Fleury's Algorithm

Let $G = (V, E)$ be an Eulerian connected graph with each vertex of even degree. the following steps construct an Eulerian circuit.

Step 1: Select any vertex u from V as the starting vertex of Euler circuit π. Initialize π to u.

Step 2: Select an edge $e = (u,v)$. If there are many such edges, select one that is not a bridge. Extend the path π to πv and set $E = E-\{e\}$. If e is a bridge (select only if there is no alternative) then set $V = V-\{u\}$. Now from vertex v proceed further.

Step 3. Repeat step 2 until $E = \phi$.

Note. The same algorithm can be used to find an Euler path in a graph with a modification in step 1. The choice of selection of staring vertex is limited to one of the two odd degree vertices. If all the vertices are of even degree no modification is required.

Example 32. Using Fleury's algorithm, find Euler circuit in the graph of Fig. 14.42.

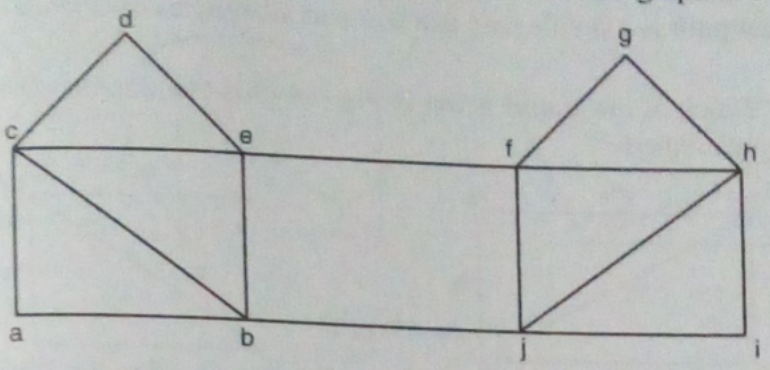

Fig. 14.42

Solution. The degrees of all the vertices are even. There exists an Euler circuit in it.

Current Path	Next Edge	Remark
$\pi : a$	(a, j)	No edge from a is a bridge.
		Choose (a, j). Add j to π and remove (a, j) from E.
$\pi : aj$	(j, f)	No edge from j is a bridge.
		Choose (j, f). Add f to π and remove (j, f) from E.
π : ajf	(f, g)	(f, e) is a bridge and (f, g) is not a bridge.
		Other option (f, h)
π : ajfg	(g, h)	(g, h) is the only edge
π : ajfgh	(h, i)	(h, i) is the other option
π : ajfghi	(i, j)	(i, j) is the only edge
π : ajfghij	(j, h)	(j, h) is the only edge
π : ajfghijh	(h, f)	(h, f) is the only edge
π : ajfghijhf	(f, e)	(f, e) is the only edge
π : ajfghijhfe	(e, d)	Other options are (e, c), (e, a)
π : ajfghijhfed	(d, c)	(d, c) is the only option
π : ajfghijhfedc	(c, b)	Other options are (c, e), (c, a)
π : ajfghijhfedcb	(b, a)	(b,a) is the only option
π : ajfghijhfedcba	(a, c)	Other options are (a, e)
π : ajfghijhfedcbac	(c, e)	(c, e) is the only option
π : ajfghijhfedcbace	(e, a)	(e, a) is the only option
π : ajfghijhfedcbacea	No edge is remaining in E This is the Euler circuit.	