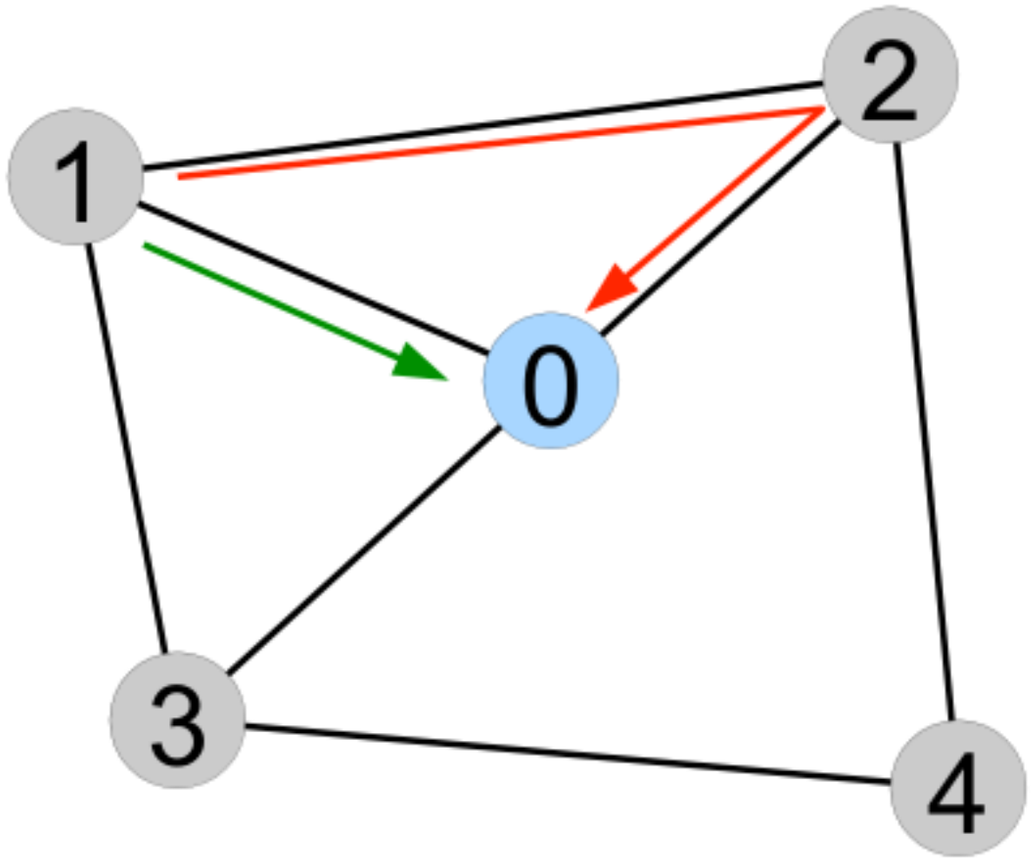
$P1$=(1 2 0) and $P2$=(1 0) are paths from 1 to 0

P^1 could be limited to $\{P1, P2\}$, meaning that node 1 does not accept to go through node 3.



Note: (1 4 0) is not a path in G.