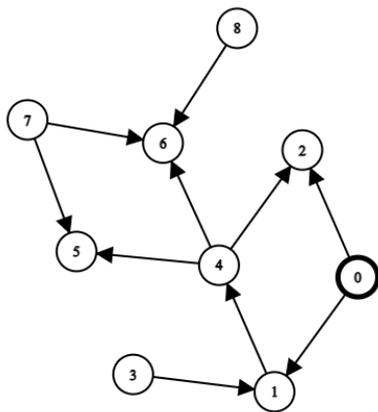
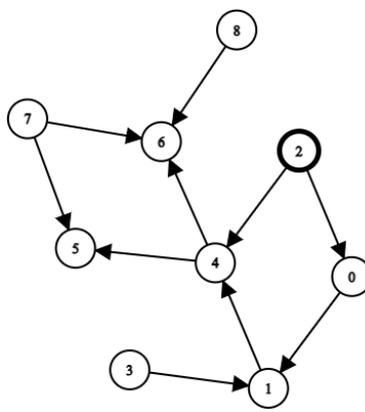


Switch Maze

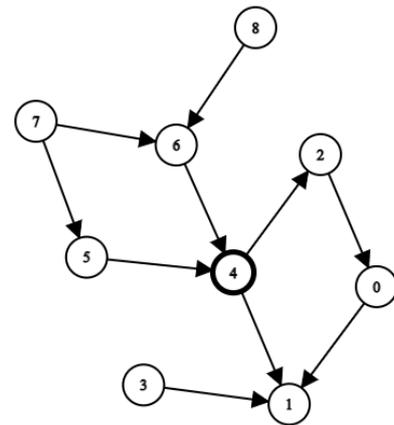
Welcome to the Switch Maze: a labyrinth of twisting corridors designed to confuse and confound those foolish enough to enter. Each corridor connects 2 rooms and can only be traversed one-way. However, whenever a room is entered, all of the corridors connected to that room switch direction.



Initial Switch Maze with you at room 0



Switch Maze after moving to room 2



Switch Maze after moving to room 4

The Switch Maze contains $n+1$ rooms numbered from 0 to n . You start in room 0 and must get to room n to escape. Due to the damaging effects of the baffling maze on your mind, you don't have very long to solve it. In fact, you have no time at all: you can already feel it begin to befuddle you. The only thing to do is minimise the time you spend wandering the complex corridors, by finding the length of the shortest path.

You will be given an integer, n , followed a list of lines describing the maze. Each line contains 2 integers, a and b , denoting that it is possible to travel from room a to room b by a direct corridor. This list will be terminated by the line $-1 -1$.

Each corridor takes 1 unit of time to traverse. Output the shortest length of time required to travel from room 0 to room n .

In the example, the shortest path is: 0-2-4-2-4-6-8

Sample Input 1:

```
8
0 1
0 2
4 2
4 5
1 4
3 1
7 6
8 6
4 6
7 5
-1 -1
```

Sample Output 1:

6