CptS 515. 9/21/2020

Questions on HW?

Last problem of the HW: You are going to write a mini-paper (2-3 pages).

General Comment:

Open-ended problem, out-of-box thinking.

Fuzzy, difficult.

Don't Google. Think by your self.

① Fundamental side. ← mathematical def.

Fuzziness ⟶ clearness

② Try to solve the mathematical problem now.

History: any big movement = finally, we have a mathematical def. of the problem.

max. bipartite matching & applications.

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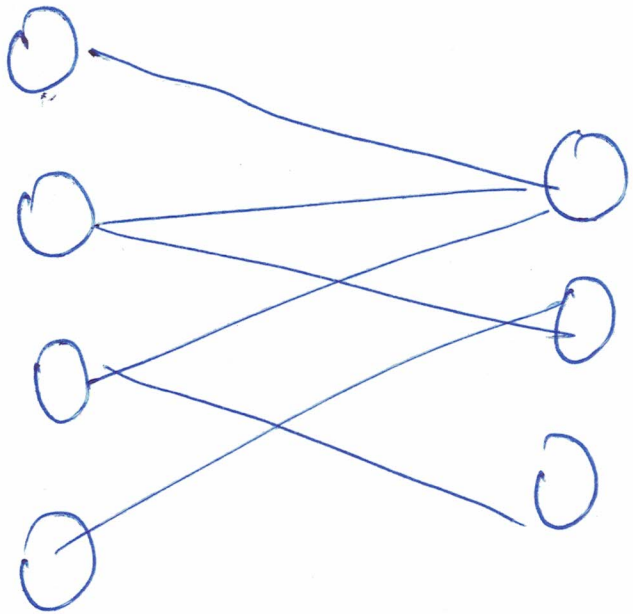
bipartite graph



4 left nodes

3 right nodes

6 edges.

There are no edges between left nodes & between right nodes.

This is bipartite graph.

Given: a bipartite graph G,

we use N_{left} to denote its left nodes,

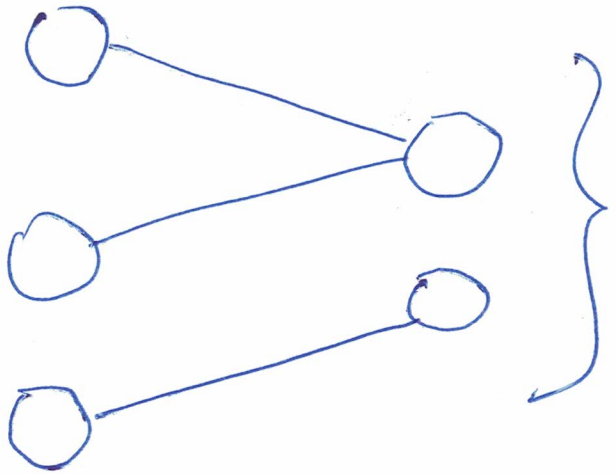
N_{right} ------ right nodes,

and E ------ all the edges.

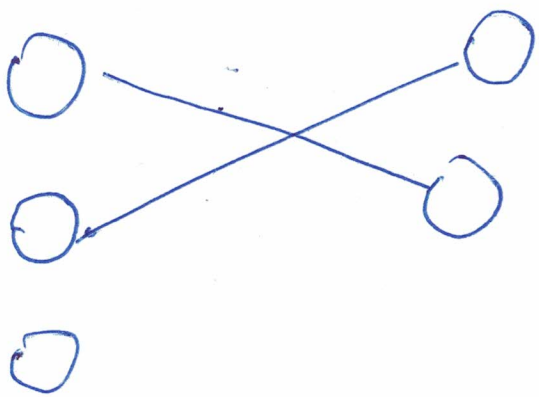
Remark. G defines a relation between left & right nodes; $E \subseteq N_{left} \times N_{right}$.

Want to Find a subset M of E s.t.

(1). M is 1-1 mapping (i.e., there are not two edges in M touching the same node).

