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لا تنسى الاشتراك في قناتنا على اليوتيوب ومشاركة القناة مع اصدقائك  
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## مهم جداً

هذا الملف للمراجعة السريعة واخذ الملاحظات عليه فقط ،لانه يحتوي على اقل من 20٪ مما يتم شرحه في الفيديوهات الاستعجال والاعتماد عليه فقط سوف يجعلك تخسر كميه معلومات وخبرات كثيره

يجب عليك مشاهدة فيديو الدرس كاملا

لاتنسى عمل لايك ومشاركة القناة لدعم الفائدة للجميع  
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## Data Structures Level 2

# Graph Representation

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# Graph Representation:

Graphs can be represented in two main ways:

## 1. Adjacency Matrix:

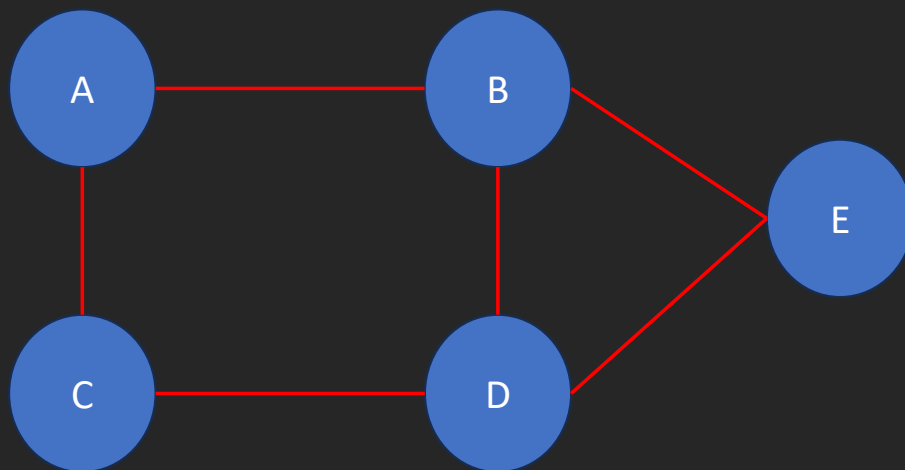
- A 2D array where the element at position  $[i][j]$  indicates whether there is an edge between vertex  $i$  and vertex  $j$ .
- For weighted graphs, the value in the matrix cell can represent the weight of the edge.

## 2. Adjacency List:

- Each vertex has a list of adjacent vertices (vertices it is connected to).

