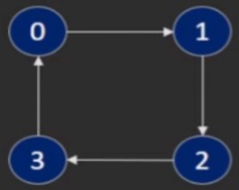
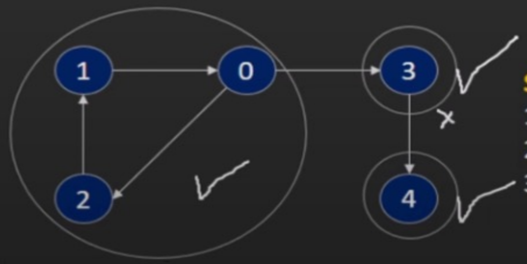
1. A directed graph is strongly connected if there is a path between all pairs of vertices.



2. A strongly connected component (**SCC**) of a directed graph is a maximal strongly connected subgraph.

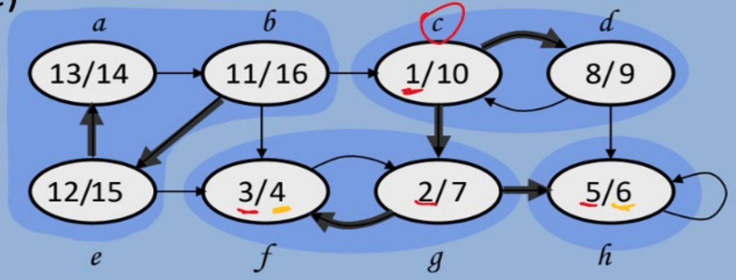


Strongly Connected Components

1. 1-0-2
2. 3
3. 4

d (starting time) and f (finishing time)

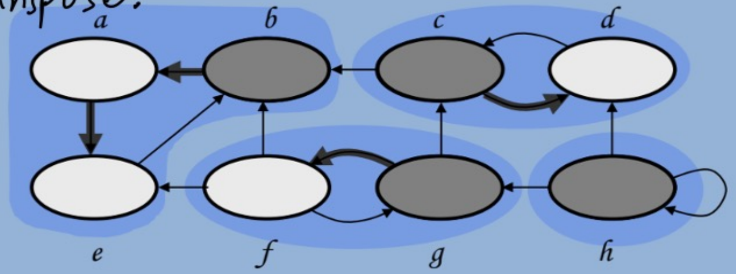
Example



DFS on the initial graph G

b	e	a	c	d	g	h	f
16	15	14	10	9	7	6	4

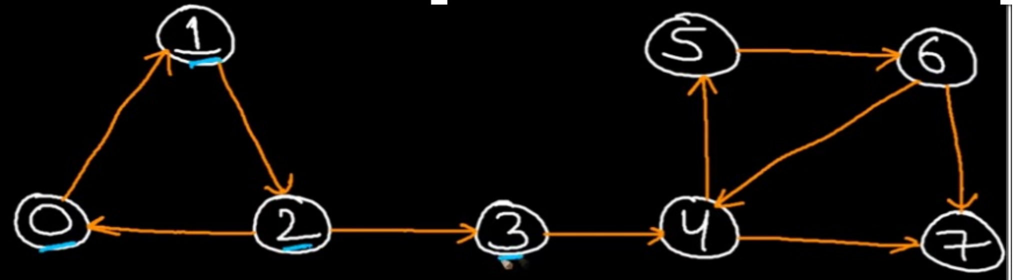
Transpose:



DFS on G^T:

- start at b: visit a, e
- start at c: visit d
- start at g: visit f
- start at h

