

1

The space complexity of matrix is $O(n^2)$. It has n rows and n columns to store 0 or 1 for each pair of nodes.

2

The ROWS of matrix should be equal to the COLUMNS. If a node does not have a row or a column, its relationships with other nodes are unclear. Even if the node has no edges with others nodes, it must still have 0 to represent it is disconnected.

3

No. In an undirected graph, we do not know which node is the first in the order and which node is after it because the edges do not have arrows.

4

No. If there is a cycle, the two orders will contradict with each other. The result is invalid.

5

We can use depth first search to detect a cycle. When we get to a node that has been visited, we know there is a cycle.