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You are given the number of rows `n_rows` and number of columns `n_cols` of a 2D binary matrix where all values are initially 0. Write a function `flip` which chooses a 0 value [uniformly at random](#), changes it to 1, and then returns the position `[row.id, col.id]` of that value. Also, write a function `reset` which sets all values back to 0. **Try to minimize the number of calls to system's `Math.random()` and optimize the time and space complexity.**

Note:

1. `1 <= n_rows, n_cols <= 10000`
2. `0 <= row.id < n_rows` and `0 <= col.id < n_cols`
3. `flip` will not be called when the matrix has no 0 values left.
4. the total number of calls to `flip` and `reset` will not exceed 1000.

Example 1:

Input:

```
["Solution","flip","flip","flip","flip"]
```

```
[[2,3],[],[],[],[ ]]
```

Output: `[null,[0,1],[1,2],[1,0],[1,1]]`

Example 2:

Input:

```
["Solution","flip","flip","reset","flip"]
```

```
[[1,2],[],[],[ ],[ ]]
```

Output: `[null,[0,0],[0,1],null,[0,0]]`

Explanation of Input Syntax:

The input is two lists: the subroutines called and their arguments. `Solution`'s constructor has two arguments, `n_rows` and `n_cols`. `flip` and `reset` have no arguments. Arguments are always wrapped with a list, even if there aren't any.