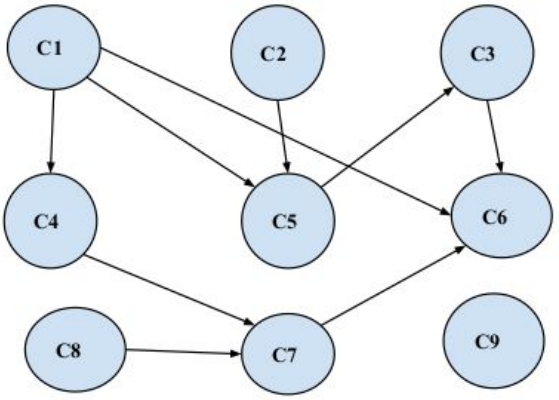
CS 310 'Algorithms' Fall 2019 **Quiz-2B** [Total marks= 12] [Time: 20 mins]

Name: _____ Roll No: _____

Q1. In the following directed graph, vertices indicate courses and edges indicate a prerequisite relationship between courses. E.g. if there is an edge directed from C2 towards C5 then C2 is a prerequisite for C5. Determine the **minimum** number of semesters needed to complete the **entire** coursework. Assume that all courses are offered in each semester and there is no limit on the number of courses that can be taken per semester. [5 marks]

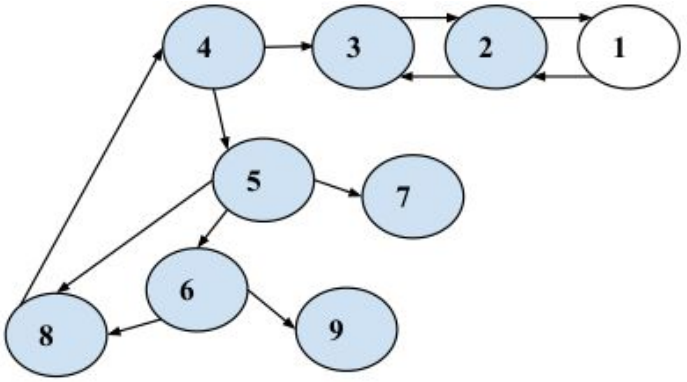


Minimum number of semesters needed to complete the entire coursework _____4_____

Mention **which courses** should be taken in the following semesters.

Semester-1: C1, C2, C8, C9	Semester-2: C4, C5	Semester-3: C3, C7
Semester-4: C6	Semester-5:	Semester-6:
Semester-7:	Semester-8:	Semester-9:

Q2. Run Depth-First-Search on the following directed graph G. **Start DFS from node 4.** During DFS, when there is choice for next vertex to explore, **pick the lower numbered one**. Write pre and post numbers for each vertex in the table. [7 marks]



	Pre-number	Post-number
Node 1	4	5
Node 2	3	6
Node 3	2	7
Node 4	1	18
Node 5	8	17
Node 6	9	14
Node 7	15	16
Node 8	10	11
Node 9	12	13

How many strongly connected components are there in G? __4_____

How do pre/post numbers help you in determining the **sink** strongly connected components? **Explain briefly and clearly.**

Run DFS on $G^{Reverse}$ and detemine the pre and post numbers. Now, run undirected connected components algorithm on G and during DFS process vertices in **decreasing order** of their post numbers.