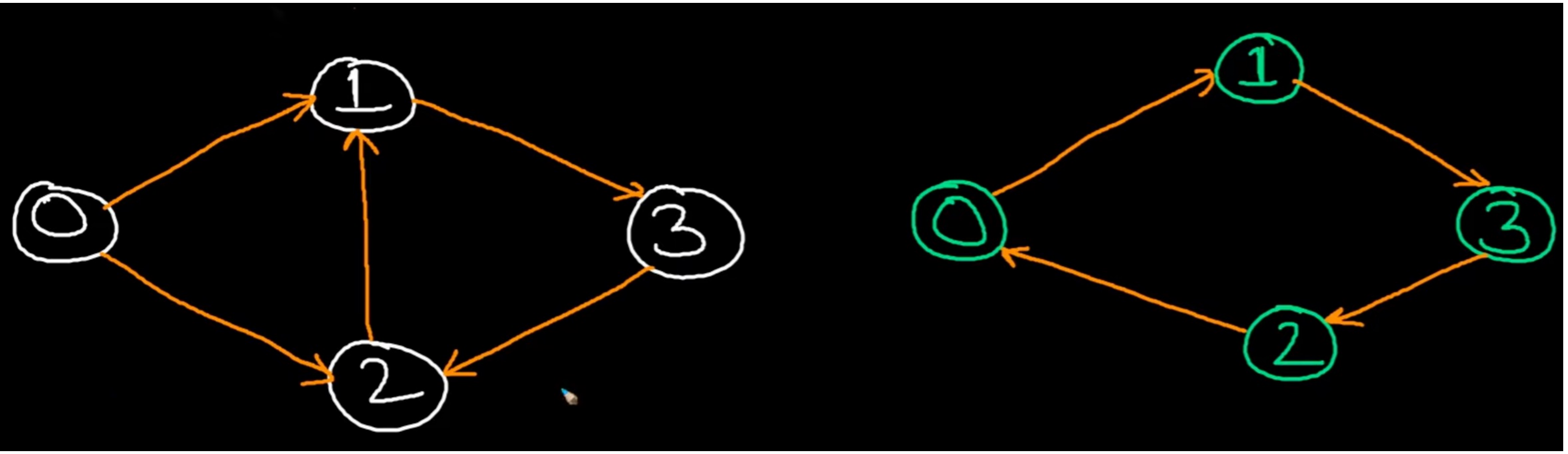
Strongly connected components: $C_1 = \{a, b, e\}$, $C_2 = \{c, d\}$, $C_3 = \{f, g\}$, $C_4 = \{h\}$



Component - 1 : 0, 1, 2
Component - 2 : 3
Component - 3 : 4, 5, 6
Component - 4 : 7

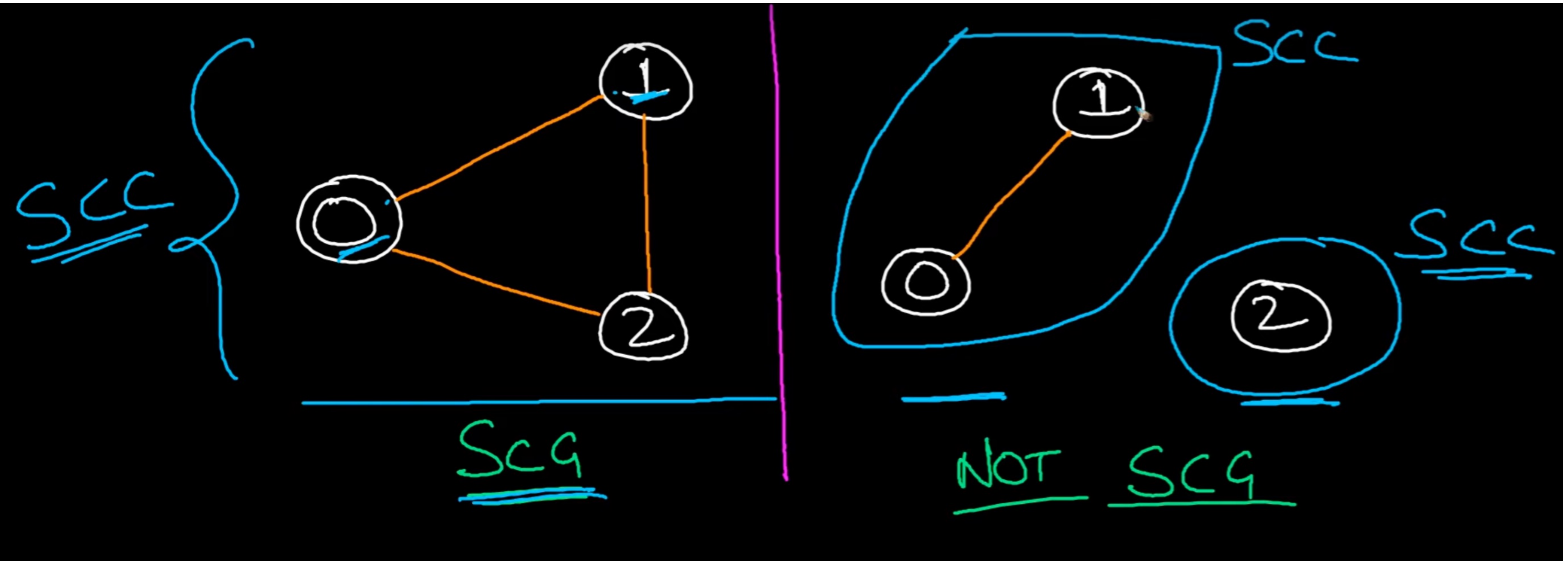
Single node is always strongly connected

