ASSIGNMENT (CSE-505)

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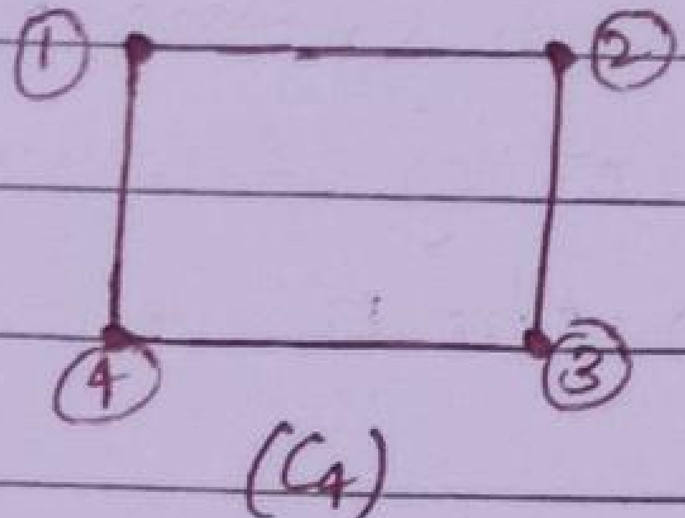
1. Construct a graph Such that

(a) alpha-0 = Beta-0

ie, ($\alpha_0 = \beta_0$)

This condition is satisfied When the graph is a cyclic graph With Even number of Vertices.



(C_4)

maximum independent set = {1,3}

minimum Vertex cover set = {1,3}

As, α_0 = Cardinality of maximum independent set = 2

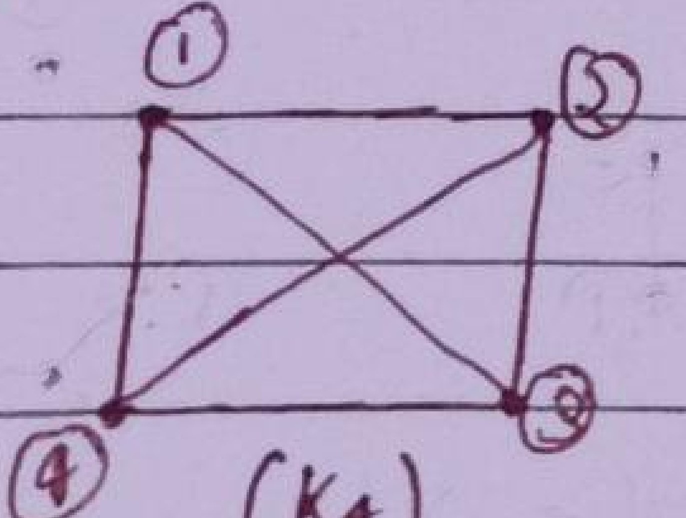
β_0 = Cardinality of minimum Vertex cover set = 2.

$\Rightarrow \alpha_0 = \beta_0 = 2$

(b) alpha-0 < Beta-0

i.e, ($\alpha_0 < \beta_0$)

This condition is Satisfied When the graph is a complete graph.



(K_4)

maximum independent set = {1}

minimum vertex cover set = {1,4,3}

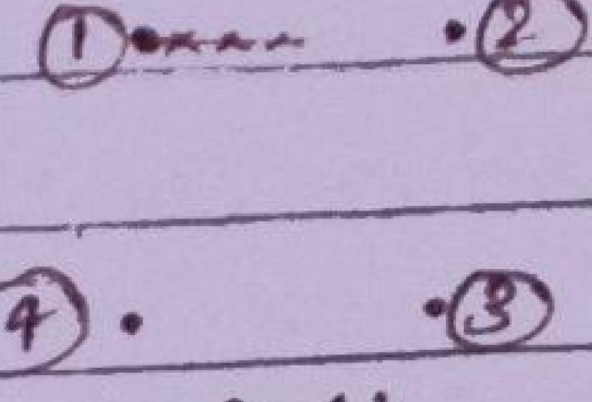
As, α_0 = Cardinality of maximum independent set = 1

β_0 = cardinality of minimum vertex cover set = 3

$\Rightarrow \alpha_0 < \beta_0$

(c) alpha-0 > Beta-0 ie, ($\alpha_0 > \beta_0$)

This condition is Satisfied When the graph is the complement of Complete graph (ie, Empty graph).



