HEAVEN'S LIGHT IS OUR GUIDE

Rajshahi University Of Engineering And Technology

Rajshahi

Depertment of computer science and engineering

RUET

Class Assignment

Subject:Discrete Mathematics

SUBMITTED BY,

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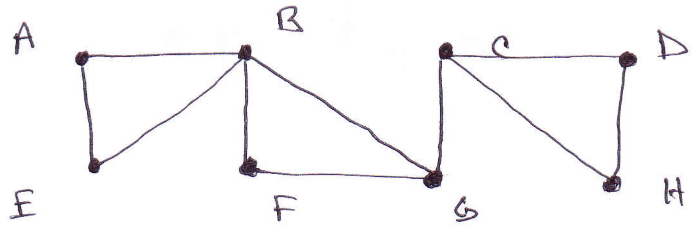
Class: *2nd year,3rd sem*

Roll:083043

...aph theory:

Problem 8.33:



(a) The degree of each vertex:

A = 2
B = 4
C = 3
D = 3
E = 2
F = 2
G = 3
H = 2

The sum of the degree = 21

total edges = 8

(b) Simple path (A to G)

ABG # ABFG # AEBG # AEBFG

(c) All traits from B to C :

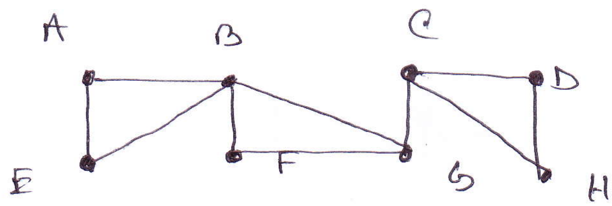
BGC # BAEBGC # BFGC # BAEBFGC

(d) d (A, C) the distance from A to C

→ A → B → G → C = 3

(e) diam (G) = 4

4 :



(a) All cycles :

i) ABEA

ii) BFGB

iii) CDHC

(b) All cut points:

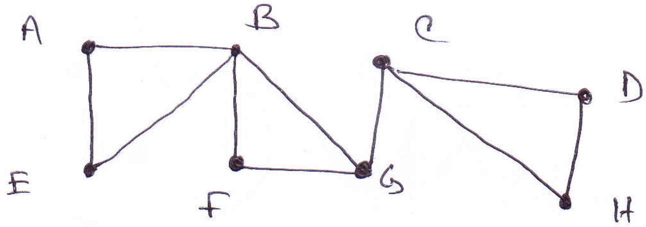
i) B

ii) G

iii) C

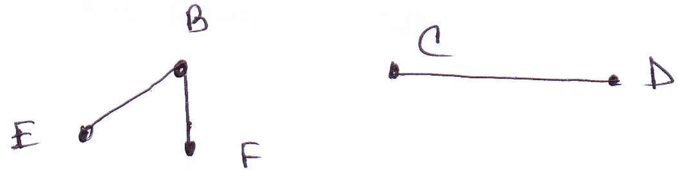
(c) All bridges : {G, C}

blem 8.35 :



(a) $V' = \{B, C, D, E, F\}$

$\Rightarrow$



$E' = \{BE, BF, CD\}$

(b) $V' = \{A, C, E, G, H\}$

$E' = \{AE, CG, CH\}$

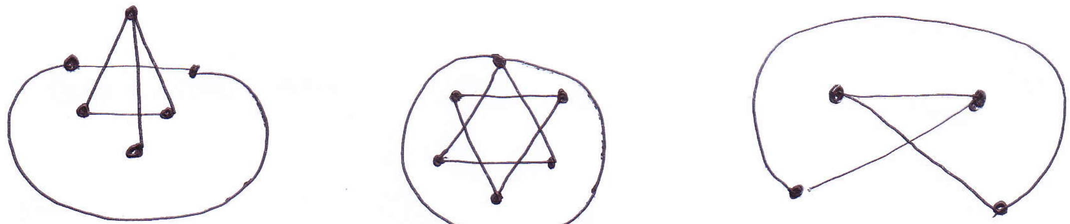
(c) $V' = \{B, D, E, H\}$

$E' = \{BE, DH\}$

(d) $V' = \{C, F, G, H\}$

$E' = \{FG, GC, CH\}$

...em 8.36 :



(i) (ii) (iii)

(a) (iii) is connected. (ii) and (i) have 2 connected ~~com~~ component.

