

Homework #3

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Problem 1: Representing Graphs

(10 points)

(Solution)

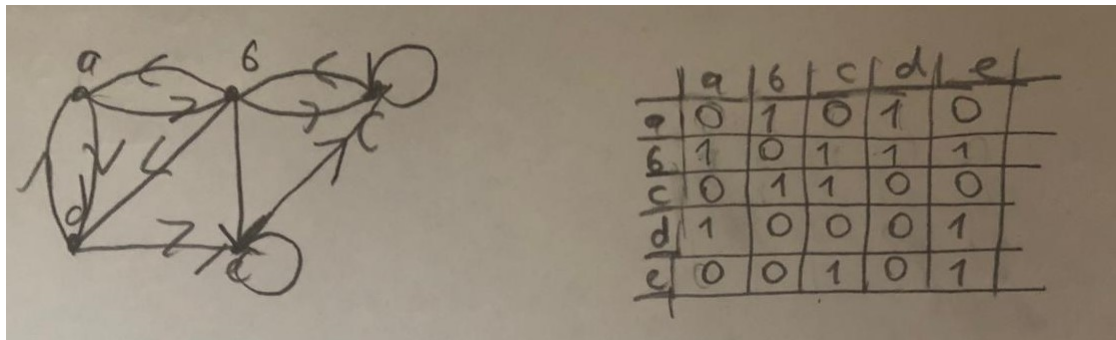


Figure 1: Matrix

In the vertical a-b-c-d-e I represented the going vertices. If any vertices have an edge to another point, I represented as 1, if not it is 0.

Problem 2: Hamilton Circuits

(10+10+10=30 points)

- According to Dirac Theorem, Let G be a simple graph with n vertices, (n should be greater than or equal to 3) such that degree of every vertex is at least $n/2$, then G has a Hamilton Circuit.

(a)

(Solution)

This Graph has 17 vertices. But degree of every vertices is not greater than or equal to $17/2=8.5$. So this Graph does not have a Hamilton Circuit.

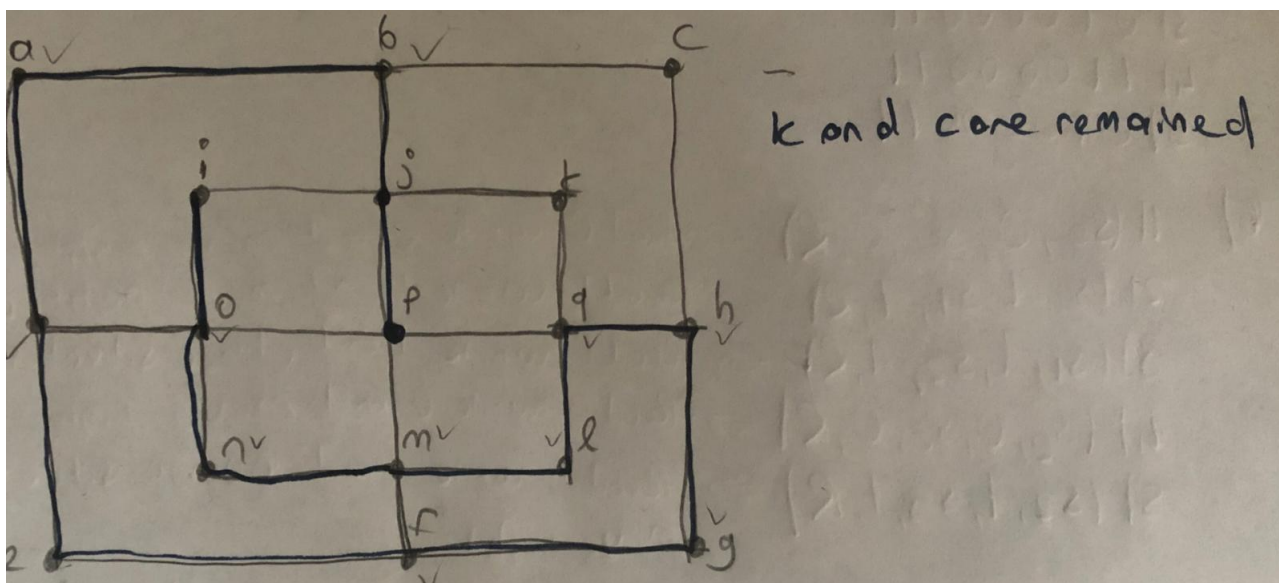


Figure 2: Graph G1

(b)

(Solution)

