Walk, Path, and Cycle

Walk

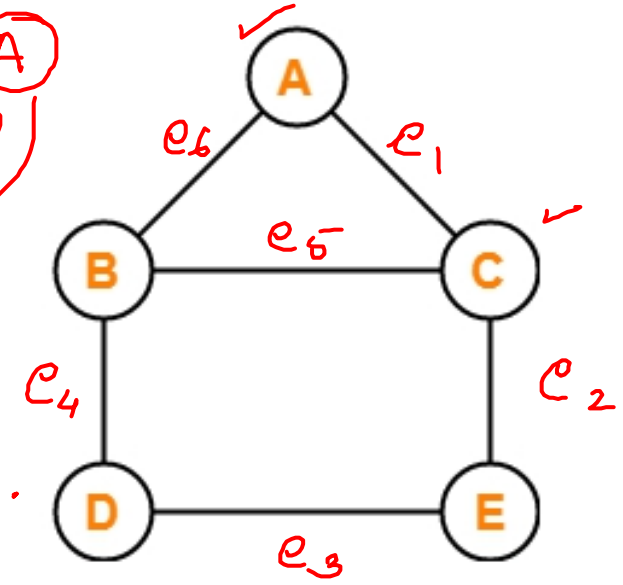
- Walk is sequence of adjacent vertices (or edges) in a graph.
- A walk is defined as a finite length alternating sequence of vertices and edges.
- The total number of edges covered in a walk is called as **Length of the Walk.**
  - If length of the walk = 0, then it is called as a Trivial Walk.
- Both vertices and edges can repeat in a walk whether it is an open walk or a closed walk.

Walk 1: A → C → E → D → B → C → A

start

closed walk

end

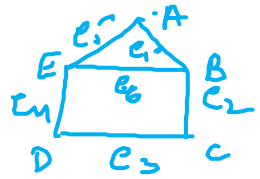


length of walk = 6

walk 2: A —e6→ B —e5→ C —e2→ E —e3→ D —e4→ B (start, end) ⇒ open walk

length of walk = 5

Open and Closed Walk



Open Walk:

- A walk is said to be open if the first and the last vertices are different i.e. the terminal vertices are different.

Closed Walk:

- A walk is said to be closed if the first and last vertices are the same. That means you start walking at a vertex and end up at the same.

A E B C D E ⇒ Trail

A E B A X

Path

A B E D C

Trail:

Trail is an open walk where vertices can repeated but not edges.

Path:

Path is an open walk with no repetition of vertices and edges.

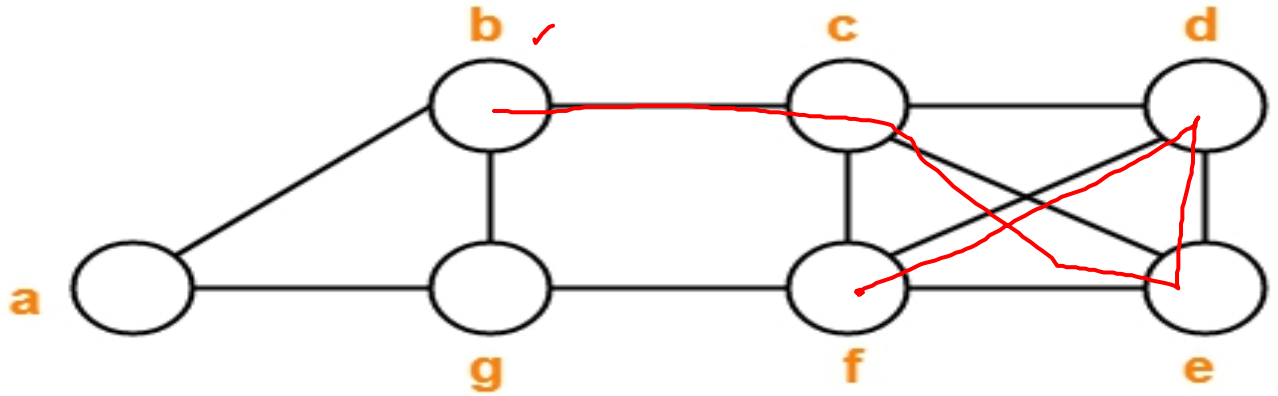
Circuit:

Circuit is a closed walk where vertices can repeat, but not edges.

Cycle:

Cycle is a closed walk where neither vertices nor edges can repeat. But since it is closed, the first and the last vertices are the same (one repetition).

Consider the following graph-



Decide which of the following sequences of vertices determine walks.

For those that are walks, decide whether it is a circuit, a path, a cycle or a trail.

1. a , b , g , f , c , b
2. b , g , f , c , b , g , a
3. c , e , f , c
4. c , e , f , c , e
5. a , b , f , a
6. f , d , e , c , b