CS309

TUTORIAL-2

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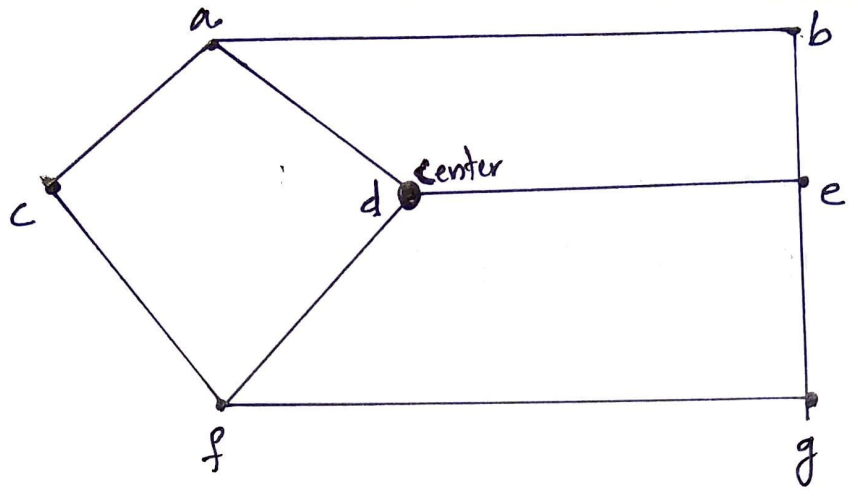
(1) Find the eccentricity of all vertices in graph G given below and also mark the center, radius and diameter of G.



Ans:-

Eccentricity (e) = maximum distance of one vertex from other vertex.

e(a)

$(a,b)=1$, $(a,c)=1$, $(a,d)=1$, $(a,e)=2$, $(a,f)=2$

$(a,g)=3$

$e(a)=3$

e(b)

$(b,a)=1$, $(b,c)=2$, $(b,d)=2$, $(b,e)=1$, $(b,f)=3$, $(b,g)=2$

$e(b)=3$

e(c)

$(c,a)=1$, $(c,b)=2$, $(c,d)=2$, $(c,e)=3$, $(c,f)=1$, $(c,g)=2$

$e(c)=3$

e(d)

$(d,a)=1$, $(d,b)=2$, $(d,c)=2$, $(d,e)=1$, $(d,f)=1$, $(d,g)=2$

$e(d)=2$

e(e)

(e,a) = 2, (e,b) = 1, (e,c) = 3, (e,d) = 1, (e,f) = 2, (e,g) = 1

e(e) = 3

e(f)

(f,a) = 2, (f,b) = 3, (f,c) = 1, (f,d) = 1, (f,e) = 2, (f,g) = 1

e(f) = 3

e(g)

(g,a) = 3, (g,b) = 2, (g,c) = 2, (g,d) = 2, (g,f) = 1

e(f) = 3.

→ Center of graph = vertices whose eccentricity minimum

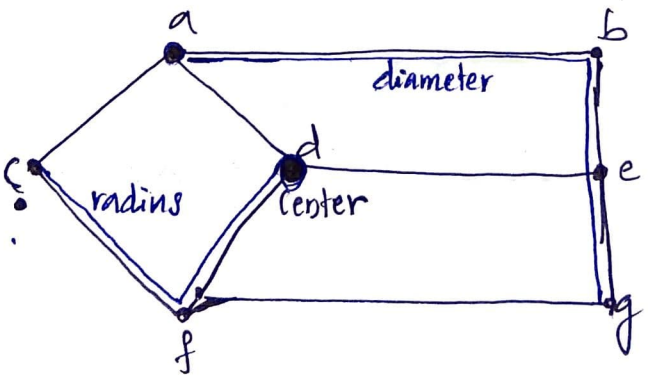
= {d}

→ Radius. Diameter = maximum distance b/w pair of vertices

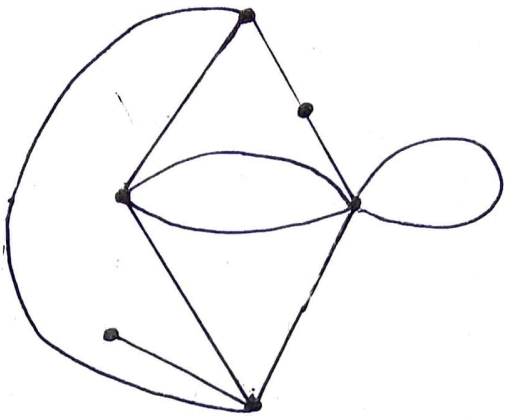
d(G)