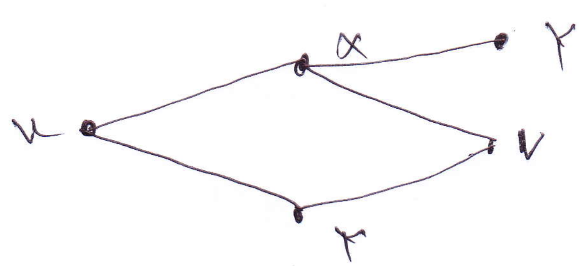
(b) none is cycle free.

(c) (i) and (iii) is loop free.

Problem 8.37 :

Suppose a graph G contains two distinct paths from a vertex u to a vertex v. Show that G has a cycle.

If we consider a graph G :



Here, two way to go from, u to v . i) u x v ii) u Y v

And there is a cycle u Y v x u

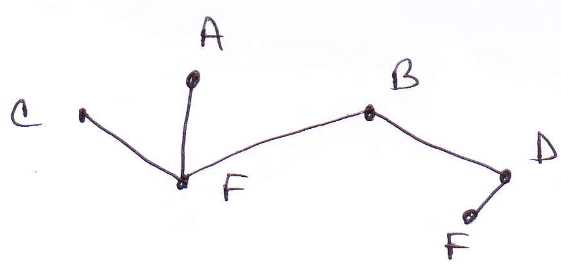
Problem 8.39 :

If we consider some connected graph then,

Here we can see that every graph having n number of vertices and all of them consist at least n-1 edges. (showed)

Problem 8.38 :

If we consider a cycle free graph G, then,



Here, deg(C) = 1 deg(B) = 2

deg(A) = 1 deg(D) = 1

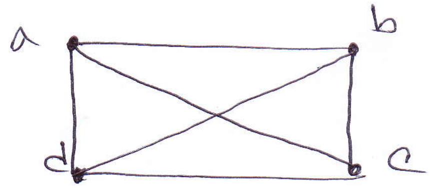
deg(F) = 2 deg(F) = 1

So, G, a finite cycle free graph with a least one edge has at least two vertices of degree 1

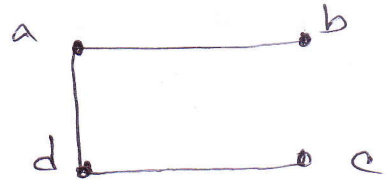
Problem 8.40 :

Find the member of connected graps with four vertices.

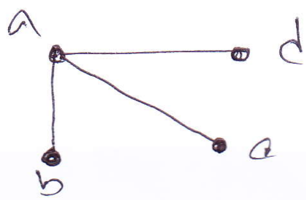
i)



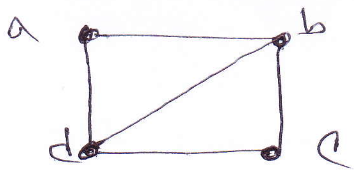
ii)



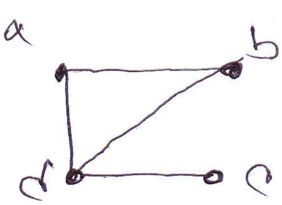
iii)



iv)



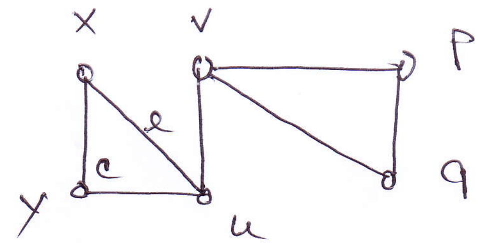
v)



8.41

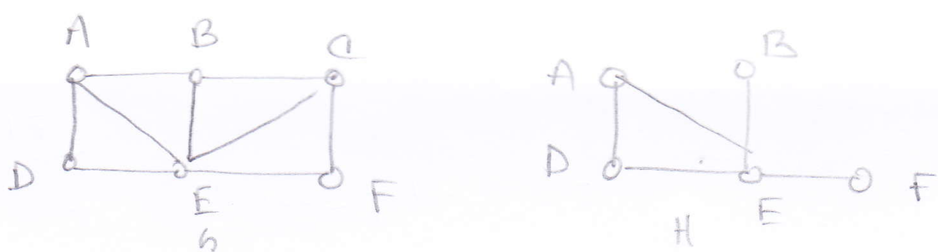
a. Consider a graph :

