

## E. Binary String Wowee

time limit per test: 2 seconds  
memory limit per test: 256 megabytes

Mouf is bored with themes, so he decided not to use any themes for this problem.

You are given a binary\* string  $s$  of length  $n$ . You are to perform the following operation exactly  $k$  times:

- select an index  $i$  ( $1 \leq i \leq n$ ) such that  $s_i = 0$ ;
- then flip<sup>†</sup> each  $s_j$  for all indices  $j$  ( $1 \leq j \leq i$ ).

You need to count the number of possible ways to perform all  $k$  operations.

Since the answer could be ginormous, print it modulo 998 244 353.

Two sequences of operations are considered different if they differ in the index selected at any step.

\* A binary string is a string that consists only of the characters 0 and 1.

† Flipping a binary character is changing it from 0 to 1 or vice versa.

### Input

Each test contains multiple test cases. The first line contains the number of test cases  $t$  ( $1 \leq t \leq 100$ ). The description of the test cases follows.

The first line of each test case contains two integers  $n$  and  $k$  ( $1 \leq k \leq n \leq 500$ ) — the length of the binary string  $s$  and the number of times the operation must be performed, respectively.

The second line of each test case contains a binary string  $s$  of length  $n$  consisting of only characters 0 and 1.

It is guaranteed that the sum of  $n$  does not exceed 500 over all test cases.

### Output

For each test case, output a single integer — the number of ways you can perform exactly  $k$  operations, modulo 998 244 353.

### Example

input	Copy
5	
3 1	
010	
3 2	
000	
5 4	
01001	
8 8	
11001100	
20 20	
10010110101101010110	
output	Copy
2	
3	
10	
27286	
915530405	

### Note

In the first test case, here are all the possible sequences of operations:

- $010 \xrightarrow{i=1} 110$
- $010 \xrightarrow{i=3} 101$

In the second test case, here are all the possible sequences of operations:

### Codeforces Round 1025 (Div. 2)

Finished

Practice



### → Virtual participation

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Start virtual contest

### → Clone Contest to Mashup

You can clone this contest to a mashup.

Clone Contest

### → Submit?

Language: GNU G++23 14.2 (64 bit, ms)

Choose file: Choose File No file chosen

Submit

### → Last submissions

Submission	Time	Verdict
<a href="#">322054938</a>	May/30/2025 15:57	Accepted

### → Problem tags

combinatorics dp strings \*2400

No tag edit access

### → Contest materials

- Announcement (en)
- Tutorial (en)

- $000 \xrightarrow{i=1} 100 \xrightarrow{i=2} 010$
- $000 \xrightarrow{i=1} 100 \xrightarrow{i=3} 011$
- $000 \xrightarrow{i=2} 110 \xrightarrow{i=3} 001$

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