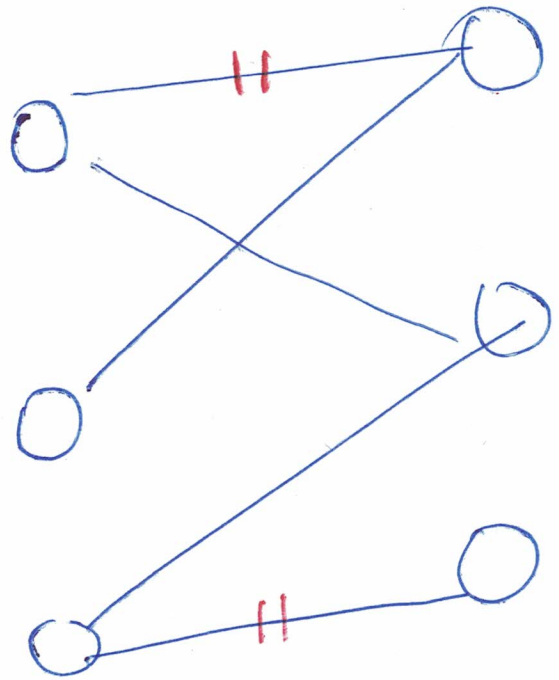


is not 1-1.



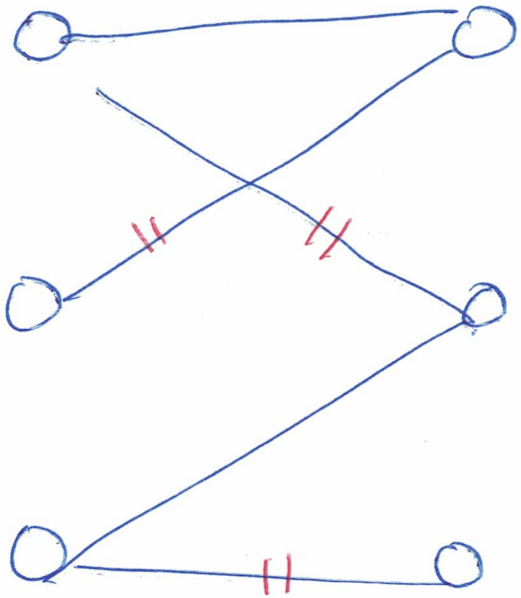
is 1-1.

(2). $|M|$ is max. among all choices of $M \subseteq E$.



this choice of M is only local max.

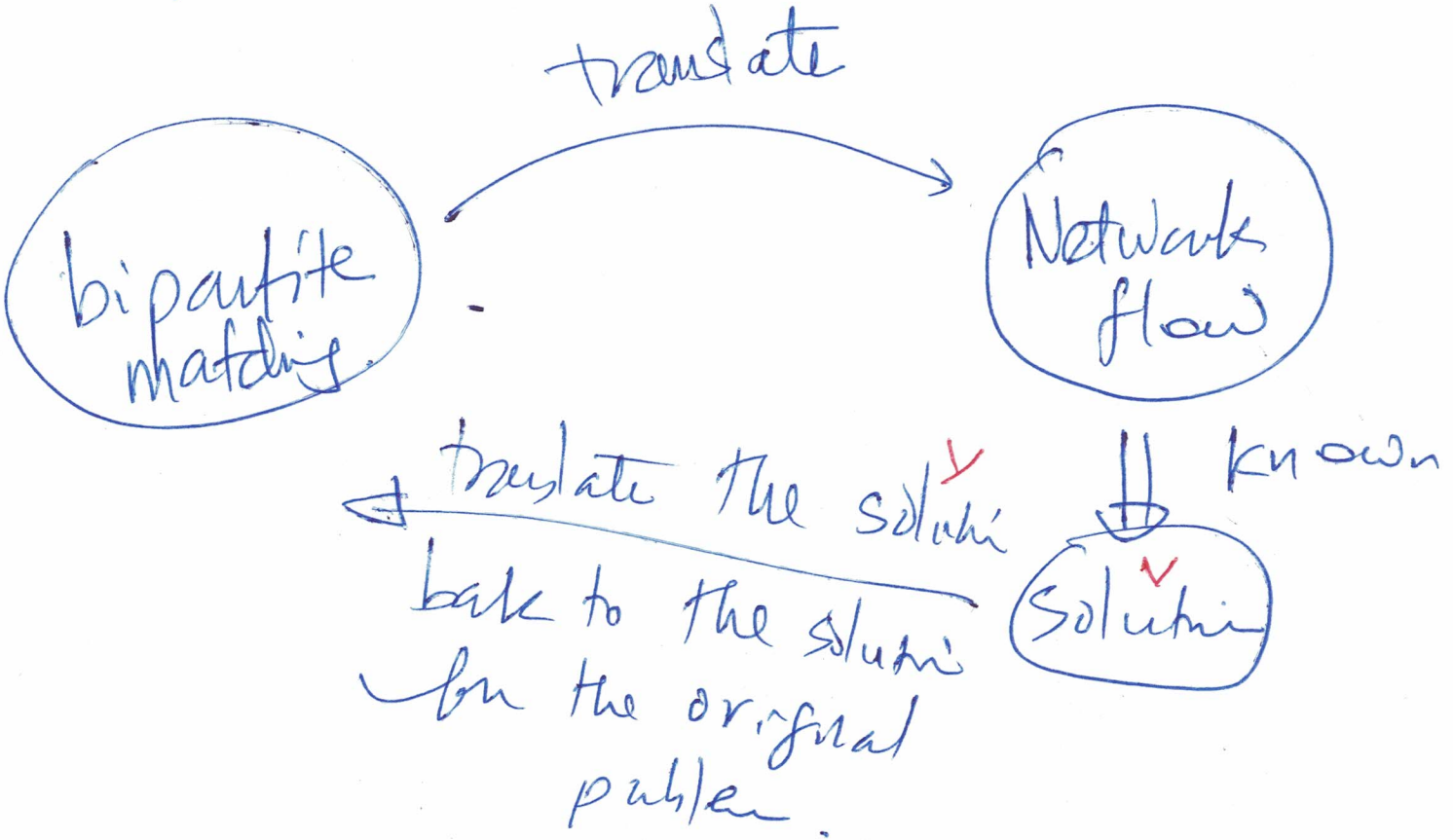
($|M| = 2$)