If we deleted e then G-e is still connected.



b. Let e = {u, v}. If we deleted the edge {u, v} then the graph is disconnected. Then xyu and vpq are the components of G-e

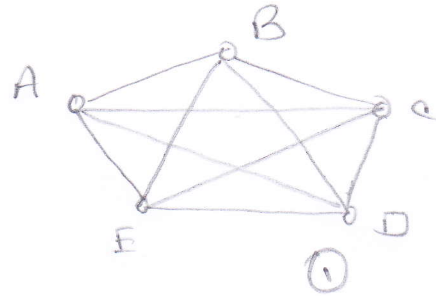
8.42:



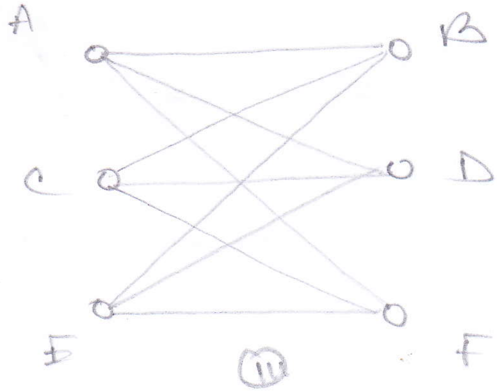
Let G is a connected graph. First we delete an edge AB. Then we delete C and all edges connected with C. Then we get a graph H, which is a sub-graph of G.

oblem 8.43:

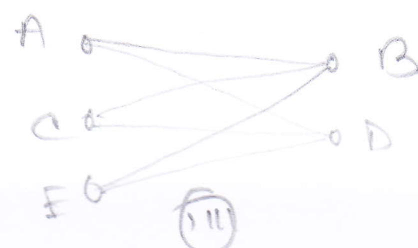
The graph is Eulerians because every vertices has even number of edges. the Eulerian path is ABCDEACEBDA.



The graph is not Eulerians because every vertices has odd number of edges.



The graph is iii) Eulerian. It has Eulerian path begining in B and end in D or vice versa.



Problem 8.44:

In the previous graph:

i) the Hamiltonian path or a Hamiltonian circuit will be ABCDEA.

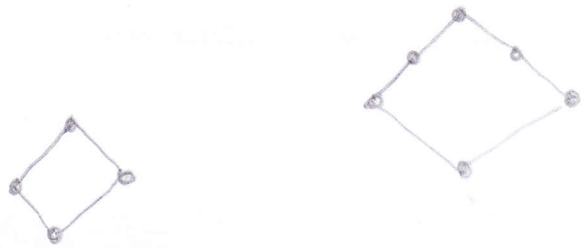
From graph, ii) The hamiltonian path will be ABCDEFA.

From graph iii) It is not hamiltonian because B or D must be visited twice in any closed path including all vertices

Problem; 8.45:

Ans: Eight.

Problem 8.46:



Adding a vertex by dividing an edge does not change the degree other original vertex and simply adds a vertex of even degree. So G is Eulerian if and only if G* is Eulerian. (showed)

Problem 8.47:

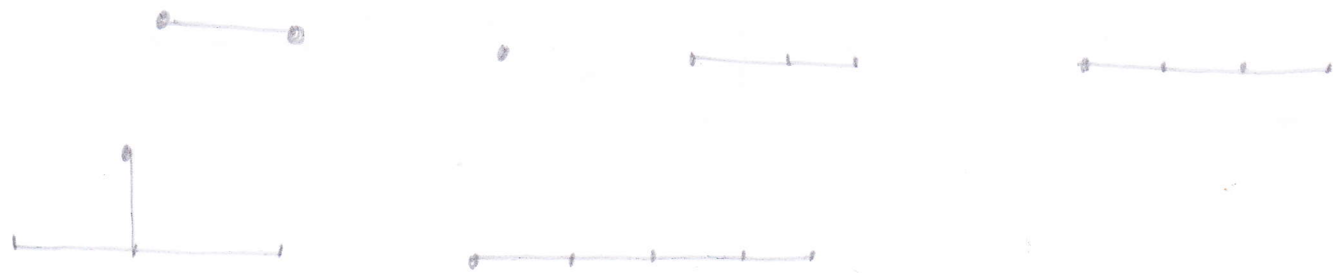
The three - regular graphs are:

roblem 8.48:

It is not possibles because we know if we draw r-regular graph with 5 vertices then then rs = even number vertices.

