L25 05 April 2022

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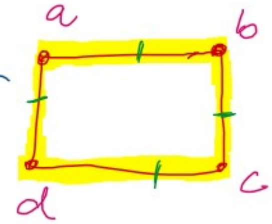
Eulerian and Hamiltonian graph :->

Eulerian graph :->

A Connected finite graph is s.t.b Eulerian if it Contains an Euler circuit.

Eulerian graph



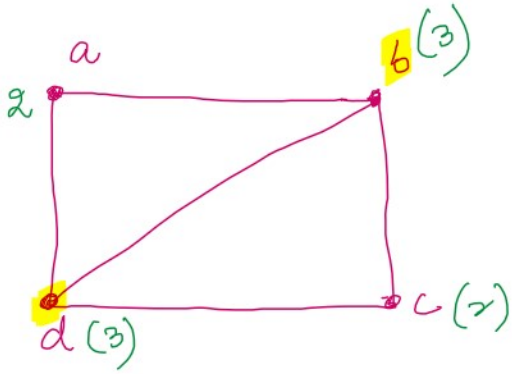
a-b-c-d-a

closed path

Euler circuit :->

is a closed path which Covers each and every edge of the graph exactly once (but we can repeat the vertices).

Not Eulerian



d-c-b-d-a-b

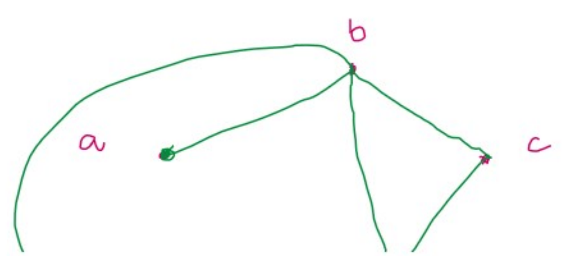
Euler path :->

is a path which Covers each and every edge of the graph exactly once

Euler Theorem

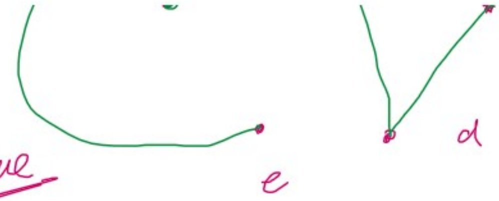
A Connected finite graph G is Eulerian (Contains an Euler circuit) if and only if degree of every vertex is even.

Euler circuit implies Euler path

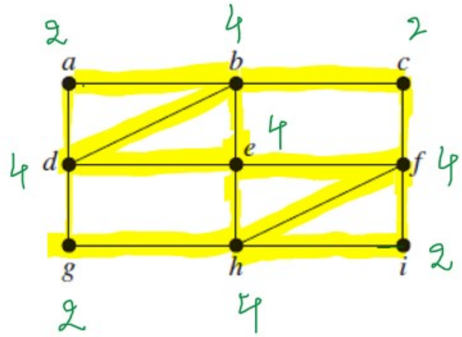


Euler path

but converse is not true



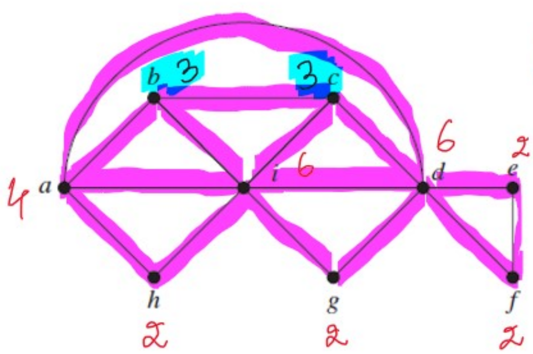
\# A connected finite graph contains an Euler path but not Euler circuit if degree of exactly two of its vertices are odd.



degree of every vertex is even
⇒ it contains Euler circuit.
⇒ Graph is Eulerian

Euler circuit

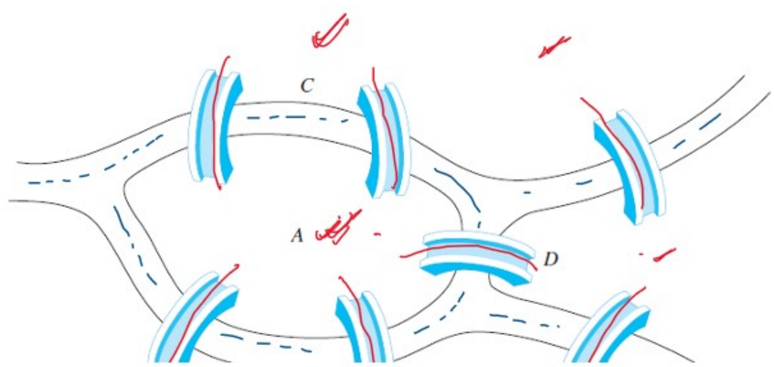
a - b - c - f - i - h - f - e
|
a - d - b - e - d - g - h

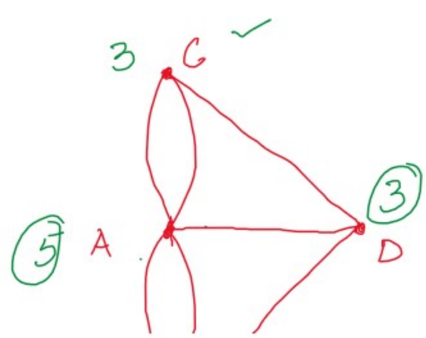


① Not contains Euler circuit
⇒ Not Eulerian graph

② Contains Euler path but not Euler circuit.

b - c - d - a - h - i - g - d - f - e - d
|
c - i - b - a - i





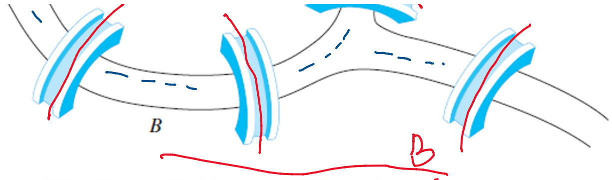


FIGURE 1 The Seven Bridges of Königsberg.