(K_4^c)

maximum independent set = {1,2,3,4}

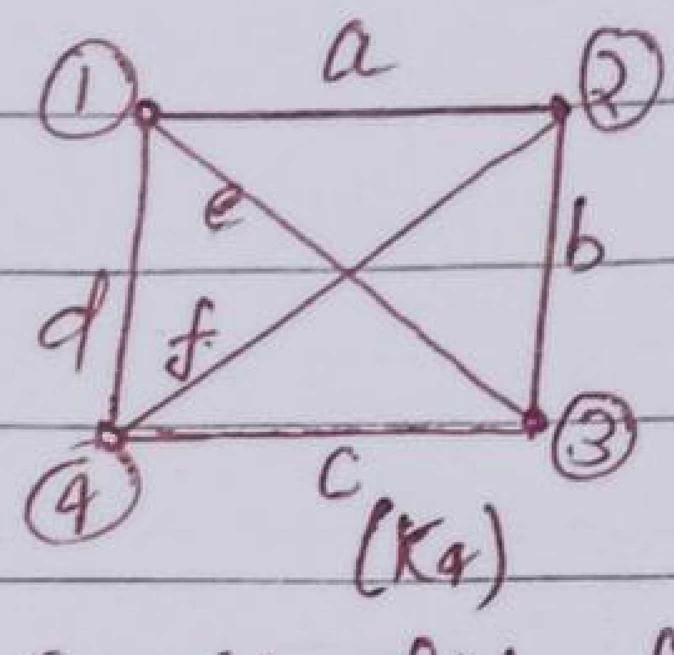
minimum vertex cover set = { }

$\therefore \alpha_0 = 4, \beta_0 = 0 \Rightarrow \alpha_0 > \beta_0$.

2. Construct a graph Such that

(a) alpha-1 = beta-1 ($\alpha_1 = \beta_1$)

This condition is Satisfied when the graph is a complete graph with even number of vertices.



maximum matching = {a, c}

minium Edge cover set = {e, f}

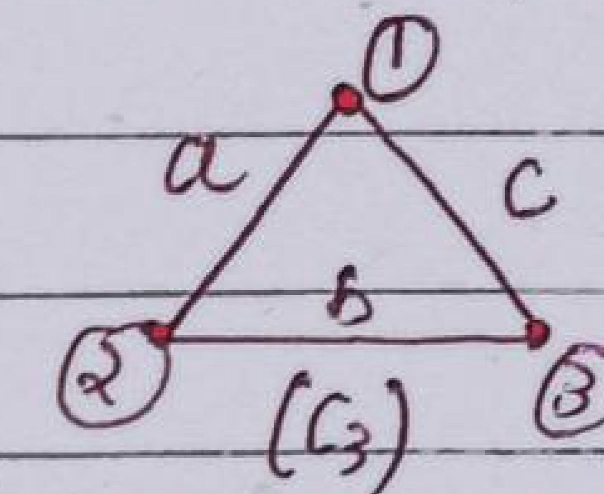
As, α_1 = Cardinality of maximum matching = 2

β_1 = Cardinality of minimum Edge cover set = 2

$\Rightarrow \alpha_1 = \beta_1 = 2$.

(b) alpha-1 < beta-1 ($\alpha_1 < \beta_1$)

This condition is Satisfied when the graph is a cyclic graph with odd number of vertices.



maximum matching = {a}

minimum Edge cover set = {a, c}

As, α_1 = Cardinality of maximum matching = 1

β_1 = Cardinality of minimum Edge cover set = 2

$\Rightarrow \alpha_1 < \beta_1$

(c) alpha-1 > beta-1 ($\alpha_1 > \beta_1$)

This condition is not Satisfied for any graph G.

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CSE/18/10