Problem 8.51:

There are 8 such trees. They are:

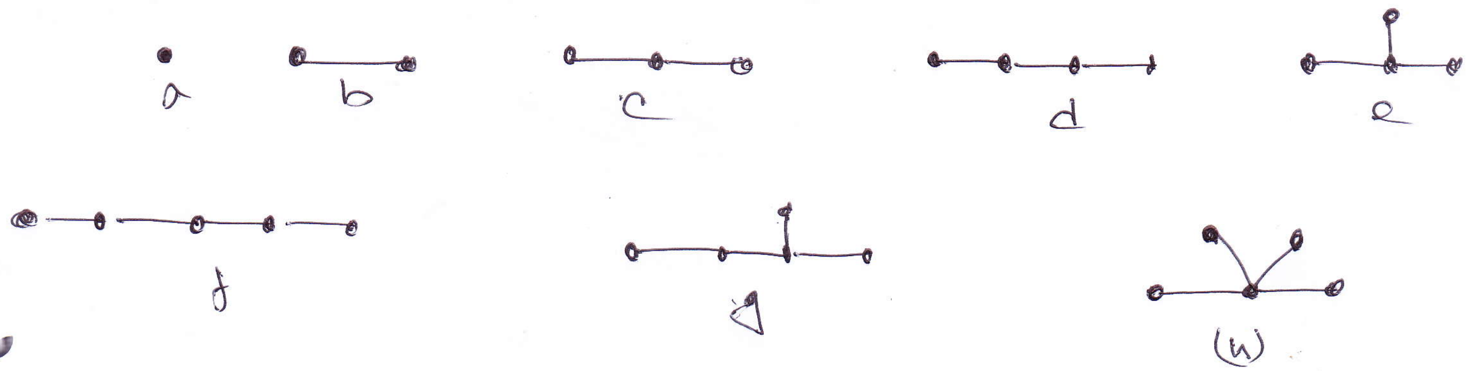


Problem 8.52: 10

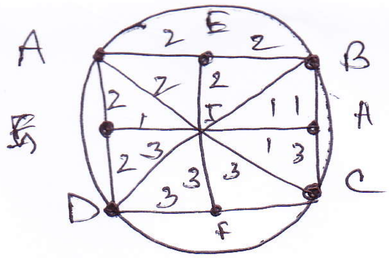
Problem 8.53: 15

Trees

Problem: 8.51 There are eight such trees, as show in Fig. The graph with one vertex and no edge is called trival tree.



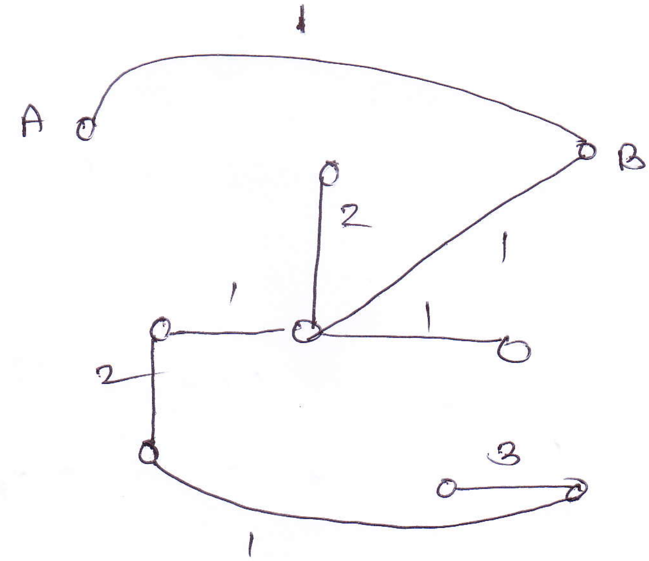
Problem 8.54: Given a weighted graph:



