

Algorithm and problem solving

-Euler circuit in a Directed Graph

By:

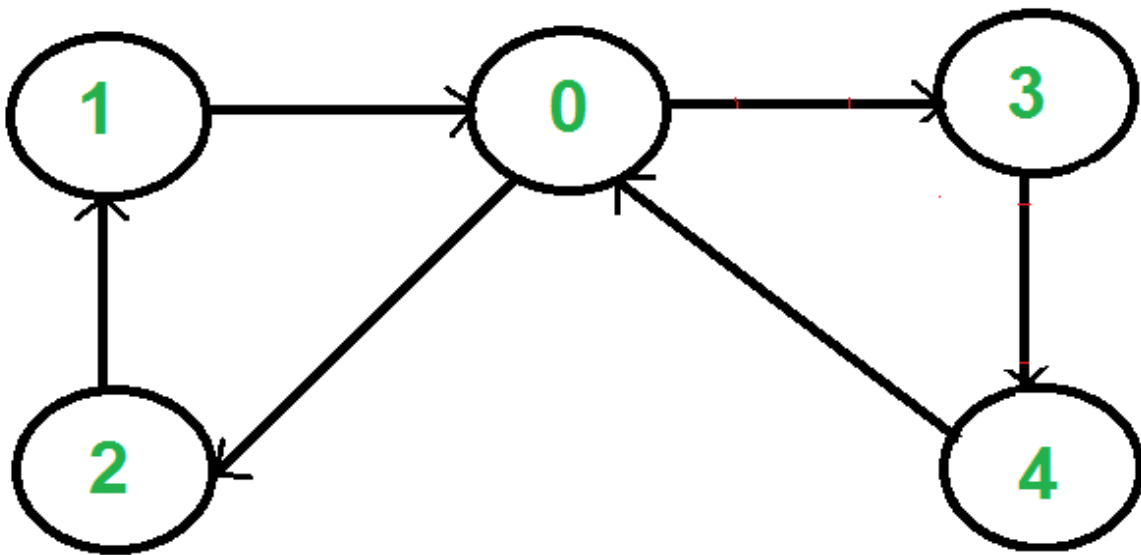
Ashreet N Salimath

01FE15BEC045

:Introduction:

Eulerian Path is a path in graph that visits every edge exactly once. Eulerian Circuit is an Eulerian Path which starts and ends on the same vertex.

A graph is said to be eulerian if it has eulerian cycle.

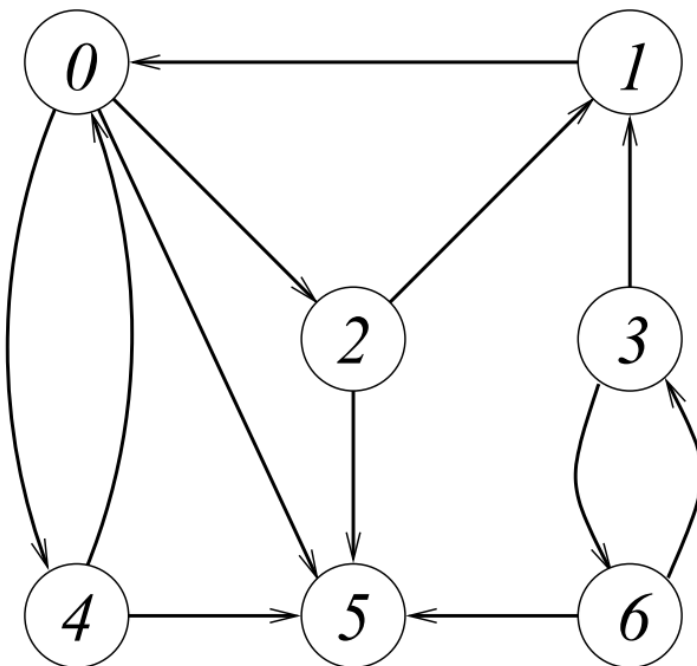


What is directed graph?

$G = (V, E)$ with vertex set $V = \{0, 1, 2, 3, 4, 5, 6\}$ and

edge set $E = \{(0, 2), (0, 4), (0, 5), (1, 0), (2, 1), (2, 5), (3, 1),$

$(3, 6), (4, 0), (4, 5), (6, 3), (6, 5)\}$.



How to check if a directed graph is eulerian?

A directed graph has an eulerian cycle if following conditions are true:

- 1) All vertices with nonzero degree belong to a single strongly connected component.
- 2) In degree and out degree of every vertex is same.

Examples:

- Kosaraju's DFS based simple algorithm.
- Hierholzer's Algorithm for directed graph.

References:

- 1) <https://www.geeksforgeeks.org/euler-circuit-directed-graph/>
- 2) https://www.youtube.com/results?search_query=euler+circuit+in+directed+graph