QUESTION 1

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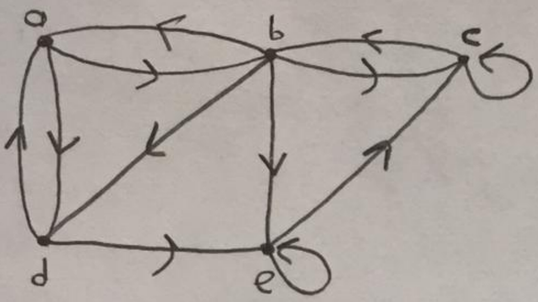
Problem 1: Representing Graphs



	a	b	c	d	e
a	0	1	0	1	0
b	1	0	1	1	1
c	0	1	1	0	0
d	1	0	0	0	1
e	0	0	1	0	1

$$\Downarrow$$

$$\begin{pmatrix} 0 & 1 & 0 & 1 & 0 \\ 1 & 0 & 1 & 1 & 1 \\ 0 & 1 & 1 & 0 & 0 \\ 1 & 0 & 0 & 0 & 1 \\ 0 & 0 & 1 & 0 & 1 \end{pmatrix}$$

This graph is a directed graph. if we want to represent this graph's adjacency matrix. we apply this way: if the "a" vertex has a edge with the "b" vertex, we write 1 in the adjacency matrix, else we write 0. And we apply this way for all vertexes.

QUESTION 2

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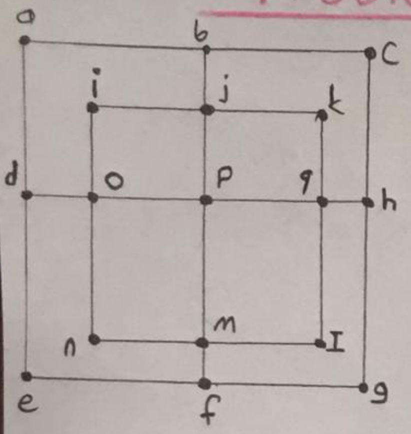
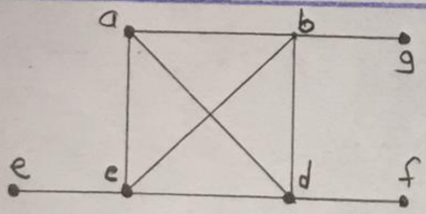
Problem 2: Hamilton Circuits



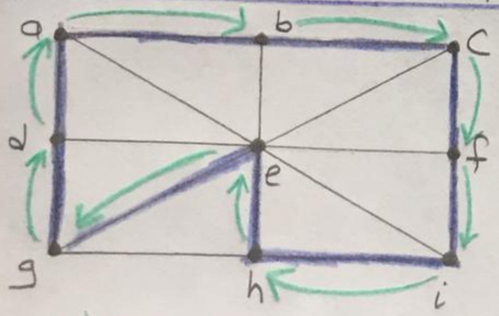
(a) The graph G_1

This graph does not has a Hamilton circuit. Because there is no way to this; for any vertex in this graph, if we draw a way that begin in a vertex, if we cross all vertex just one time and we arrive the begining vertex finally. Hence we get a Hamilton Circuit. But we can not apply this implementation for this graph. So for this reason, there is no Hamiton circuit in this graph.



(b) The graph G_2

Also this graph does not has a Hamilton circuit. Because we can not imply Hamilton circuit rule as i explain above.



(c) The Graph G_3

This graph has Hamilton circuit. Because in this graph, for any vertex, if we start to draw the Hamilton Circuit at a vertex, and we cross all vertex just one time and finally we arrive the begining vertex, we get a Hamilton Circuit.

For example at the this graph, if we start to draw Hamilton circuit at the g vertex, and we cross the all vertex only one time and again we can arrive our begining vertex g. So for these reason, we actually say that the Hamilton Circuit exist.