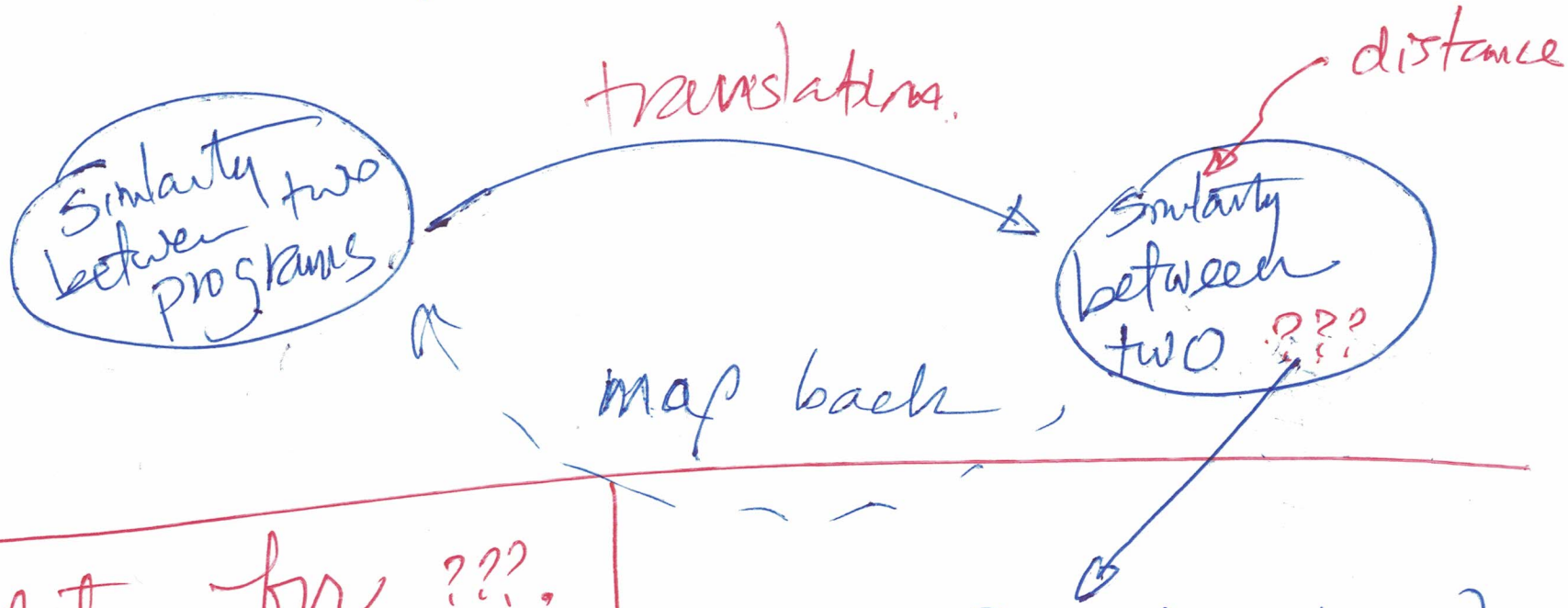
This M is global max.

