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Graph

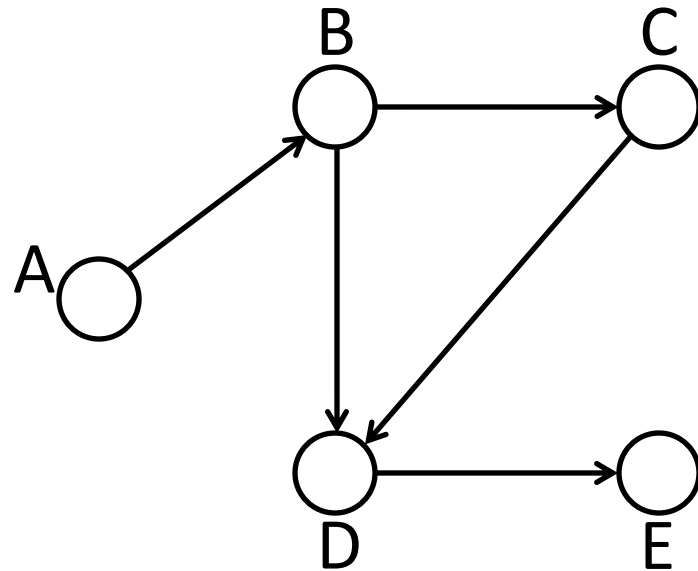
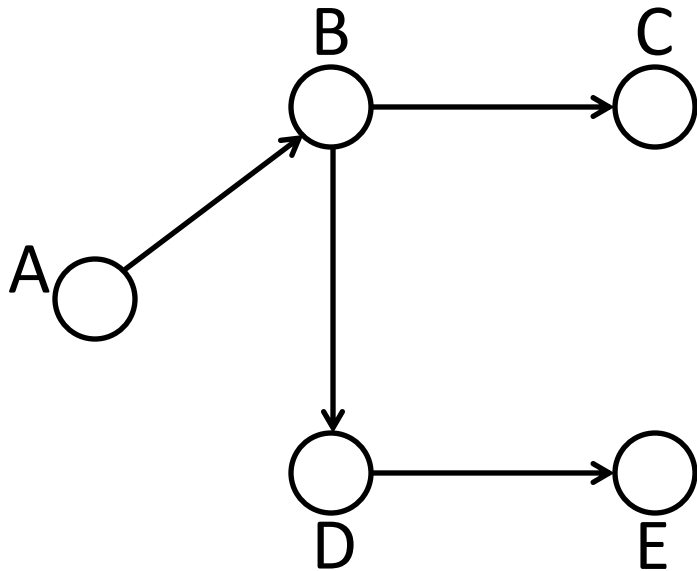
The original slides were created by Dr. Jianfeng Ren
Edited by Heshan Du

Cycle, acyclic & connected

- **Cycle**: A path from a vertex to itself.
- Graph is **acyclic** if it does not have cycles.
- Graph is **connected** if there is a path between every pair of vertices.
- Graph is **strongly connected** if there is a path in **both directions** between every pair of vertices

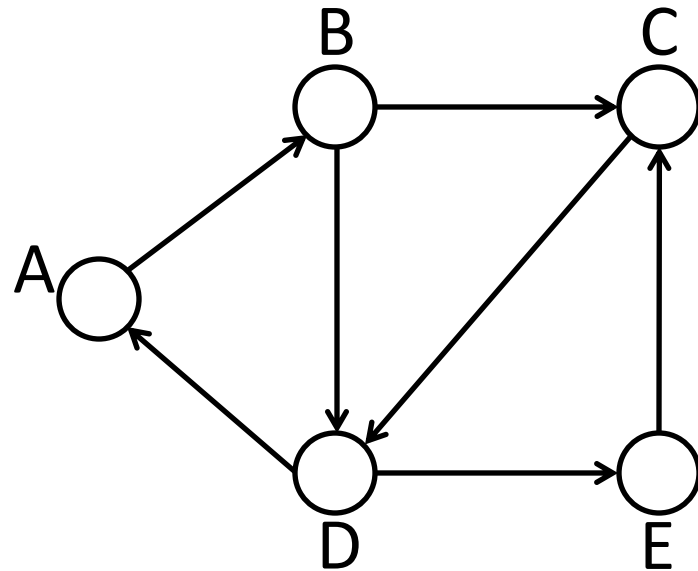
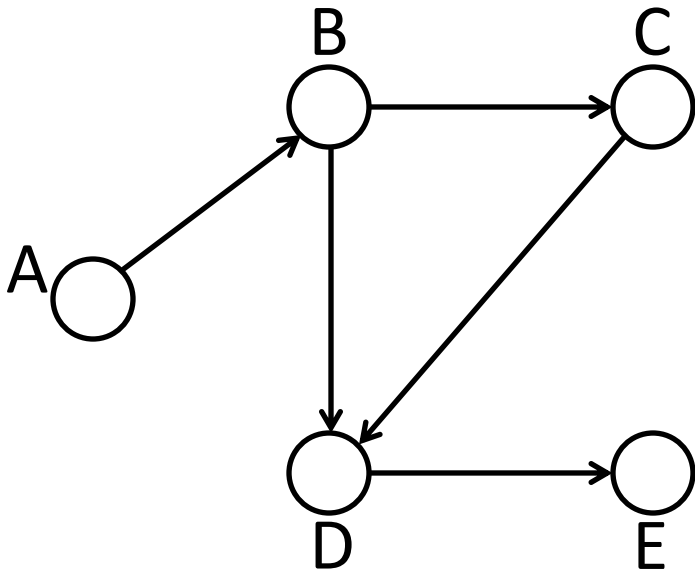
Exercise 1 - 1

