Iridescent Universe

Input file:	`standard input`
Output file:	`standard output`
Time limit:	1 second
Memory limit:	512 megabytes

雨过天晴白云飘，
天空架起彩虹桥。
赤橙黄绿青蓝紫，
数数颜色有七道。

The background story in the Chinese statements is removed due to the translation difficulties. >_<

When Little Cyan Fish was young, he believed that formal science is also a form of art. Just as an artist defines his canvas, theoretical scientists also use their own ways to give unique colors to theories.

Now, Little Cyan Fish has an undirected graph G with n nodes and m edges. In Little Cyan Fish's universe, there are k types of colors $1, 2, \cdots, k$. The i-th edge (where $1 \leq i \leq m$) connects nodes u_i and v_i, and its color is c_i (where $1 \leq c_i \leq k$). Of course, it is possible that there is a color that is not used by any edge—this is unavoidable, as some colors are destined not to appear in the world.

"How wonderful it is, from crimson to light blue, from grayish white to deep black." Unfortunately, Little Cyan Fish discovers that his favorite color does not appear in this universe. Little Cyan Fish can only settle for the k colors available to complete his work. After careful consideration, Little Cyan Fish believes that if the color of the i-th edge can ultimately be modified to t_i, then this world can still become very cool. To achieve this dream, Little Cyan Fish can use the following magic to modify this rainbow graph:

- Choose a node x and a color y, and color all edges adjacent to x (i.e., having one endpoint as x) with y.

Of course, Little Cyan Fish's magical power is limited; he can cast magic at most n times. Little Cyan Fish wants to know if it is possible to use magic to make the color of the i-th edge turn into color t_i. If possible, please provide Little Cyan Fish with a solution.

To help you solve this problem, Little Cyan Fish has proven that if there exists a valid solution, then there is certainly a solution that requires at most n operations. I hope this observation can help you and help Little Cyan Fish.

Input

The first line of input contains three integers n, m, k ($1 \leq n \leq 2 \times 10^5$, $0 \leq m \leq 2 \times 10^5$, $1 \leq k \leq 2 \times 10^5$), representing the number of nodes, the number of edges, and the number of color types, respectively.

The next m lines, the i-th line contains four integers u_i, v_i, c_i, t_i ($1 \leq u_i, v_i \leq n$, $1 \leq c_i, t_i \leq k$) representing the information of the i-th edge.

It is guaranteed that there are no multiple edges or self-loops in the given graph.

Output

If there is a solution, the first line of output should contain an integer s indicating the number of magic casts, ensuring that $0 \leq s \leq n$. The next s lines should each contain two integers u, c (ensuring that $1 \leq u \leq n$, $1 \leq c \leq k$) representing one operation.

If there is no solution, output a line with -1.

Examples

standard input	standard output
4 5 2 1 2 1 2 1 3 1 1 2 3 1 2 2 4 1 2 3 4 1 1	1 2 2
3 3 3 1 2 1 2 2 3 2 3 3 1 3 1	-1