$|M| = 3$.

Hard problems can only be solved indirectly.



HW — last problem.



Candidate for ???:

graph,

function, operators,

Sets,

vectors,

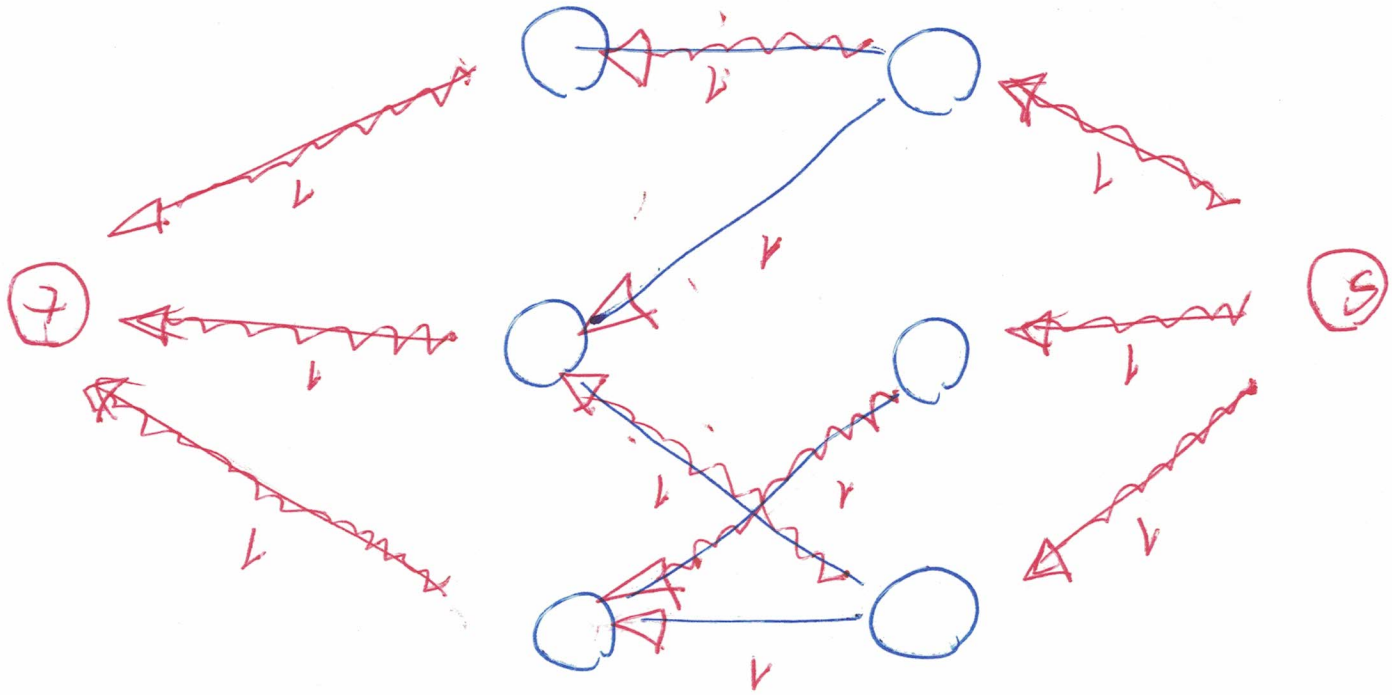
.....

① You know well about ???

② justify the translati

③ provide solutions to

④ map back.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Applications. ——— one of my papers.

