#include <bits/stdc++.h>

#define rep(i,a,b) for(ll i = a; i<=b ;++i)

#define per(i,a,b) for(ll i = a; i>=b ;--i)

#define inf 0x3f3f3f3f

#define mem(a) memset(a, false, sizeof(a))

#define IO ios\_base::sync\_with\_stdio(0),cin.tie(0)

typedef long long ll;

#define maxn 40

const int N = 2e5 + 10;

using namespace std;

int w, h, l, n;

char s[15][15];

bool vit[4][15][15];

int dir[2][4] = {0,1,0,-1,1,0,-1,0};

map<ll, int>mp;

struct Node

{

int x[4], y[4], step;

}st;

bool check( int x, int y)

{

if( x < 1 || y < 1 || x > w || y > h )

return false;

return true;

}

int bfs()

{

queue<Node> q;

st.step = 0;

q.push(st);

mem(vit);

rep(i, 0, 3)

vit[i][st.x[i]][st.y[i]] = 1;

while( !q.empty())

{

Node h = q.front();

q.pop();

if( h.step > l)

continue;

if( s[h.x[0]][h.y[0]] == 'X' )//1号走到了X

{

//cout << "h.step" << h.step;

return h.step;

}

rep(i, 0, n-1)

{

int xx = h.x[i] , yy = h.y[i];

rep(j, 0, 3)

{

int xi = xx + dir[0][j];

int yi = yy + dir[1][j];

int ff = 1;

while( check(xi, yi) && s[xi][yi] !='W' )

{

ff = 1;

rep(k, 0, n-1)//n个点

{

if( xi == h.x[k] && yi == h.y[k] )

{

ff = 0;

break;

}

}

if( ff == 0)

break;

xi += dir[0][j];

yi += dir[1][j];

}

xi -= dir[0][j];

yi -= dir[1][j];

if( xi == xx && yi == yy)

continue;

ll sum = 0;

rep(k, 0, n-1) // 状态压缩

{

if( k == i)

{

sum \*= 10;

sum += xi;

sum \*= 10;

sum += yi;

}

else

{

sum \*= 10;

sum += h.x[k];

sum \*= 10;

sum += h.y[k];

}

}

if( mp[sum] )

continue;

mp[sum] = 1;

//cout <<xi <<' ' << yi << endl;

Node node ;

rep(k, 0, n-1)

{

node.x[k] = h.x[k];

node.y[k] = h.y[k];

}

node.x[i] = xi;

node.y[i] = yi;

node.step = h.step+1;

//cout << i << ' ' << xi << ' ' << yi << ' '<< !i << ' ' << h.x[!i] << ' ' << h.y[!i] <<endl;

q.push(node);

}

}

}

return -1;

}

int main()

{//IO;

cin >> n >> h >> w >> l;

rep(i, 1, w){

rep(j, 1, h){

cin >> s[i][j];

if( s[i][j] >= '1' && s[i][j] <= '4' )

st.x[ s[i][j] -'1' ] = i, st.y[ s[i][j] -'1'] = j;

}

}

int aa = bfs();

if( aa == -1)

cout << "NO SOLUTION" <<endl;

else cout << aa << endl;

}