# CSC263 A6Q1

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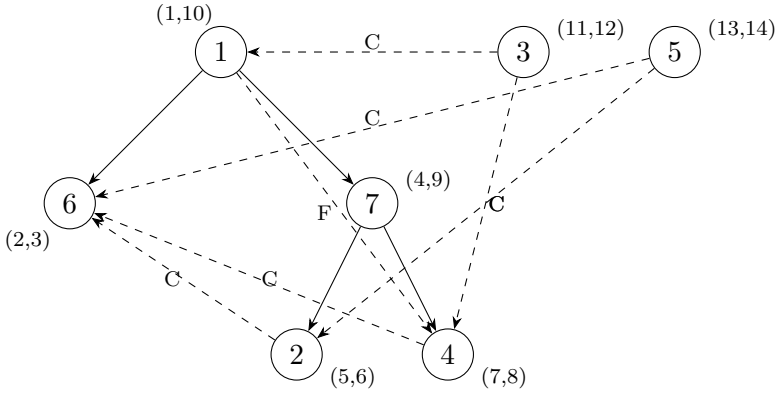
## (a)




## (b)

- According to Theorem 22.11 in *CLRS* (White–Path Theorem), for all directed graphs $G$ and all DFS of $G$, $G$ has a cycle $\iff$ DFS of $G$ has a back edge. By part (a), we know $G$ has no back edge, by the above theorem we know $G$ has no cycle.
- If $G$ is a DAG (Directed Acyclic Graph), we can use the topological sort algorithm to produce a topological order over nodes of $G$. That is, it is possible to take all courses in a sequential order that satisfy all the prerequisite requirements.

## (c)

$G$ is a DAG. Using topological sort on the graph:

$$f[5] > f[3] > f[1] > f[7] > f[4] > f[2] > f[6]$$

The order would be:

$$5, 3, 1, 7, 4, 2, 6$$

## (d)