(ii security.

Background.

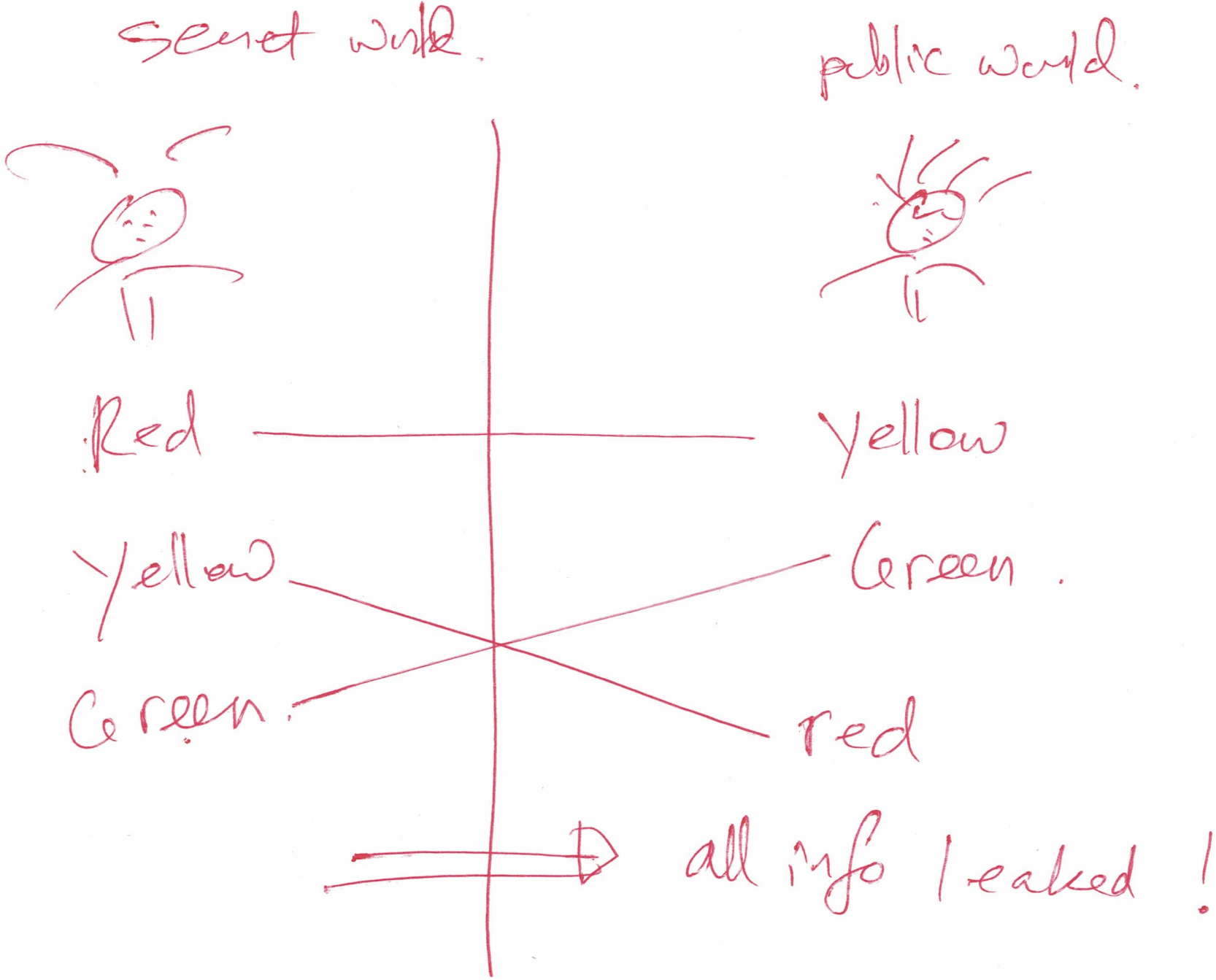
What is computer security?