Given the following graph, please identify whether the graph is **connected**.



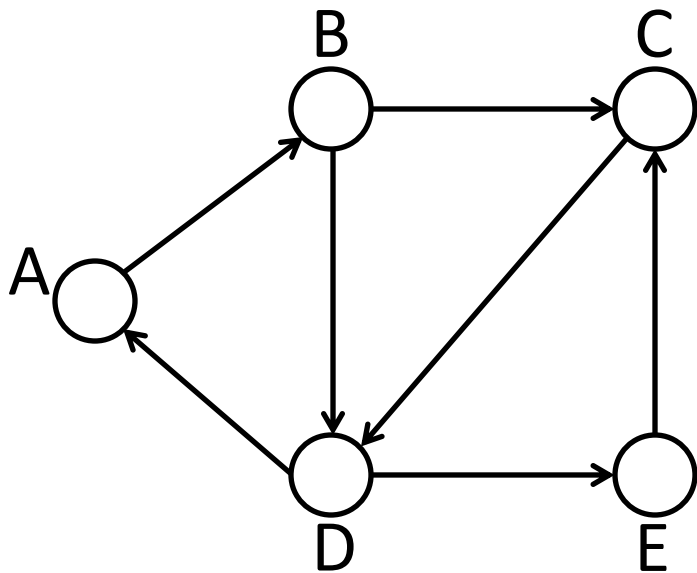
Exercise 1 - 2

Given the following graph, please identify whether the graph is **strongly connected**.



Exercise 2 - 1

Find the adjacency matrix for the following graph:



Exercise 2 - 2

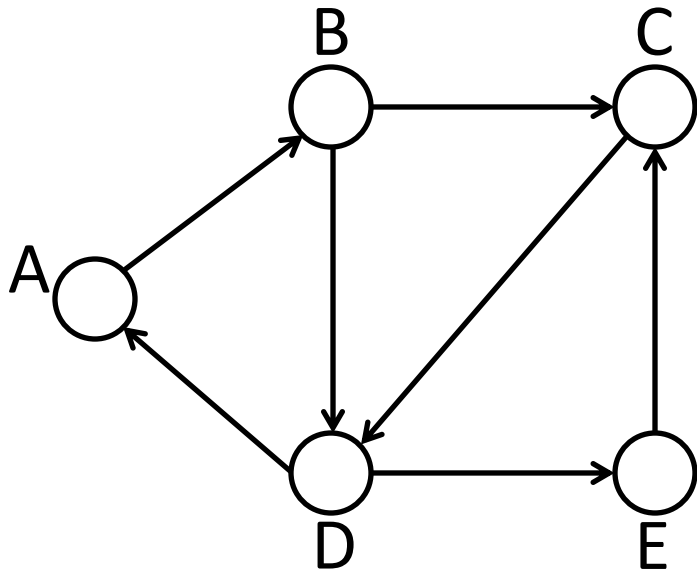
Given the adjacency matrix below, build the corresponding graph.

