an integer **T** denoting the number of test cases. The description of **T** test cases follows.
First line of each test case contains two integers **N** and **Q**. **Q** denotes the number of queries to be answered. Second line of each test case contains **N** integers, the numbers written on cards.
Following **Q** lines contain an integer **M**.

Output

For each query output the required Answer modulo **1000000009**. Answer is the number of subsets that will ensure you win.

Constraints

- **1 ≤ T ≤ 3**
- **1 ≤ N ≤ 100000**
- **1 ≤ Q ≤ 30**
- **1 ≤ M ≤ 100**
- **-10^9 ≤ Number on card ≤ 10^9**

Example

Input
2
5 1
1 2 -1 4 5
9
5 2
1 2 3 4 5
5
15

Output
4
8
2

Explanation

Test Case #1, Query #1
{}, {1,-1}, {1,-1,4,5}, {4,5} are winning subsets. Sums are 0, 0, 9, 9 respectively.

Test Case #2, Query #1
{}, {5}, {1,4}, {2,3}, {1,4,5}, {2,3,5}, {1,2,3,4}, {1,2,3,4,5} are winning subsets. Sums are 0, 5, 5, 5, 10, 10, 10, 15 respectively.

Test Case #2, Query #2
{}, {1,2,3,4,5} are winning subsets. Sums are 0 and 15 respectively.

Author's Note

Time Limit is not very strict (Yes, not very loose either) if correct Algorithm is used.Author's solution passes with 2 sec Time Limit (C++ solution, using scanf and printf).

SUCCESSFUL SUBMISSIONS

User	Time	Mem	Lang	Solution
shreygupta	5.50	4.3M	C++11	View
abel	5.51	4.3M	C++11	View
vikram987	5.52	4.3M	C++11	View
sincerio_nishu	5.84	4.1M	C++14	View
enrevol	6.12	4.8M	C++11	View
ezreal	6.73	4.2M	C++ 4.9.2	View
shacer28	6.73	4.2M	C++ 4.9.2	View
witman	8.90	4.7M	C++ 4.3.2	View
raunakkumar01	11.75	3.8M	C++ 4.3.2	View
sachin92	11.81	3.4M	C++ 4.3.2	View
divakar_tomar	11.99	4.6M	C++ 4.3.2	View
betrayermor	13.68	9.9M	C++ 4.8.1	View

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HELP

Program should read from **standard input** and write to **standard output**. After you submit a solution you can see your results by clicking on the **[My Submissions]** tab on the problem page. Below are the possible results:

- **Accepted** Your program ran successfully and gave a correct answer. If there is a score for the problem, this will be displayed in parenthesis next to the checkmark.
- **Time Limit Exceeded** Your program was compiled successfully, but it didn't stop before time limit. Try optimizing your approach.
- **Wrong Answer** Your program compiled and ran succesfully but the output did not match the expected output.
- **Runtime Error** Your code compiled and ran but

Maximum Input File Size < 4MB.

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Tester:	white_king
Editorial	http://discuss.codechef.com/problems/ANUCBC
Tags	anudeep2011 april14 dynamic-prog medium
Date Added:	15-01-2014
Time Limit:	3 sec
Source Limit:	50000 Bytes
Languages:	ADA, ASM, BASH, BF, C, C99 strict, CAML, CLOJ, CLPS, CPP 4.3.2, CPP 4.9.2, CPP14, CS2, D, ERL, FORT, FS, GO, HASK, ICK, ICON, JAVA, JS, LISP clisp, LISP sbcl, LUA, NEM, NICE, NODEJS, PAS fpc, PAS gpc, PERL, PERL6, PHP, PIKE, PRLG, PYTH, PYTH 3.1.2, RUBY, SCALA, SCM guile, SCM qobi, ST, TCL, TEXT, WSPC

SUBMIT

encountered an error. The most common reasons are using too much memory or dividing by zero. For the specific error codes see the help section.

- **Compilation Error** Your code was unable to compile. When you see this icon, click on it for more information.

If you are still having problems, see a sample solution here.

Comments

Need help? Post a comment. But before that please spare a moment to read the guidelines.
Your name:
akashiitj
Comment: *

Save