

For a connected multigraph G , G is eulerian iff every vertex has even degree.

An euler path requires traversal of all edges exactly once while vertices can be traversed any number of times.

We know that degree of each vertex will be the no. of incident edges on it (both incoming and outgoing in case of directed graph). Now suppose our graph G is euler this means it should have an eulerian circuit . Thus whenever we arrive at a vertex we enter it and leave it via 2 different edges only i.e. we have even degree always as for every incoming edge there exist an outgoing edge to complete the eulerian circuit.

Hence proved the statement above.