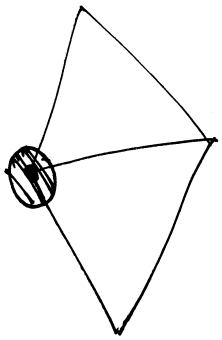
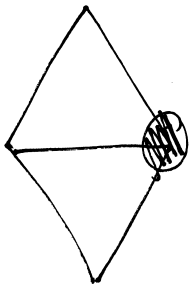
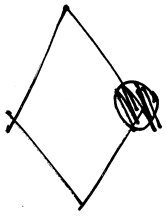
12/04/06

Vertex Geography



move taken





Vertex geography - delete vertex

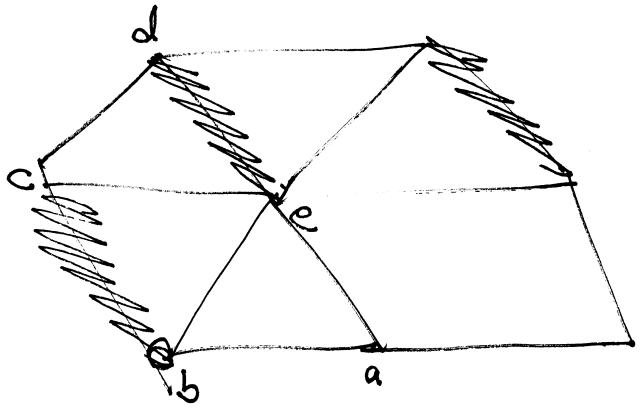
Edge Geography - delete edge

Game ends when player cannot move.

Undirected Vertex Geography

Matchings in graphs

Alternating Path



abced is an alternating path. P

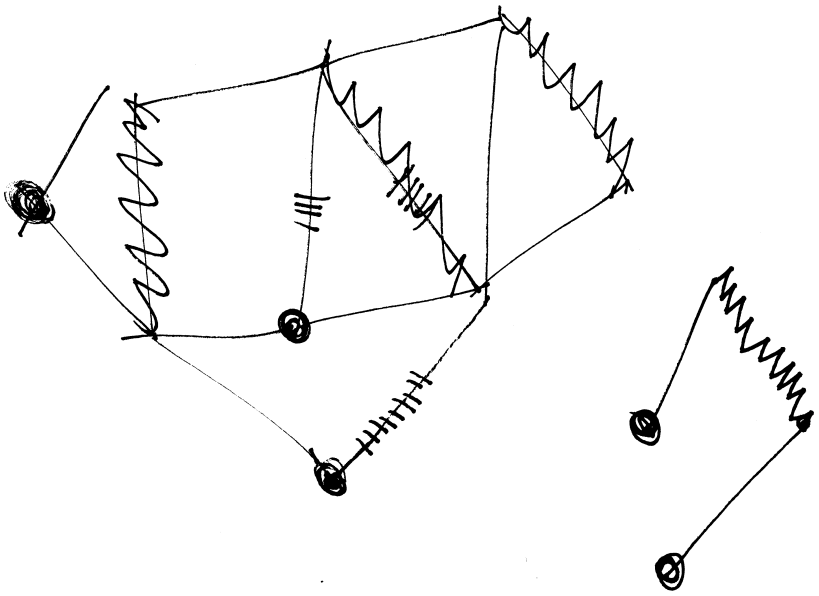
M

M-saturated means M covers.

a is M- unsaturated

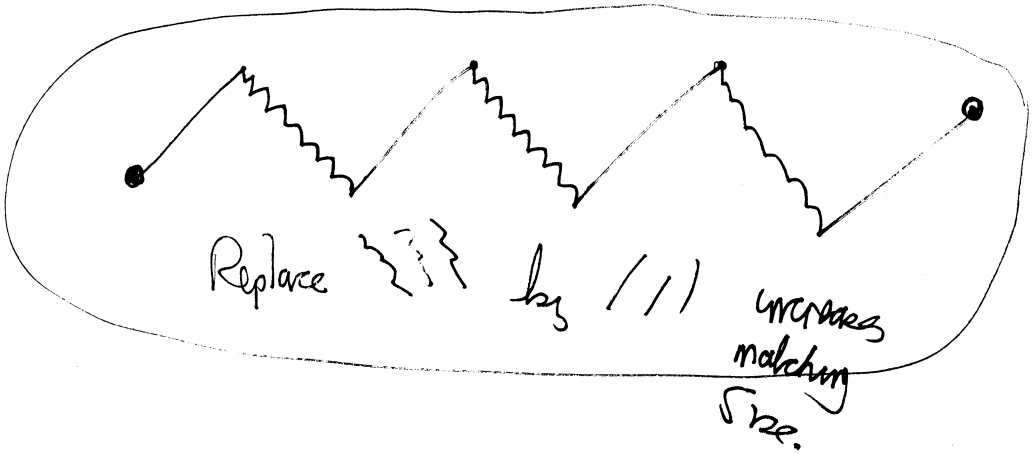
b is M- saturated

P is an M-augmenting path if it starts & ends with an M-unsaturated vertex.