	0	1	2	3	4
0	0	1	0	0	0
1	0	0	0	2	3
2	0	0	0	0	0
3	4	5	0	0	6
4	0	7	0	0	0

Adjacency matrix

Exercise 2 - 3

Find the adjacency list for the following graph:



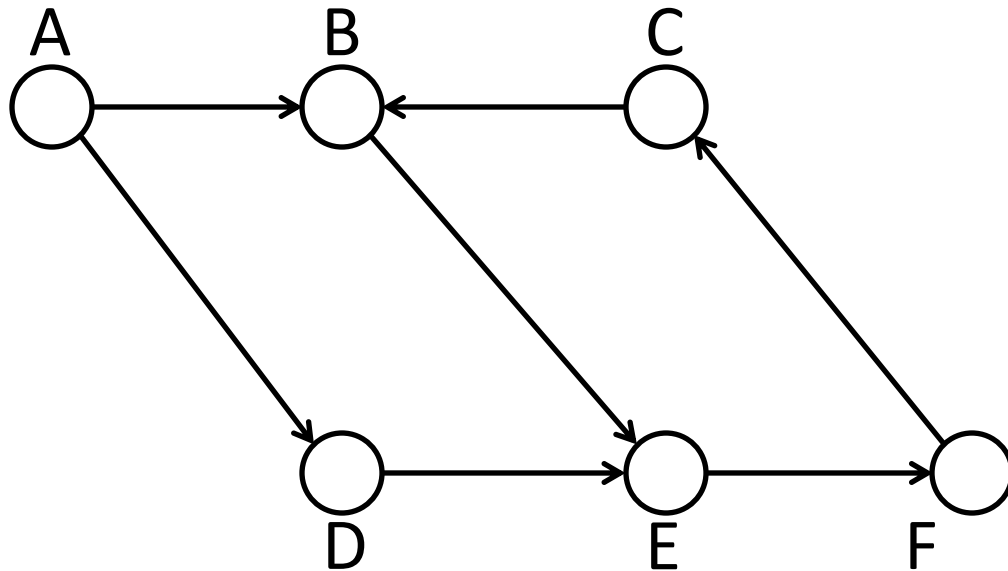
Exercise 2 - 4

Given the adjacency list below, build the corresponding graph.

List of nodes	List of adjacency nodes
A	B
B	C,D,E
C	D
D	A,C,E
E	C

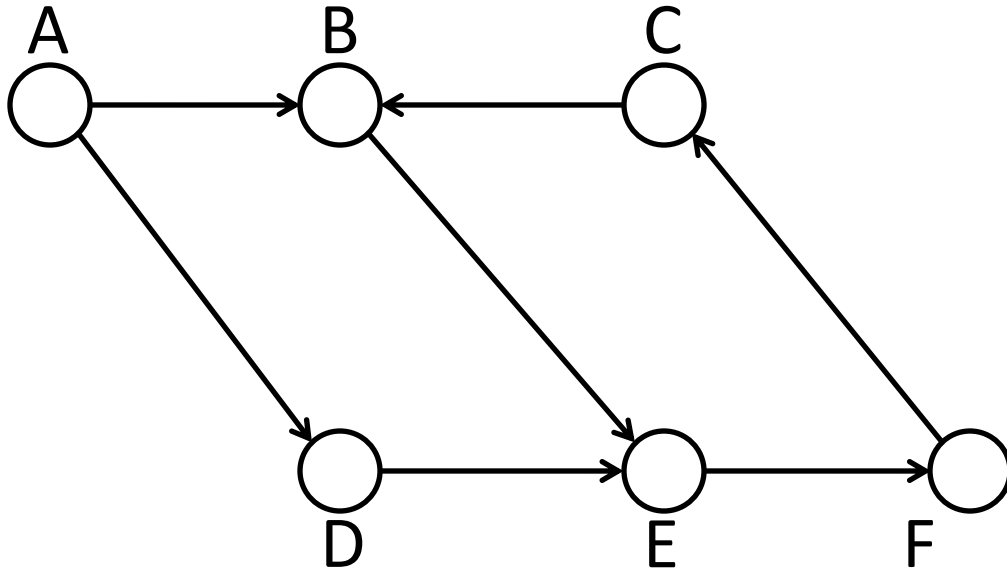
Exercise 3

Travel all vertices using BFS: (starting from A)



Exercise 4

Travel all vertices using DFS: (starting from A)



Exercise 5

Use modified DFS for cycle detection.

