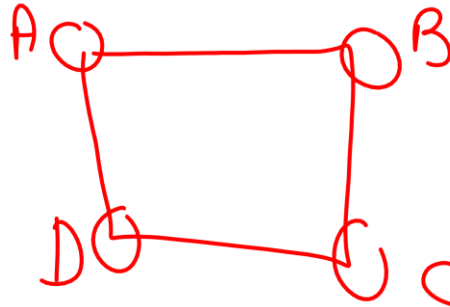


A graph data structure is a collection of nodes (or vertices) connected by edges, representing relationships or connections between them.

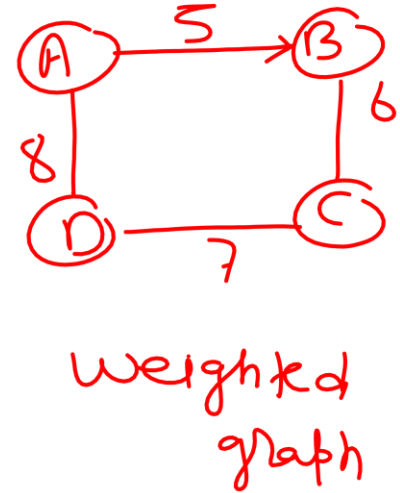
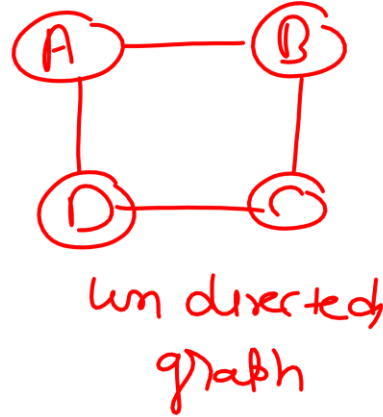
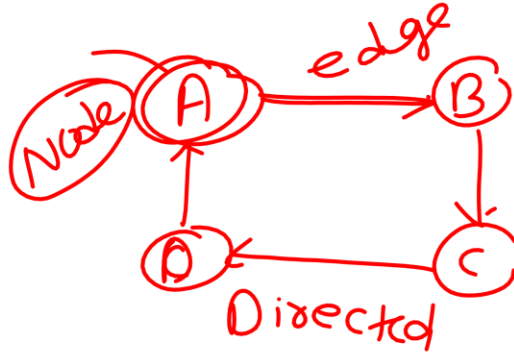
It can be directed (edges have direction) or undirected (edges don't have direction), and may be weighted (edges have associated values) or unweighted.

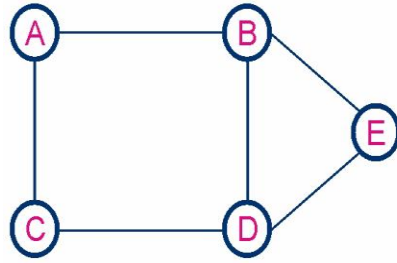


A, B, C, D - node

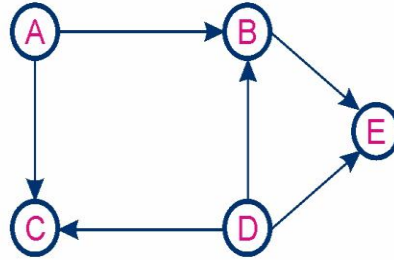
A-B, B-C, C-D, A-D - edge

## Types of graph

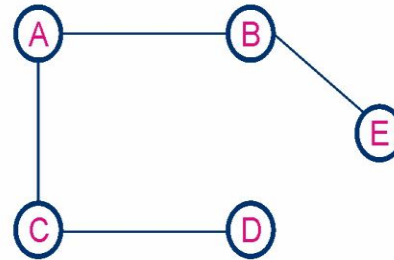




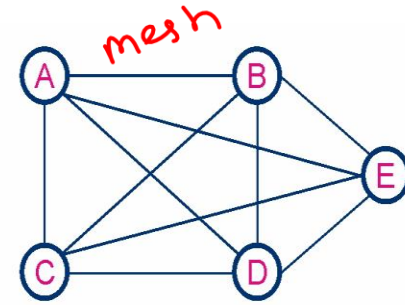
Undirected Graph



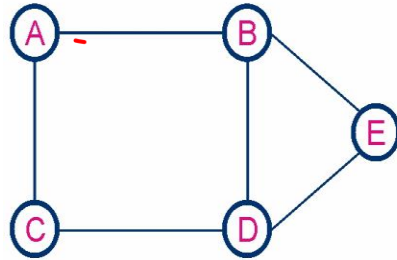
Directed Graph



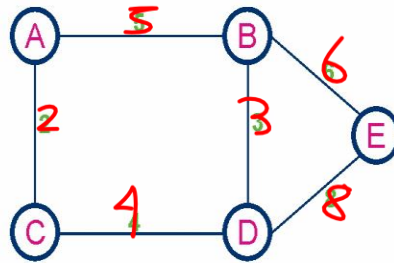
Sparse Graph



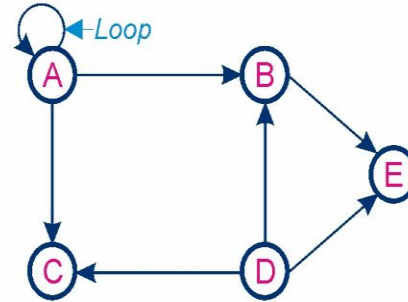
Complete Graph (Dense)