AB	BC	CD	AD	AE	BE	BH
1	2	1	3	2	2	1

CH	CF	DF	AG	DG	AI	DI
3	3	3	2	2	2	3

CI	BI	GI	EI	HI	FI
3	1	1	2	1	3

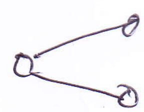


The weight of minimum spanning tree =

$1+1+1+1+1+2+2+3=12$

Problem 8.55:

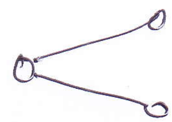
Let a tree has three vertices and two edges.



We know, A graph G is said to be bipartite if it's vertices V can be partitioned into two sub sets M and N such that each edge of G connects a vertex of N. Clearly the graph K_{mn} has mn edges.

If we consider one vertex is M and another two vertex N then graph

Problem 8.56 :



$K_{1,2}$

Ans : $m = 1$, & $n = 2$

Problem 8.58 :

The outside region has degree 8 and ~~path~~ other two region have 5.

The map has 9 edges.

$\therefore$ Sum of the degrees = $8 + 5 + 5 = 18$

$2E = 9 \times 2 = 18$

$\therefore$ Sum of the degree of the region is equal to the twice of the number of edges.

Problem 8.59 :

a. 5, 8, 5

$V - E + R = 5 - 8 + 5 = 2$

b. 12, 17, 7

$V - E + R = 12 - 17 + 7 = 2$

c. 3, 6, 5

$V - E + R = 3 - 6 + 5 = 2$

d. 7, 12, 7

$V - E + R = 7 - 12 + 7 = 2$

Problem 8.60:

a) 3 b) 3 c) 2 d) 3

Problem 8.62:

a. $n = 3$

b. $n = 4$

Problem 8.63:

a.

	A	B	C	D
A	0	1	0	1
B	1	0	1	1
C	0	1	0	1
D	1	1	1	0

b.

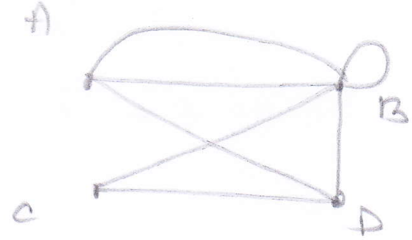
	A	B	C	D
A	0	1	2	0
B	1	0	1	1
C	2	1	0	0
D	0	1	0	0

c.

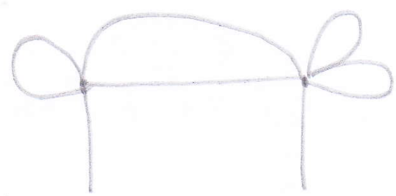
A	A	B	C	D
A	1	1	1	0
B	1	0	0	2
C	1	0	0	0
D	0	2	0	0

oblem 8.64:

a.



b.



Problem 8.66:

a. List of the vertices which are appears in memory .... B → F → A → D → E → C

b. G = [A : B ; B: A, C , D, E ; C : F ; D: B , E : B ; F : C]

Problem 8.67:

Each vertex is adjacent to the other four vertices.

b: G = [A : B, D, F ; B: A, C, E ; C : B, D, F ; D: A, C, E ; E : B, D, F ; F: A, C, E]

c = G [A: B, D ; B: A, C, E ; C : B, D ; D: A, C, E ; E: B, D]

Problem 8.68: Vertex File:

Vertex → A → B → C → D → E → F

Ptr 1 → 2 → 9 → 14 → 8 → 12

Edge File:

	1	2	3	4	5	6	7	8	9	10	11	12	13	14
number	22	22	33	33	44	44	55	55	66	60	77	77	88	88
adj	2	1	6	5	4	2	5	2	6	3	6	2	4	1
next	13	9	0	0	7	0	11	3	0	4	0	10	0	6

Problem 8.69:

a. G = [A: B, E ; B: A, E, F, G ; C: D, G, H ; D: C, H, E ; A, B ; F: B, G ; G: B, C, F , H: C, D]

Problem 8.70:

a: C, D, G, H, B, F, A, E

B, A, E, F, G, C, D, H