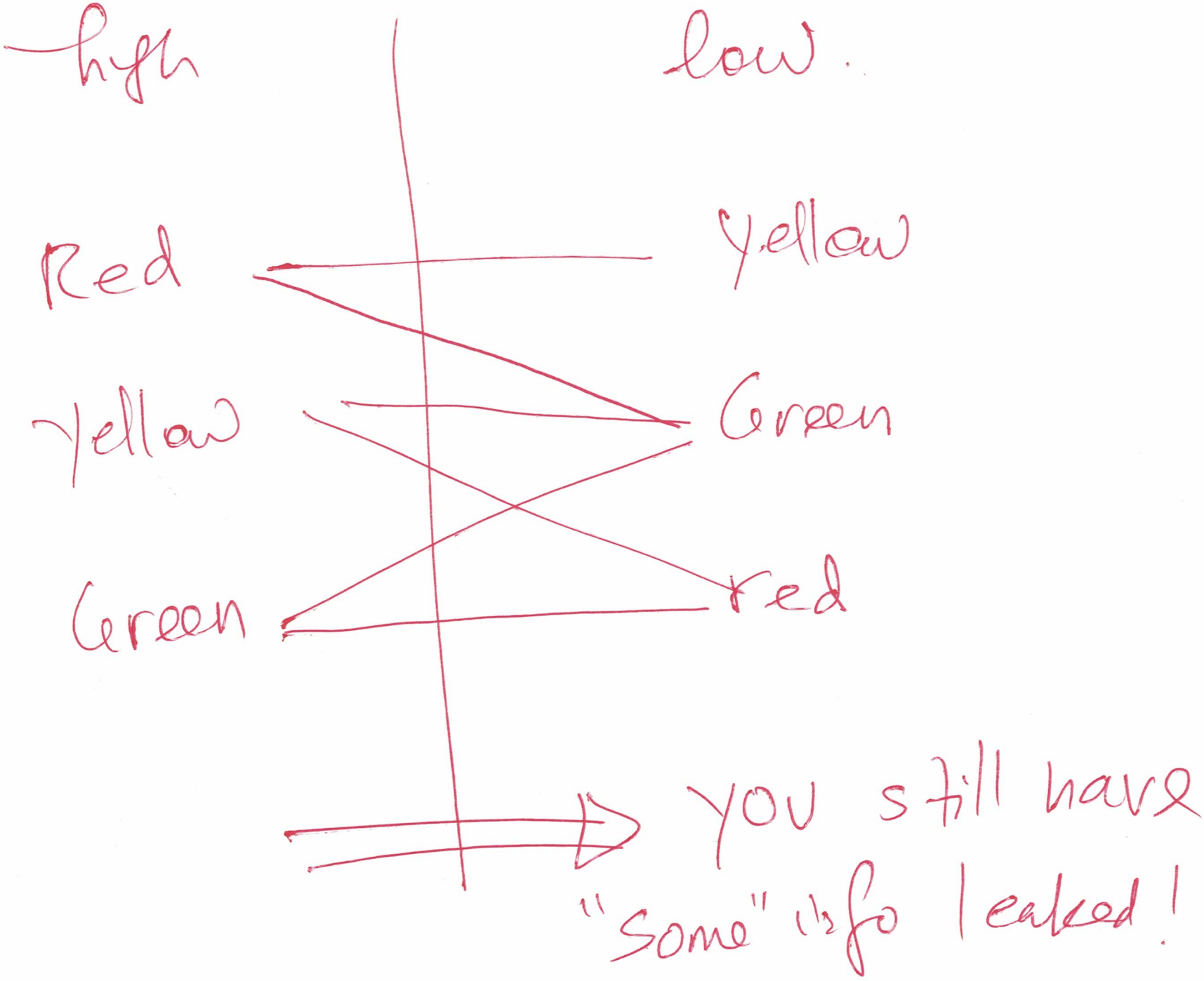
house ("secure" computer system)

good foundation.
(basic algorithms on data encryption/decryption, data transmission, protocols)

mathematicians, other problems?

HIGH (Security).	LOW (public).
students academic records, name, wsu-id, grades, ...	(name, wsu-id)
patients record.	— — —
one more example.	


secret world.
public world.
Red
yellow
yellow
Green.
Green.
red
all info leaked!


high
low.
Red
yellow
yellow
Green
Green
red
you still have
"some" info leaked!

I have a C program P where we have two integer (32-bit) vars.

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x & y:

x is the input var to P;

y is The ret value of P.

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how much info leaked from x to y ?