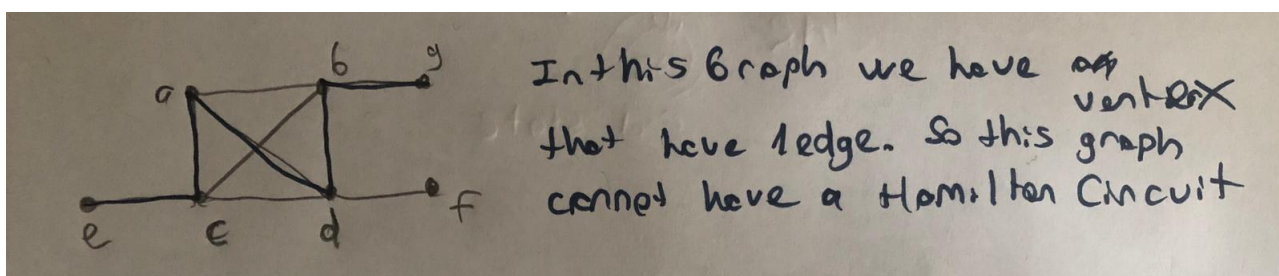


Figure 3: Graph G1

In this Graph we have a vertex that have just 1 edge. So this Graph cannot have a Hamilton Circuit.

(c)
(Solution)

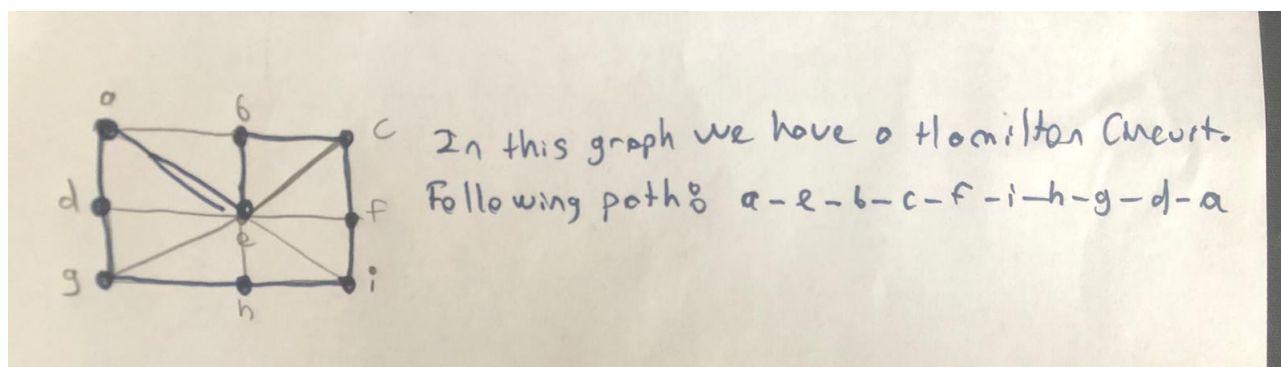


Figure 4: Graph G1

Problem 3: Applications on Graphs

(20 points)

(Solution)

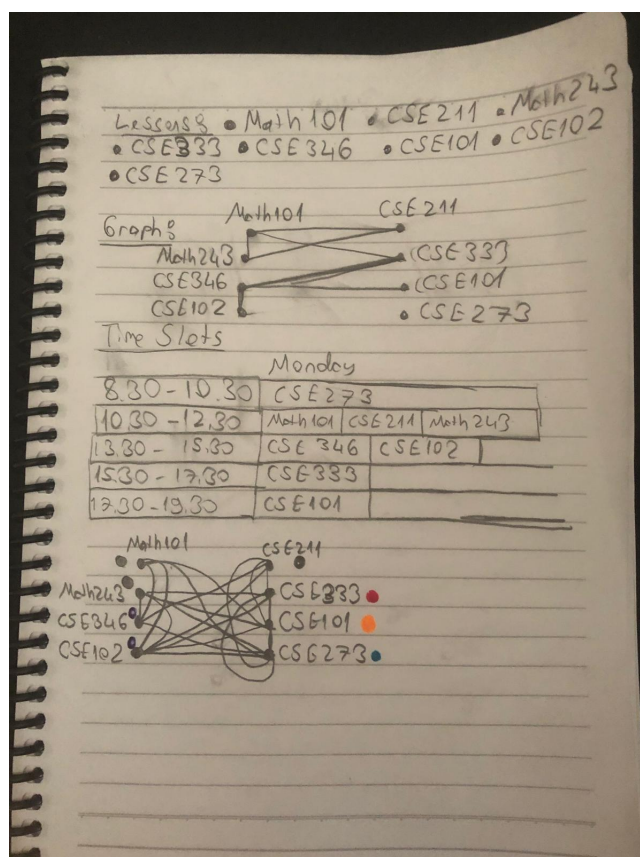


Figure 5: Solution

In the Graph, I represented the vertices as the lessons which are not taken together by students. So, I designed the time slots like in the figure. MATH101, CSE211 and MATH243 are not taken together, we can do these exams at the same time. It can be applied to CSE346 and CSE102 also.