# Graph Representation (Adjacency Matrix)

# Example 1:

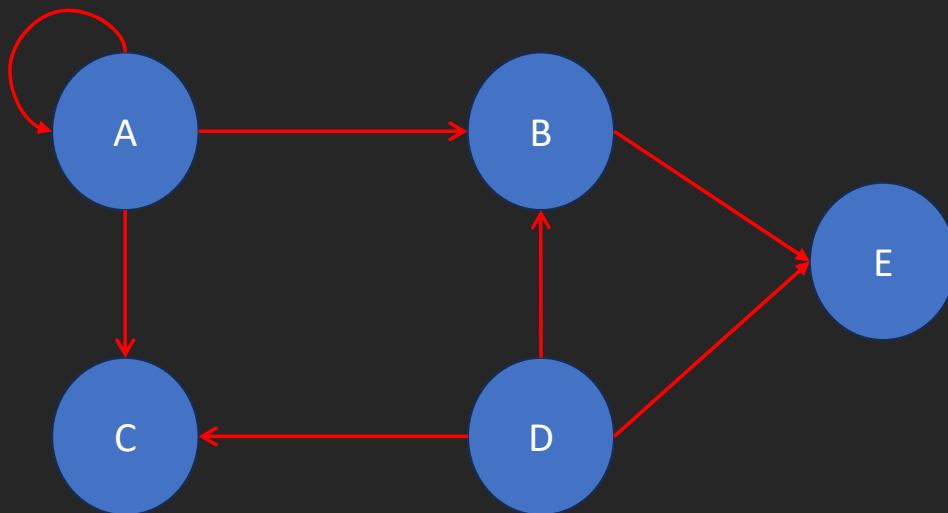


Undirected Graph

Adjacency Matrix

	A	B	C	D	E
A	0	1	1	0	0
B	1	0	0	1	1
C	1	0	0	1	0
D	0	1	1	0	1
E	0	1	0	1	0

# Example 2:

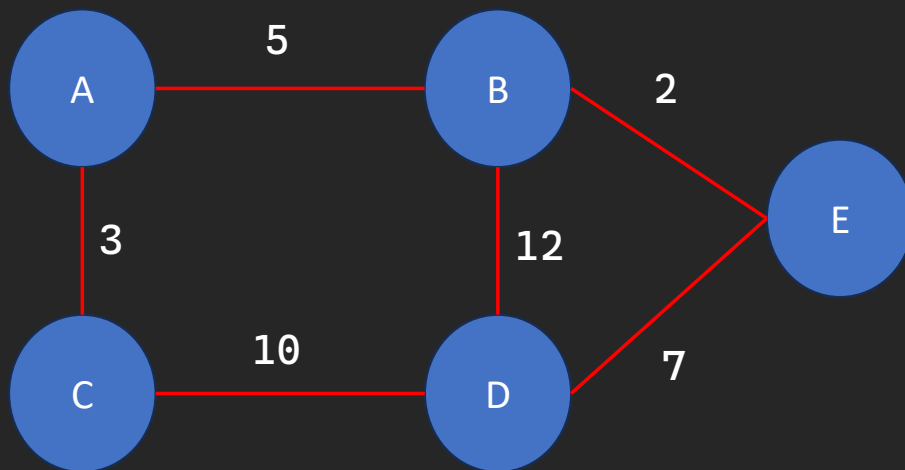


Directed Graph

Adjacency Matrix

	A	B	C	D	E
A	1	1	1	0	0
B	0	0	0	0	1
C	0	0	0	0	0
D	0	1	1	0	1
E	0	0	0	0	0

# Example 3:



Weighted Graph

Adjacency Matrix

	A	B	C	D	E
A	0	5	3	0	0
B	5	0	0	12	2
C	3	0	0	10	0
D	0	12	10	0	7
E	0	2	0	7	0

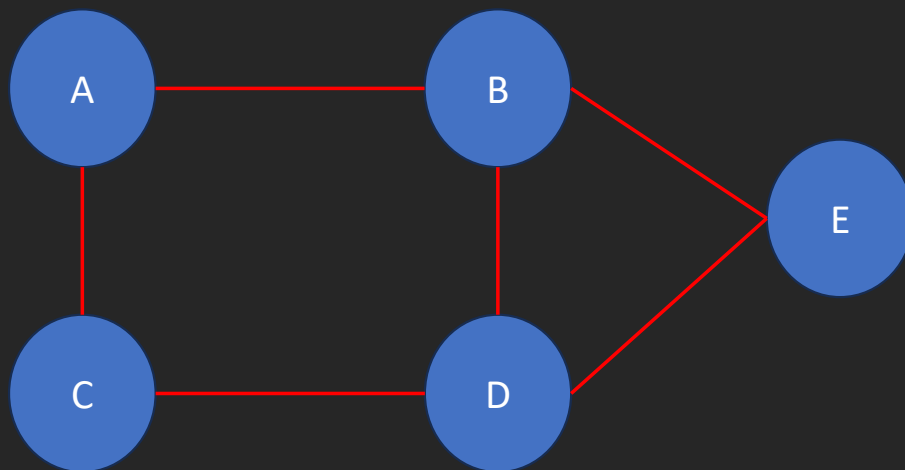


# Pros/Cons: Adjacency Matrix

- Pros: Fast lookup to check if an edge exists.
- Cons: Space-intensive for large graphs with many vertices but few edges.

