Codeforces 455B – A lot of Games:

Andrew, Fedor and Alex are inventive guys. Now they invent the game with strings for two players.
Given a group of n non-empty strings. During the game two players build the word together, initially the word is empty. The players move in turns. On his step player must add a single letter in the end of the word, the resulting word must be prefix of at least one string from the group.A player loses if he cannot move.
Andrew and Alex decided to play this game k times. The player who is the loser of the i-th game makes the first move in the (i + 1)-th game. Guys decided that the winner of all games is the player who wins the last (k-th) game. Andrew and Alex already started the game. Fedor wants to know who wins the game if both players will play optimally. Help him.

Input

The first line contains two integers, n and k ($1 \le n \le 10^5$; $1 \le k \le 10^9$).
Each of the next n lines contains a single non-empty string from the given group. The total length of all strings from the group doesn't exceed 10^5. Each string of the group consists only of lowercase English letters.

Output

If the player who moves first wins, print "First", otherwise print "Second".

Idea:

To solve this problem we need the prefix tree(trie), which will have all the strings from the group. Next we will calculate the two DP:

win[u] — Can player win if he makes a move now (players have word equal to prefix u in the prefix tree(trie)).
lose[u] — Can player lose if he makes a move now (players have word equal to prefix u in the prefix tree(trie)).

if u is leaf of trie, then win[u] = false; lose[u] = true;
Else win[u] = (win[u] or (not win[v])); lose[u] = (lose[u] or (not lose[v])),
such v — children of vertex u.

Let's look at a few cases:
If win[u] = false, then second player win (first player lose all games).
If win[u] = true and lose[u] = true, then first player win (he can change the state of the game in his favor).
If win[u] = true and lose[u] = false, then if k is odd, then first player win, else second player win.