

# Trump Towers (100 points)

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## Introduction

Donald Trump has been struggling to maintain his real-estate empire while campaigning for president. He wants to make sure that it stays highly connected but because of poor planning on his part, his towers are connected by one-way roads. To make his towers more connected, some towers can be directly connected with more than one road.

In the new plan to connect his towers, he wants his penthouse apartment to be better connected to the tower where he runs his campaign. The connectivity between his home tower and his campaign tower is defined as the number of different paths from the home tower to the campaign tower. A path may use more than one road if possible. Two paths are different if and only if they don't use the exact same sequence of roads.

Given  $N$  towers numbered 1 to  $N$  and  $M$  one-way roads, what is the connectivity of Trump's towers when his penthouse is at tower 1 and his campaign office is at tower  $N$ .

## Input Specifications

The first line contains integers  $N$  and  $M$  followed by  $M$  lines, each containing integers  $x$  and  $y$  where there exists a road from  $x$  to  $y$ . ( $x$  and  $y$  are between 1 and  $N$ ).  $N$  is the number of city blocks and Trump's home tower is at 1 and the campaign tower is at  $N$ . There are  $M$  roads where each road goes from city block  $x$  to city block  $y$ .

## Output Specifications

The number of different paths from the penthouse to the campaign office. If there are infinitely many paths, print "INFINITE PATHS"

## Sample Input/Output

### Input

```
5 5
1 2
2 4
2 3
3 4
4 5
```

### Output

```
2
```

### Explanation

The path is linear except one can travel from tower 2 to tower 4 directly or via tower 3.

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### Input

5 5  
1 2  
4 2  
2 3  
3 4  
4 5

## Output

INFINITE PATHS

## Explanation

There is a back road that makes a cycle. This means that he could go in circles many times before going to his campaign tower.