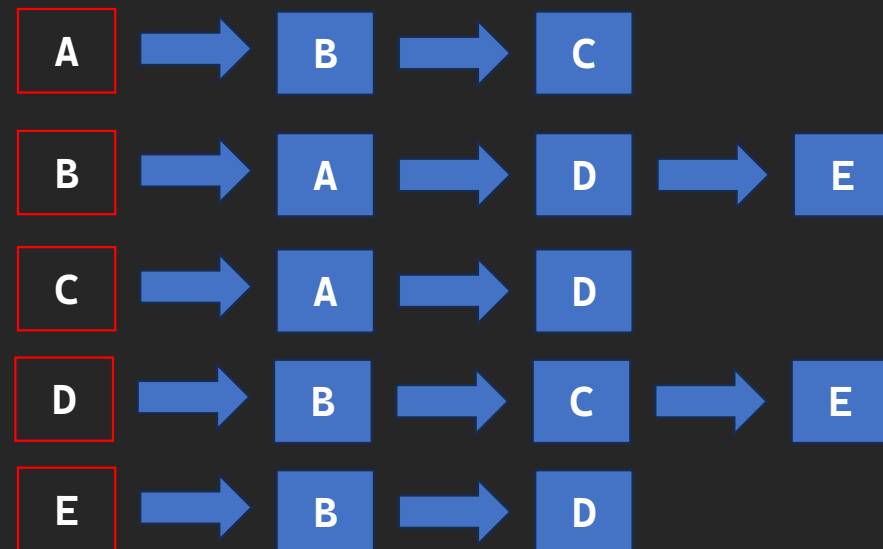
# Graph Representation (Adjacency List)

