Task 2: `Shops`

James is the mayor of Yuland, which consists of n cities connected by m bidirectional roads of varying distances. It is possible to travel from any city to any other city using only the roads. Note that there might be multiple roads between the same pair of cities.

Each city can have either a bunny or duck shop but not both. Residents of each city want to collect **both** animals. The inconvenience of a city is defined as the maximum between the distance to the nearest bunny shop and the distance to the nearest duck shop.

James has not built the shops yet and needs your help to choose which cities to build which shops to **minimize** the maximum of inconveniences across all cities.

Input format

Your program must read from standard input.

The first line contains two integers n, m.

The next m lines contains 3 integers $u[i], v[i], w[i]$ representing a road connecting cities $u[i]$ and $v[i]$ of distance $w[i]$.

Output format

Your program must print to standard output.

The first line should be the minimal possible maximum of inconveniences across all cities.

The next line should be a string of n characters that are either B or D where the ith character represents whether you choose to build a bunny or duck shop in the ith city respectively. If there are multiple ways to build the shops such that the maximum inconvenience is as stated in the first line any will be accepted.

Subtasks

For all test cases, the input will satisfy the following bounds:

- $2 \leq n, m \leq 500\,000$

- $1 \le u[i], v[i] \le n$

- $1 \le w[i] \le 10^9$

- It is possible to travel from any city to any other city using only the roads

Your program will be tested on input instances that satisfy the following restrictions:

Subtask	Marks	Additional Constraints
0	0	Sample Testcases
1	7	$n \le 16$
2	13	$m = n - 1, u[i] = i, v[i] = i + 1$
3	18	$m = n - 1$
4	24	$w[i] = 1$
5	38	No additional constraints

Sample Testcase 1

This testcase is valid for subtask 1,5.

Input	Output
3 3 1 2 3 2 3 1 1 3 2	2 BBD

Sample Testcase 1 Explanation

In this assignment, cities 1 and 2 have a bunny shop while city 3 has a duck shop. Hence, the inconvenience for each city would be $[2, 1, 1]$, the maximum being 2 from city 1.

Sample Testcase 2

This testcase is valid for subtask 1,5.

Input	Output
5 6 3 2 3 4 2 1 5 3 9 1 3 5 1 4 2 2 3 1 	9 DBDDB

Sample Testcase 2 Explanation

In this assignment, the inconvenience of each city would be $[3, 1, 1, 1, 9]$, the maximum being 9 from city 5.