= 3

→ Radius : minimum eccentricity, r(G) = 2

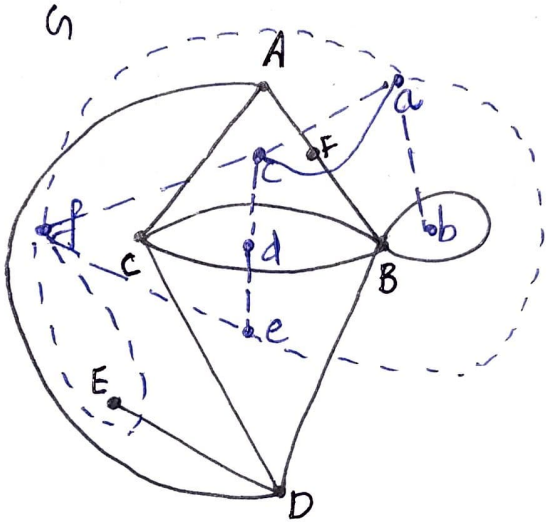


(2) Find the geometric dual (G^*) of the graph G given below.

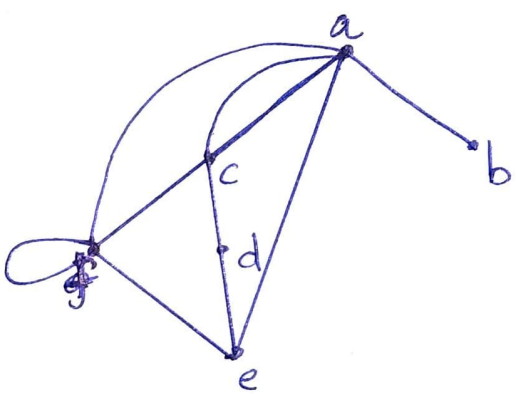


Ans:-

G

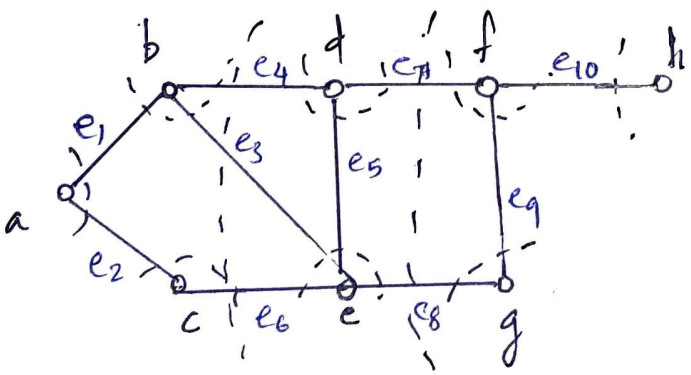


G^* (geometric dual)



(3) Obtain cut set matrix for the following graph.

Ans:-



cutsets

(1) $\{e_{10}\}$

(2) $\{e_7, e_9, e_{10}\}$

(3) $\{e_9, e_8\}$

(4) $\{e_7, e_8\}$

(5) $\{e_4, e_5, e_7\}$

(6) $\{e_6, e_3, e_5, e_8\}$

(7) $\{e_4, e_3, e_6\}$

(8) $\{e_1, e_3, e_4\}$

(9) $\{e_2, e_6\}$

(10) $\{e_1, e_2\}$

cutset matrix =

	e_1	e_2	e_3	e_4	e_5	e_6	e_7	e_8	e_9	e_{10}
1	0	0	0	0	0	0	0	0	0	1
2	0	0	0	0	0	0	1	0	1	1
3	0	0	0	0	0	0	0	1	1	0
4	0	0	0	0	0	0	1	1	0	0
5	0	0	0	1	1	0	1	0	0	0
6	0	0	1	0	1	1	0	1	0	0
7	0	0	1	1	0	1	0	0	0	0
8	1	0	1	1	0	0	0	0	0	0
9	0	1	0	0	0	1	0	0	0	0
10	1	1	0	0	0	0	0	0	0	0