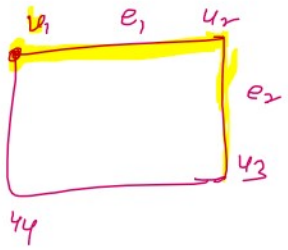
L23 30 Mar 2022

30 March 2022 10:04

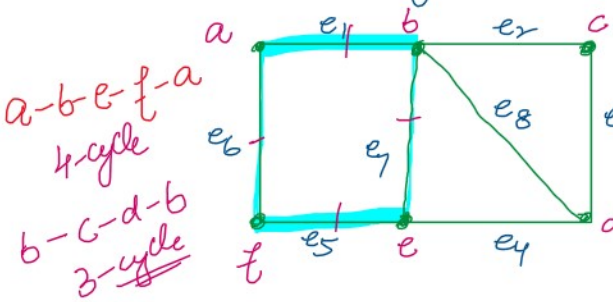
Paths and Connectivity

Path:- A path in a graph G consists of alternating sequence of vertices and edges of the form.

$v_0 e_1 v_1 \; e_2 v_2 \; e_3 v_3 \; \cdots \; e_{n-1} v_{n-1} \; e_n v_n$.



where each edge e_i connects the vertices v_{i-1} and v_i



a-b-e-t-a
4-cycle

b-c-d-b
3-cycle

Trail ① $a\, e_1\, b\, e_2\, c\, e_3\, d$ — Length = 3 — Simple path

② $a\, e_1\, b\, e_2\, c\, e_3\, d\, e_8\, b\, e_1\, a$ — Not Simple path. — Length = 5 — closed path.

③ $a\, e_6\, t\, e_5\, e\, e_7\, b$ — Length = 3 — Simple path

Not ④ $a\, e_6\, t\, e_5\, e\, e_4\, d\, e_8\, b\, e_7\, e\, e_5\, t$.

Length = 6. — Not simple path

Length of the path :→

The no. of edges involve in trail path.

closed path :→

The path is s.t.b closed if $v_0 = v_n$

Starting vertex = final vertex

Simple path :→

A simple path is a path in which all vertices are distinct.

not repeated ← different

Trail

A path in which all the edges are distinct

cycle :→

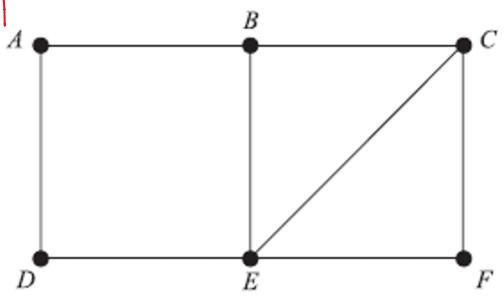
A cycle is a closed path in which all the vertices are distinct except $v_0 = v_n$

v

Simple closed path

A cycle of length K is called K-cycle

Trail from A to F



(7) A-D-E-B-C-F

(8) A-D-E-B-C-E-F

(9) A-D-E-C-B-E-F

Simple paths from A to F

(1) A-B-C-F

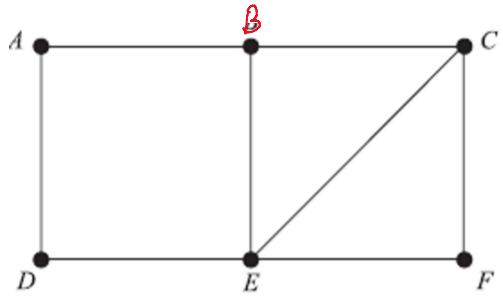
(2) A-B-C-E-F

(3) A-B-E-F

(4) A-B-E-C-F

(5) A-D-E-F

(6) A-D-E-C-F



No. of cycles ?

(1) A-B-E-D-A

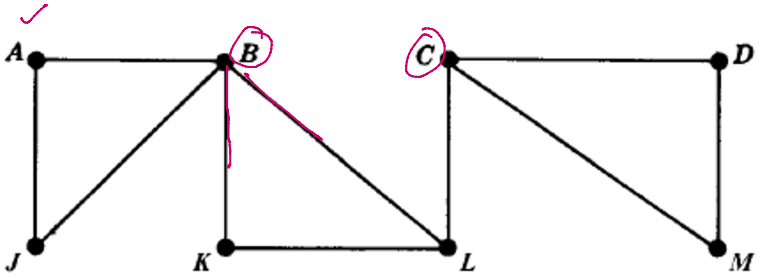
(2) A-B-C-E-D-A

(3) A-B-C-F-E-D-A

(4) B-C-E-B

(5) C-E-F-C

(6) B-C-F-E-B



Simple paths from A to L

1. A-B-L
3. A-J-B-L
2. A-B-K-L
4. A-J-B-K-L

Trail from B to C

1. B-L-C
2. B-K-L-C
3. B-A-J-B-L-C
4. B-A-J-B-K-L-C