QUESTION 3

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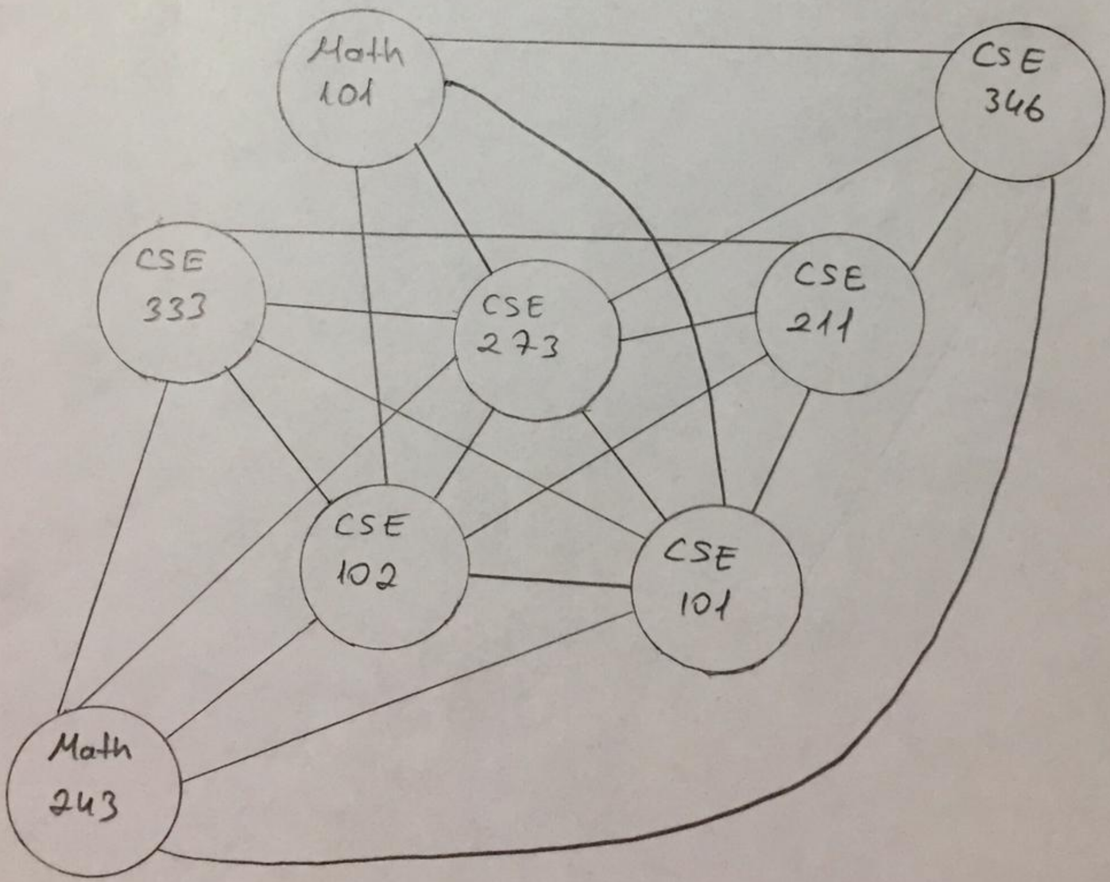
Problem 3: Applications On Graphs

In my solution, I use Graph Coloring Problem. I created the graph by combining the edges between the lessons taken by the students taking the same lesson. So vertexes are the lessons and edges represent of for the taking same time lessons for student. For example, since there are students taking Math 101 and CSE 346 lessons at the same time, these lessons have a edge to each other in the graph.



QUESTION 3 CONTINUE

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Promblem 3 Continue...

I tried to group the vertexes (lessons) in the graph that do not have a edge each other. In the other words, i arranged the exam times so that there were no students taking two lessons at the same time. In this way, there will be no students with overlapping exams and the exams will be over with the least number of days through graph coloring problem solution. For example, there will be no exam conflict since there are no students taking lessons Math 101, Math 243 and CSE 211 in Time 1 at the same time. This is valid for other exam times.

Time 1: Math 101, Math 243, CSE 211

Time 2: CSE 333, CSE 346

Time 3: CSE 102

Time 4: CSE 101

Time 5: CSE 273