A - Caesar Cipher

Time Limit: 2 sec
Memory Limit: 1024 MB

Bob has been employed by a reputable company as a Caesar Cipher expert with the task of implementing a programming algorithm into their machines to enhance the security of the organization. Bob has recommended the integration of an algorithm that necessitates to check encrypted language with multiple constraints. Specifically, Algorithm must check that the language incorporates numerical digits that fall inside of the not commonly used range, spanning from **100000** to **999999**. This will serve as a crucial measure to thwart attempts at code cracking. Furthermore, as an essential security measure to prevent connection refusals through socket communication, Bob has advised us to check that the language should start and end with **capital alphabet letter**. By adhering to these recommendations, the company can significantly increase its security measures and safeguard its systems from unauthorized access and potential breaches.

Constraints:

S consists of uppercase English letters and digits.
The length of S is between 1 and 10, inclusive

Input:

Input a string S.

Output:

Print Yes, if S satisfies the algorithm conditions, else print No.

Examples:

Input 1	Output 1
Q142857Z	Yes

S satisfies all the conditions such that; Q and Z are uppercase English letters, and 142857 is a string that is a decimal representation of an integer between 100000 and 999999, so S satisfies the condition.

Input 2	Output 2
AB912278C	No

AB is not an uppercase English letter, so S does not satisfy the condition.

Input 3	Output 3
X900000	No

Input 4	Output 4
K012345K	No

012345 is not a string of length 6 that is a decimal representation of an integer between 100000 and 999999, so S does not satisfy the condition.

B - The Weight of the Lives

Time Limit: 2 sec
Memory Limit: 1024 MB

Consider a group of N individuals, each characterized as either a Worthy or Non-Worthy individual, denoted by a binary string S of length N (0 representing a child and 1 an adult). Each person has an associated weight, represented by W_i. Consider a person, Erwin Smith, when he is provided with a real number X, he categorizes those individuals with a weight less than X as Non-Worthy and those with a weight greater than or equal to X as Worthy. Let f(X) represent the count of correctly classified individuals. Determine the maximum possible value of f(X) across all real values of X.

Constraints

$1 \leq N \leq 2 \times 10^5$
S is a string of length N consisting of 0 and 1.
$1 \leq W_i \leq 10^5$
N and W_i are integers.

Input

Input is given from Standard Input in the following format:
N
S
$W_1\ W_2\ \ldots\ W_N$

Examples

INPUT 1	OUTPUT 1
5 10101 60 45 30 40 80	4

When Erwin assumes X to be 50, he considers the 2-nd, 3-rd, and 4-th people to be Non-Worthy and the 1-st and 5-th to be Worthy.
However, in reality, the 2-nd and 4-th are Non-Worthy, and the 1-st, 3-rd, and 5-th are Worthy, so the 1-st, 2-nd, 4-th, and 5-th people are correctly judged. Thus, f(50)=4, 4 is now **The Weight of the Lives**.
This is the maximum since there is no X that judges correctly for all 5 people. Thus, 4 should be printed.

INPUT 2	OUTPUT 2
3 000 1 2 3	3

For example, When Erwin Smith assumes X to be 10, he achieves the maximum value f(10)=3.
Note that the people may be all Worthy or Non-Worthy.

INPUT 3	OUTPUT 3
5 10101 60 50 50 50 60	4

For example, When Erwin assumes X to be 55, he achieves the maximum value f(55)=4.
Note that there may be multiple people with the same Weight of their lives.

C - Dice Sum

Time Limit: 2 sec
Memory Limit: 1024 MB

How many integer sequences of length N, A = (A_1, …, A_N), satisfy all of the conditions below?

- $1 \leq A_i \leq M \, (1 \leq i \leq N)$
- $\sum_{i=1}^{N} A_i \leq K$

Since the count can get enormous, find it modulo 998244353.

Constraints

1 ≤ N, M ≤ 50
N ≤ K ≤ N M
All values in input are integers.

Input

The input is given from Standard Input in the following format:
N M K

Output

Print the answer.

Examples

Input 1	Output 1
2 3 4	6

The following six sequences satisfy the conditions.
(1,1)
(1,2)
(1,3)
(2,1)
(2,2)
(3,1)

Input 2	Output 2
31 41 592	798416518

Be sure to print the count modulo 998244353.