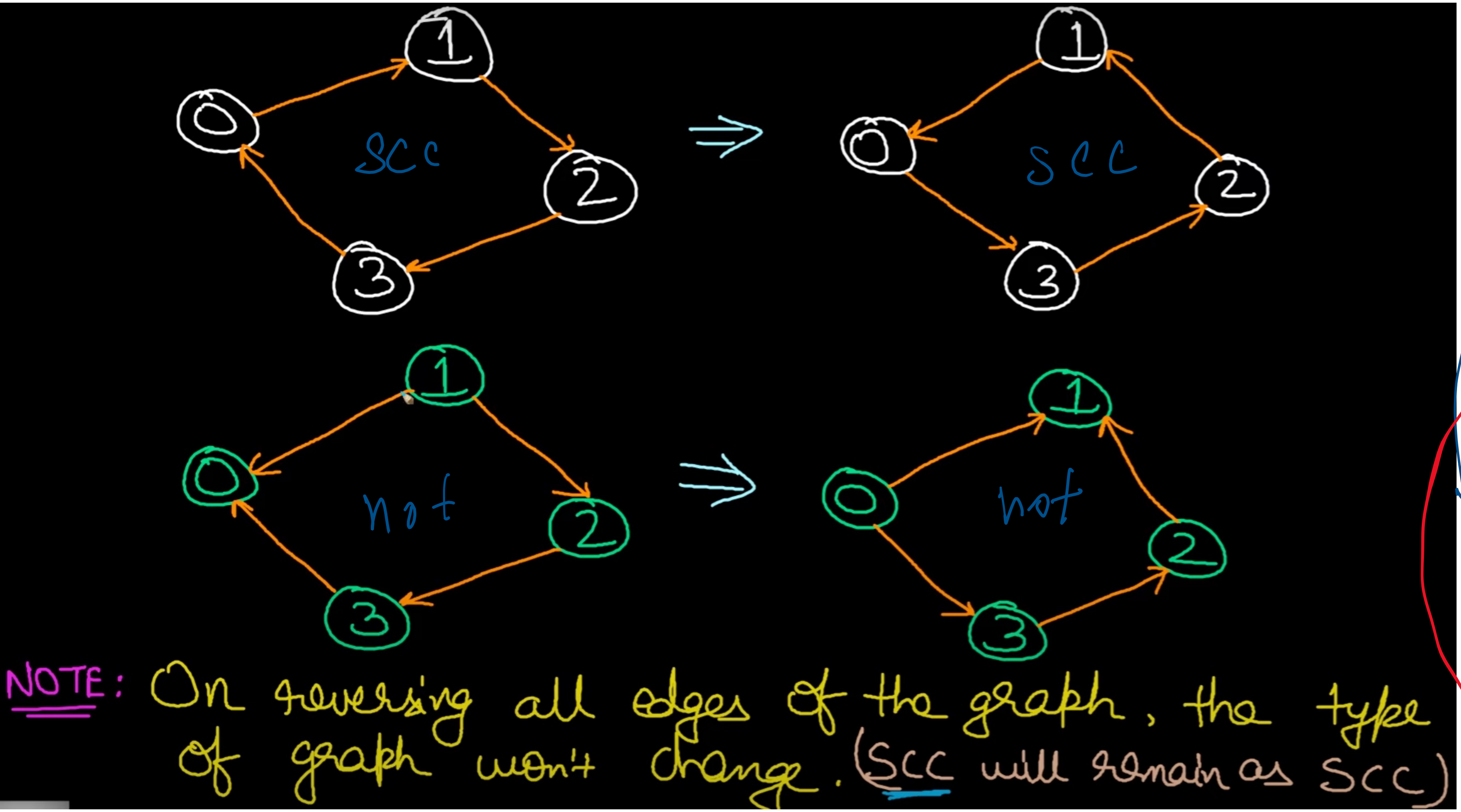
Scc:if we can reach from every vertex to every vertex in a component



We can reach to every vertex if we start from 0 but
If we start from 1 ,we cant reach 2 and so it is not
scc

scc





$SCC_1 \rightarrow SCC_2 \rightarrow SCC_3$

$SCC_1 \leftarrow SCC_2 \leftarrow SCC_3$

If we start DFS From SCC_1, we can traverse all the nodes from SCC_1 to SCC_3

But if we Do the same after transposing, we cant go from SCC_1 to SCC_2, we have to create a manual path for this

When we jump manually component will be discovered.

Time com. Of
Kosaraju Algorithm :3(v+e)
Asl it takes 3 steps