Cat & Mouse

September 2024
C++ — 2 sec — 512 MB

Ever since there have been mice stealing breadcrumbs and cheese, there have been hungry cats waiting to catch them. One such intrepid mouse is trying to flee a vicious cat through a labyrinthine house.

The house has **n** rooms, numbered from 0 to **n**−1. Some of these rooms are connected by corridors, and it is possible to reach every room from any given room via a sequence of corridors.

Room 0 contains the mouse-hole; if the mouse ever reaches room 0, it successfully escapes. However, if the cat and mouse ever occupy the same room, the cat catches the mouse. Because of its size, the cat can never enter room 0.

The cat and mouse move between rooms in turns, starting with the mouse. During their turn, the cat / mouse *must* move to a room directly connected to their current room.

Will the mouse be able to escape? Or is it doomed to become dinner?

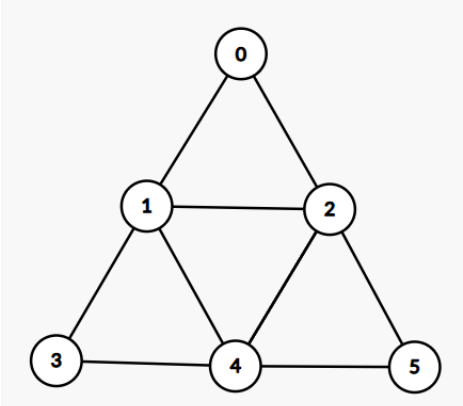
INPUT You will be given three integers on a single line, **n**, **m**, and **c** — denoting the number of rooms, the starting room of the mouse, and the starting room of the cat, respectively. This will be followed by lines containing two integers, **a** and **b**, denoting that rooms **a** and **b** are directly connected by a corridor. The input will be terminated by the line `-1 -1`.

The cat and mouse will always start in different rooms and neither the cat nor the mouse will start in room 0.

$5 \leq \mathbf{n} \leq 500$

OUTPUT Output the result if the cat and mouse both move optimally. If the cat catches the mouse, output `CAT`. If the mouse escapes, output `MOUSE`. If the cat and mouse are caught in an infinite loop, output `DRAW`.

SAMPLE For example, suppose there are 6 rooms in the house, connected as shown in the diagram below. If the mouse starts at room 3 and the cat starts at room 5, the mouse can reach the hole via the sequence $3 \to 1 \to 0$ without the cat being able to catch it. However, if the cat instead starts at room 2, the cat can always catch the mouse after the mouse's first move.



INPUT	OUTPUT
9 7 4 0 1 0 2 0 3 1 2 1 4 2 3 3 6 5 7 5 8 7 8 6 8 -1 -1	CAT
6 3 5 0 1 0 2 1 2 1 3 1 4 3 4 2 4 2 5 4 5 -1 -1	MOUSE
5 1 3 1 2 1 3 3 4 2 4 4 0 3 0 -1 -1	DRAW