Department of Computer Science and Engineering,
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CS23301 – Data Structures (R2023)
Practical
July – November 2026
Year/Sem/Batch : II/III/ N

Exercise: 11	GRAPHS AND SPANNING TREE	09 – Oct - 2026

SPOT (5 marks)

1. A warehouse stores oranges in an m × n grid. Each cell contains one of the following values:

   0: empty cell

   1: fresh orange

   2: rotten orange

   Every minute, any fresh orange that is directly adjacent (up, down, left, or right) to a rotten orange becomes rotten. Rot does not spread diagonally and cannot pass through empty cells.

   Write a program to find the minimum number of minutes that must pass until no fresh orange remains. If it is impossible for all fresh oranges to become rotten, print -1.

   ### Input Format

   m n

   (m lines, each containing n integers)

   Output Format

   A single integer: the minimum number of minutes, or -1.

   Constraints

   $1 \leq m, n \leq 10$

   Each cell value is 0, 1, or 2

   ### Sample Input 1

   3 3

   2 1 1

1 1 0

0 1 1

Sample Output 1

4

Sample Input 2

3 3

2 1 1

0 1 1

1 0 1

Sample Output 2

-1

Explanation: The fresh orange in the bottom-left corner is surrounded by empty cells, so rot can never reach it.

Sample Input 3

1 2

0 2

Sample Output 3

0