# Example 1:

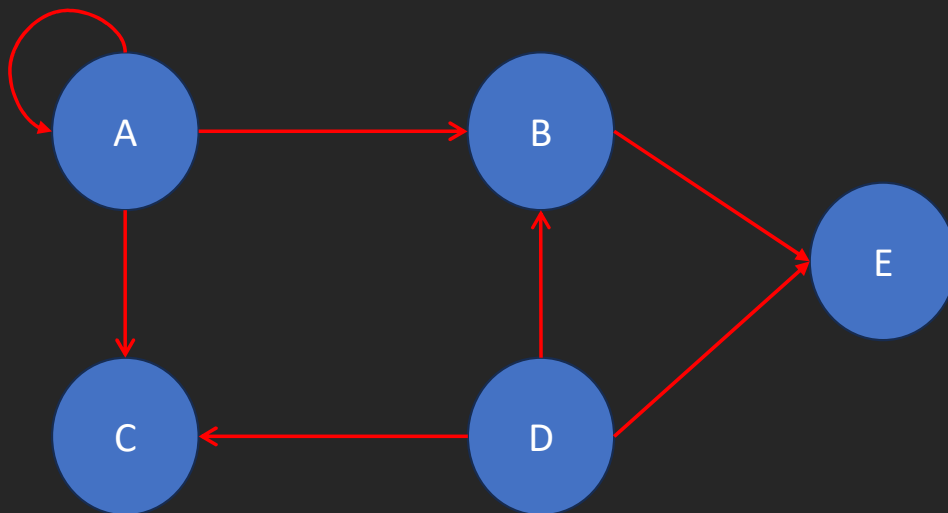


Undirected Graph

## Adjacency List:

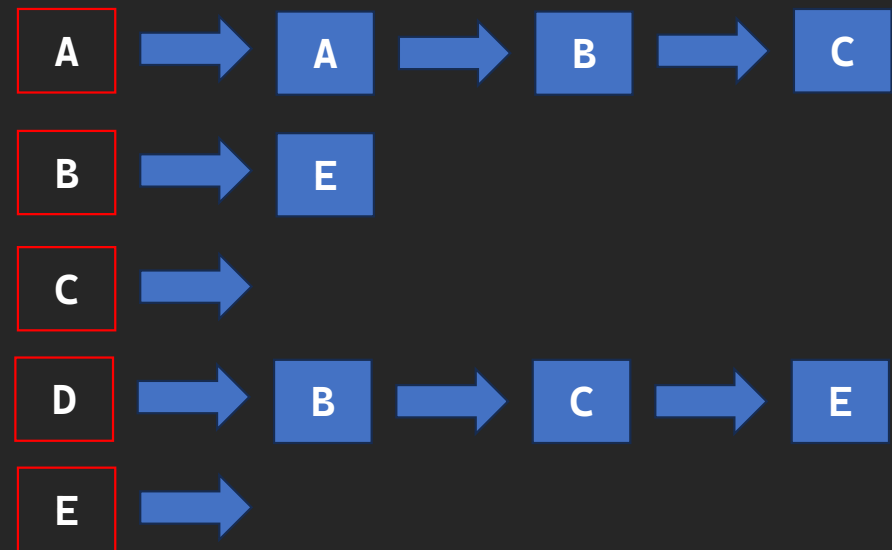


# Example 2:

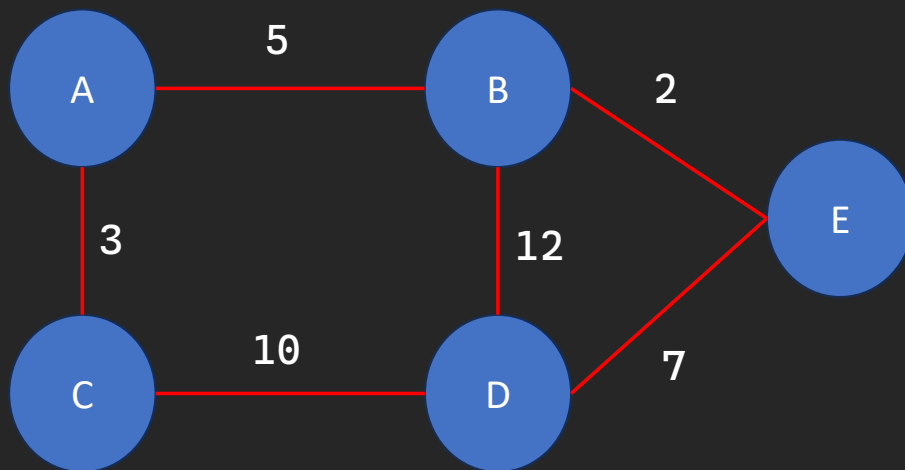


Directed Graph

## Adjacency List:

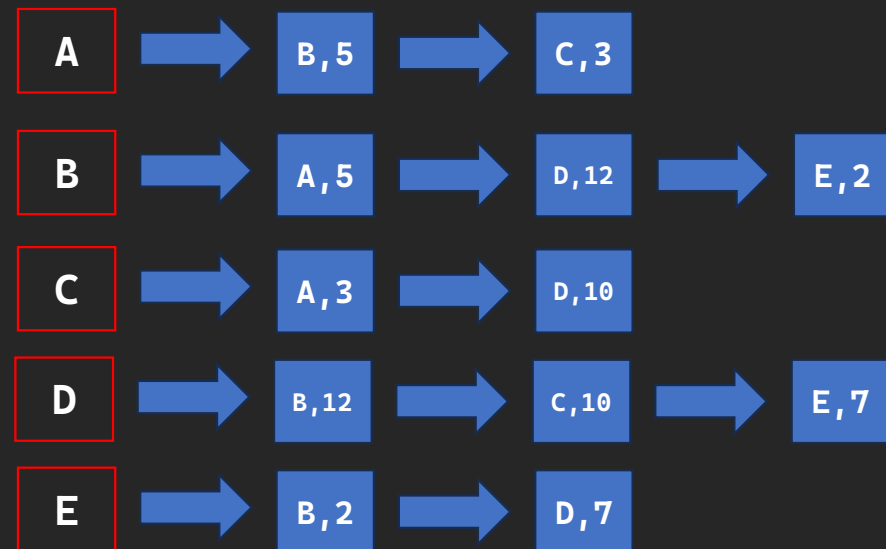


# Example 3:



Weighted Graph

## Adjacency List:





# Pros/Cons: Adjacency List

- Pros: Space-efficient for sparse graphs (graphs with fewer edges).
- Cons: Slightly slower to check if a specific edge exists between two vertices.



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Thank You

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