Highways

Input file:	`standard input`
Output file:	`standard output`
Time limit:	3 seconds
Memory limit:	256 megabytes

Timothy travels between lattice points on a coordinate plane, with $Y \in 1, 2...N$ and $X \in 1, 2...M$. He can freely move up and down across Y coordinates, but cannot move freely left and right across X coordinates. However, there are K roads available to him, each of which spans from (x_a, y_r) to (x_b, y_r) where $x_a \leq x_b$, and allows him to move freely between any points (x_i, y_r) and (x_j, y_r) where $x_a \leq x_i$, $x_j \leq x_b$. We have to answer Q queries, each of which asks if it's possible to travel from (A, B) to (C, D), traveling only across y coordinates between $min(B, D)$ and $max(B, D)$ inclusive (so he may use roads with y-coordinate B or D).

Input

The first line contains the integers N $(1 \leq N \leq 10^9)$, M $(1 \leq M \leq 2 \cdot 10^5)$, K $(1 \leq K \leq 2 \cdot 10^5)$, and Q $(1 \leq Q \leq 2 \cdot 10^5)$ respectively.

The next K lines denote each of the roads with three integers x_a, x_b, and y_r respectively $(1 \leq x_a \leq x_b \leq M$, $1 \leq y_r \leq N)$.

The final Q lines each denote a query with the integers A, B, C, D $(B \neq D$, $1 \leq A, C \leq M$, $1 \leq B, D \leq N)$.

Test cases 1-5: N, M, K, $Q \leq 2000$

Test cases 6-20: No further restrictions

Output

Q lines of output where the i'th line is a "YES"if Timothy can reach his destination in the i'th query, and a "NO"if he cannot.

Example

standard input	standard output
10 5 2 2 1 2 2 2 3 1 1 1 3 3 4 3 2 1	YES NO

Note

On the first query note that Timothy can move up to $(1, 2)$, then take the first road to $(2, 2)$. Then he can move down to $(2, 1)$, use the second road to move to $(3, 1)$, and from there move up to his destination at $(3, 3)$. On the second query note that Timothy is only able to move up and down and therefore not able to make it from $(4, 3)$ to $(2, 1)$.

Idea: Timothy

Preparation: Timothy, Bossologist

Occurences: Advanced 7