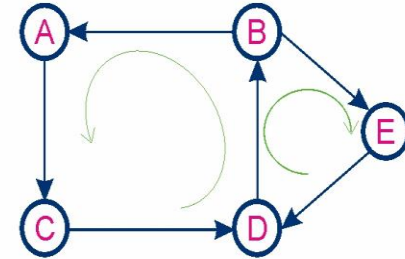
Unweighted Graph



Weighted Graph



Acyclic Graph



Cyclic Graph

A

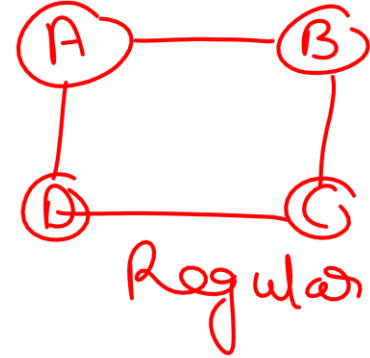
B

C

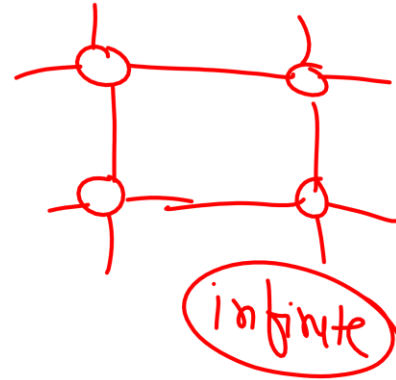
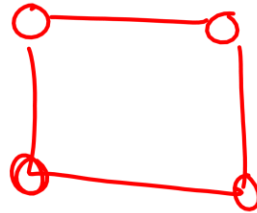
trivial graph

A

trivial graph

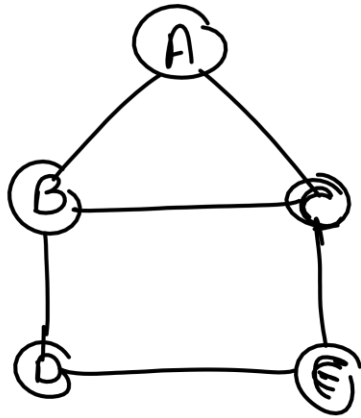


finite graph

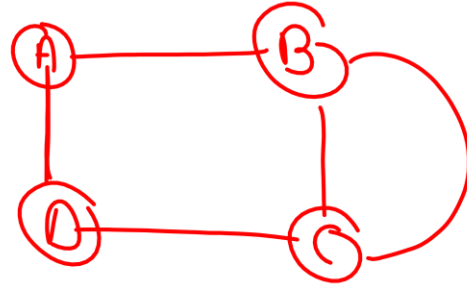


## Planner Graph

It can be drawn on a single plane with any two of edges



## A multigraph



Self Study

Which of the following is the disadvantage of the array?

1. Stack and Queue data structures can be implemented through an array.
2. Index of the first element in an array can be negative
3. Wastage of memory if the elements inserted in an array are lesser than the allocated size
4. Elements can be accessed sequentially.

10 - 7 3x  
int a[10] = { . . . }

Note box  
3 new

Which of the following is true about a B-tree of order  $m$ ?

- a) Each node has at most  $m$  children.
- b) All leaf nodes must be at the same level.
- c) A non-leaf node with  $k$  children contains  $k-1$  keys.
- d) All of the above.

What is the time complexity of the Floyd-Warshall algorithm for finding all-pairs shortest paths in a graph?

a)  $O(V^2)$

b)  $O(V^3)$

c)  $O(E \log V)$

d)  $O(V \log E)$

Vertex



Which hashing technique avoids clustering entirely?

- ☒ a) Linear Probing — Primary clustering
- ☒ b) Quadratic Probing → Secondary clustering
- ☒ c) Double Hashing → Minimal " "
- ☒ d) Separate Chaining

Which graph representation is most space-efficient for sparse graphs?

- a) Adjacency Matrix
- b) Adjacency List
- c) Incidence Matrix
- d) Edge List

Space

$$O(V^2)$$

— Dense graph

$$O(V+E)$$

$$O(V \times E)$$

— Rarely optimal

$$O(E)$$

— Kruskal Algo

**. The time complexity to find the kth smallest element in a BST is:**

a)  $O(1)$

b)  $O(\log n)$

c)  $O(n)$

d)  $O(n \log n)$

**Interpolation search works best on:**

- a) Unsorted arrays
- b) Linked lists
- ~~c) Uniformly distributed sorted arrays~~
- d) Binary trees

**A B+ tree is preferred over a B-tree for databases because:**

- a) Faster insertions
- ~~b) Supports range queries efficiently~~
- c) Uses less memory
- d) Easier to balance

In AVL trees, what is the maximum allowed height difference between left and right subtrees (balance factor)?

- a) 0
- b) 1
- c) 2
- d)  $\log n$



**What is the time complexity of the Floyd-Warshall algorithm for finding all-pairs shortest paths in a graph?**

a)  $O(V^2)$

b)  $O(V^3)$

c)  $O(E \log V)$

d)  $O(V \log E)$

**The stable sorting algorithms among these are:**

a) QuickSort, Heap Sort

b) Merge Sort, Bubble Sort

c) Insertion Sort, Selection Sort

d) Radix Sort, Shell Sort



**In a threaded binary tree, what is the purpose of threading?**

- a) To enable level-order traversal
- ☒ b) To allow traversal without recursion/stack
- c) To balance the tree
- d) To reduce space complexity

THANKS FOR

Watching  
Adda247

LIKE



SHARE

COMMENT



SUBSCRIBE

