

PROBLEMS SUBMIT STATUS STANDINGS CUSTOM TEST

## B. Maximum Sum

time limit per test: 1 second  
memory limit per test: 256 megabytes

You have an array  $a$  of  $n$  integers.

You perform exactly  $k$  operations on it. In one operation, you select any contiguous subarray of the array  $a$  (possibly empty) and insert the sum of this subarray anywhere in the array.

Your task is to find the maximum possible sum of the array after  $k$  such operations.

As this number can be very large, output the answer modulo  $10^9 + 7$ .

Reminder: the remainder of a number  $x$  modulo  $p$  is the smallest non-negative  $y$  such that there exists an integer  $q$  and  $x = p \cdot q + y$ .

### Input

Each test consists of several test cases. The first line contains a single integer  $t$  ( $1 \leq t \leq 10^4$ ) — the number of test cases. Then follows the description of the test cases.

The first line of each test case contains two integers  $n$  and  $k$  ( $1 \leq n, k \leq 2 \cdot 10^5$ ) — the length of the array  $a$  and the number of operations, respectively.

The second line of each test case contains  $n$  integers  $a_1, a_2, \dots, a_n$  ( $-10^9 \leq a_i \leq 10^9$ ) — the array  $a$  itself.

It is guaranteed that the sum of the values of  $n$  and  $k$  for all test cases does not exceed  $2 \cdot 10^5$ .

### Output

For each test, output a single integer — the maximum sum of the array that can be obtained after  $k$  operations modulo  $10^9 + 7$ .

### Example

input

Copy

12  
2 2  
-4 -7  
3 3  
2 2 8  
1 7  
7  
5 1  
4 -2 8 -12 9  
7 4  
8 14 -9 6 0 -1 3  
7 100  
5 3 -8 12 -5 -9 3  
6 1000  
-1000000000 -1000000000 -1000000000 -1000000000 -1000000000 -1000000000  
2 1  
1000000000 8  
5 4  
0 0 0 0 0  
6 10  
48973 757292 58277 -38574 27475 999984  
7 1  
-1000 1000 -1000 1000 -1000 1000 -1000  
10 10050  
408293874 -3498597 7374783 295774930 -48574034 26623784 498754833 -294875830 283045804 85938045

output

Copy

999999996  
96  
896  
17  
351  
716455332  
42  
2  
0  
897909241  
0  
416571966

### Note

In the first test case, it is advantageous to take an empty subarray of the array twice and insert the sum of the empty subarray (zero) anywhere, then the sum of the resulting array will be  $(-4) + (-7) + 0 + 0 = -11$ , modulo  $10^9 + 7$  this is 999 999 996.

In the second test case, it is advantageous to take the sum of the entire array three times and place it anywhere in the array, then one of the possible sequences of actions:  $[2, 2, 8] \rightarrow [2, 2, 8, 12] \rightarrow [2, 2, 8, 12, 24] \rightarrow [2, 2, 8, 12, 24, 48]$ , the sum of the final array is  $2 + 2 + 8 + 12 + 24 + 48 = 96$ .

In the fourth test case, it is advantageous to take a subarray of the array consisting of the first three numbers (i.e. consisting of the numbers 4,  $-2$  and 8) and insert its sum at the beginning of the array, thereby obtaining the array  $[10, 4, -2, 8, -12, 9]$ , the sum of this array is 17.

In the seventh test case, it will always be advantageous for us to take an empty subarray of the array. In this case, the sum of the resulting array will not differ from the sum of the original. The answer will be the sum of the original array, taken modulo — 42, because  $(-6 \cdot (10^9 + 7) + 42 = -6\,000\,000\,000)$ .

### Codeforces Round 936 (Div. 2)

Finished

Practice



### → Virtual participation

Virtual contest is a way to take part in past contest, as close as possible to participation on time. It is supported only ICPC mode for virtual contests. If you've seen these problems, a virtual contest is not for you - solve these problems in the archive. If you just want to solve some problem from a contest, a virtual contest is not for you - solve this problem in the archive. Never use someone else's code, read the tutorials or communicate with other person during a virtual contest.

Start virtual contest

### → Clone Contest to Mashup

You can clone this contest to a mashup.

Clone Contest

### → Submit?

Language: GNU G++20 13.2 (64 bit, win)

Choose file: Choose File No file chosen

Submit

### → Last submissions

Submission	Time	Verdict
<a href="#">257195612</a>	Apr/18/2024 18:52	Accepted
<a href="#">257195500</a>	Apr/18/2024 18:51	Wrong answer on test 3
<a href="#">257194640</a>	Apr/18/2024 18:45	Wrong answer on test 3
<a href="#">257193381</a>	Apr/18/2024 18:34	Accepted
<a href="#">257193191</a>	Apr/18/2024 18:33	Wrong answer on test 3
<a href="#">257193028</a>	Apr/18/2024 18:31	Wrong answer on test 3
<a href="#">257192512</a>	Apr/18/2024 18:27	Wrong answer on test 3
<a href="#">257191891</a>	Apr/18/2024 18:22	Wrong answer on test 3
<a href="#">257191673</a>	Apr/18/2024 18:21	Wrong answer on test 1

### → Problem tags

dp greedy math \*1100

No tag edit access

### → Contest materials

- Announcement
- Tutorial (en)