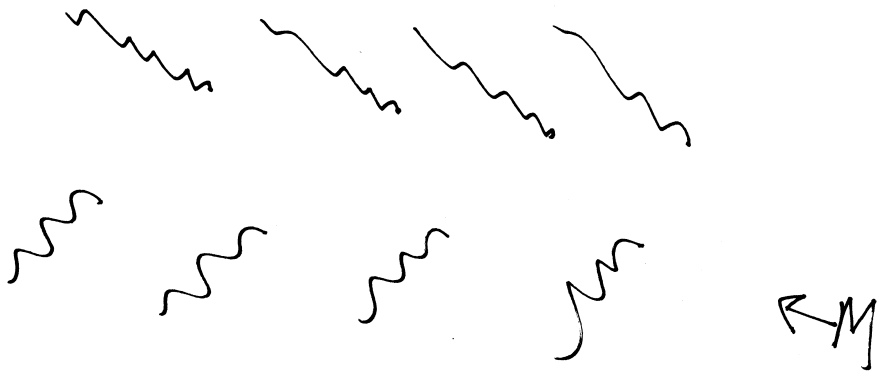
Augmenting

If you switch out edge & in-edges you get a bigger matching.



$\nexists$ Augmenting $\Rightarrow$ Not max. ✓

Not max $\Rightarrow$ $\nexists$ augmenting.



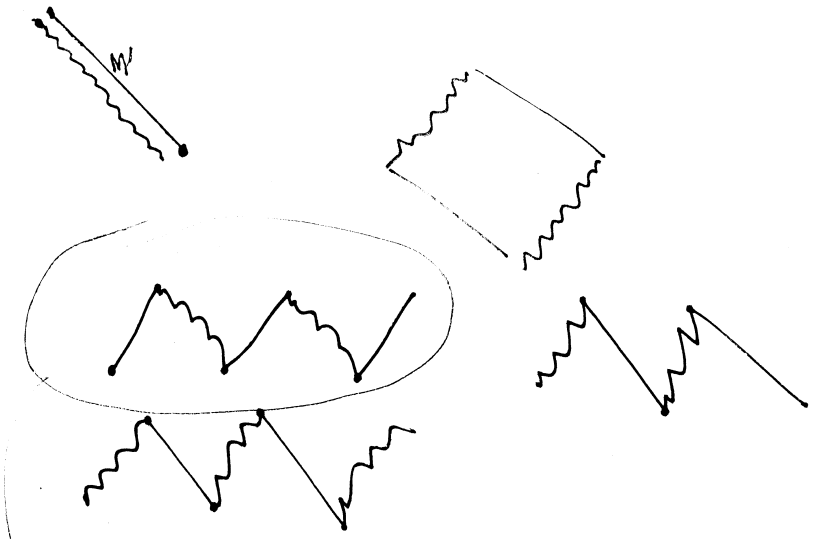
$\nexists$ M', $|M'| > |M|$

Look at $M \cup M'$

$\nexists$

Subgraph

$M \cup M'$ — max. degree ≤ 2.



$\exists$ such a component $\equiv$ augmenting path.

Geography

(G, v) is an N-position

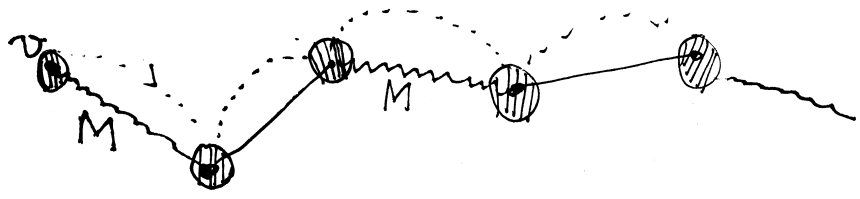
start

iff v is in every maximum matching of G.

Proof

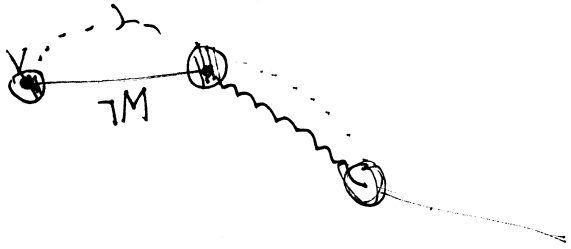
If: Suppose v is in all maximum matchings.

Player 1 chooses maximum matching M.



Only If:

Suppose $\exists$ maximum matching M that does not cover v.



□

Finding a maximum matching can be done in $O(|E| \times \sqrt{|V|})$ time.

v is in every maximum matching if $\mu(G-v) < \mu(G)$ ← size of max. matching