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F2. Long Colorful Strip

time limit per test: 6 seconds
memory limit per test: 256 megabytes
input: standard input
output: standard output

This is the second subtask of problem F. The only differences between this and the first subtask are the constraints on the value of m and the time limit. It is sufficient to solve this subtask in order to hack it, but you need to solve both subtasks in order to hack the first one.

There are $n + 1$ distinct colours in the universe, numbered 0 through n. There is a strip of paper m centimetres long initially painted with colour 0.

Alice took a brush and painted the strip using the following process. For each i from 1 to n, **in this order**, she picks two integers $0 \le a_i < b_i \le m$, such that the segment $[a_i, b_i]$ is currently painted with a **single** colour, and repaints it with colour i.

Alice chose the segments in such a way that each centimetre is now painted in some colour other than 0. Formally, the segment $[i - 1, i]$ is painted with colour c_i ($c_i \ne 0$). Every colour other than 0 is visible on the strip.

Count the number of different pairs of sequences $\{a_i\}_{i=1}^n$, $\{b_i\}_{i=1}^n$ that result in this configuration.

Since this number may be large, output it modulo 998244353.

Input

The first line contains a two integers n, m ($1 \le n \le 500$, $n \le m \le 10^6$) — the number of colours excluding the colour 0 and the length of the paper, respectively.

The second line contains m space separated integers $c_1, c_2, \ldots, c_m$ ($1 \le c_i \le n$) — the colour visible on the segment $[i - 1, i]$ after the process ends. It is guaranteed that for all j between 1 and n there is an index k such that $c_k = j$.

Output

Output a single integer — the number of ways Alice can perform the painting, modulo 998244353.

Examples

input
```
3 3
1 2 3
```

output
```
5
```

input
```
2 3
1 2 1
```

output
```
1
```

input

Codeforces Global Round 4

Contest is running

00:43:52

Contestant

⭐

→ Submit?

Language: Python 3.7.2   ▼
Almost always, if you send a solution on PyPy, it works much faster

Choose file: [Choose File]   No file chosen

Be careful: there is 50 points penalty for submission which fails the pretests or resubmission (except failure on the first test, denial of judgement or similar verdicts). "Passed pretests" submission verdict doesn't guarantee that the solution is absolutely correct and it will pass system tests.

[Submit]

→ Score table

	Score
Problem A	331
Problem B	496
Problem C	826
Problem D	1157
Problem E	1322
Problem F1	992
Problem F2	992
Problem G	2148
Problem H	2644
Successful hack	100
Unsuccessful hack	-50
Unsuccessful submission	-50
Resubmission	-50

* If you solve problem on 01:46 from the first attempt

```
2 3
2 1 2
```

output   `Copy`

```
0
```

input   `Copy`

```
7 7
4 5 1 6 2 3 7
```

output   `Copy`

```
165
```

input   `Copy`

```
8 17
1 3 2 2 7 8 2 5 5 4 4 4 1 1 6 1 1
```
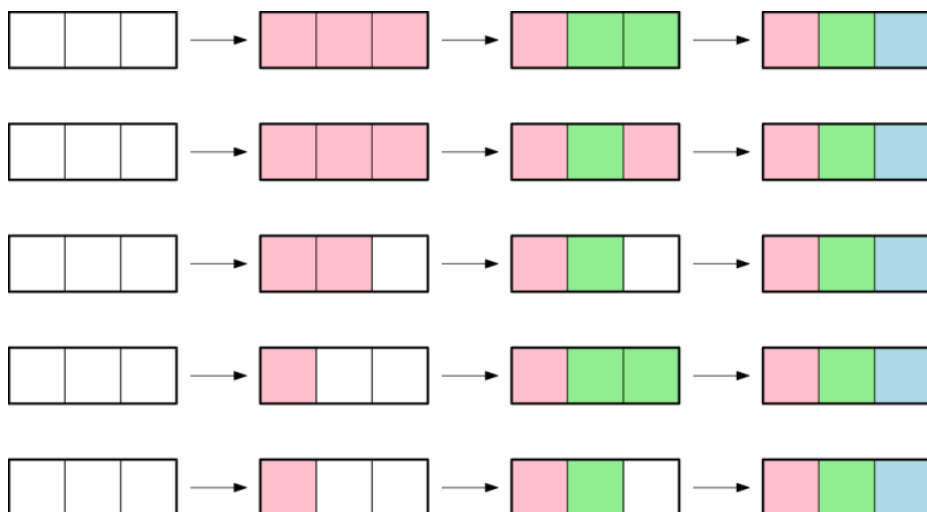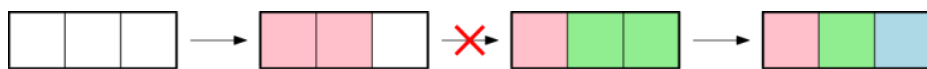
output   `Copy`

```
20
```

Note

In the first example, there are 5 ways, all depicted in the figure below. Here, 0 is white, 1 is red, 2 is green and 3 is blue.

Below is an example of a painting process that is not valid, as in the second step the segment $1\ 3$ is not single colour, and thus may not be repainted with colour 2.

In the second example, Alice must first paint segment $0\ 3$ with colour 1 and then segment $1\ 2$ with colour 2.