Interactive Proofs

Lecture 19

And Beyond

So far

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- Perfect completeness: One-sided-error-AM = AM
  - Similar to BPP $\subseteq$ Σ_2^P (yields MAM protocol; MAM=AM)

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- Similarly, $MA \subseteq \Sigma_2^P$

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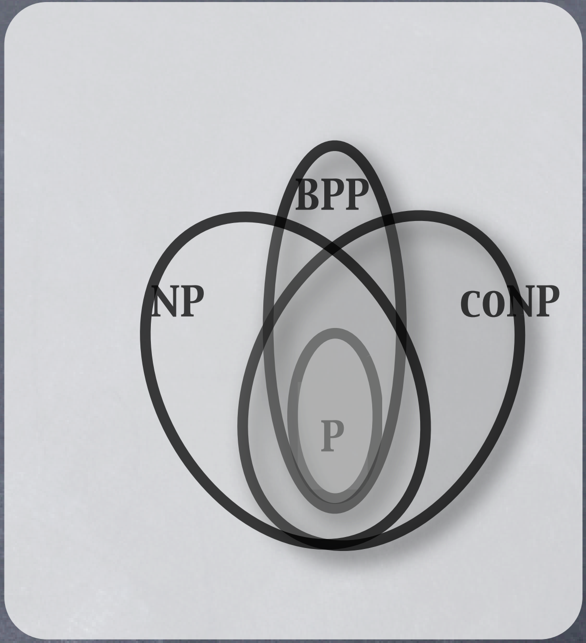

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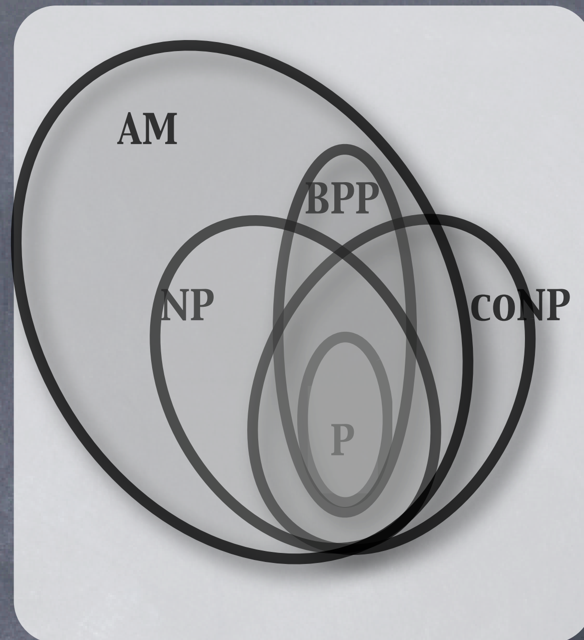
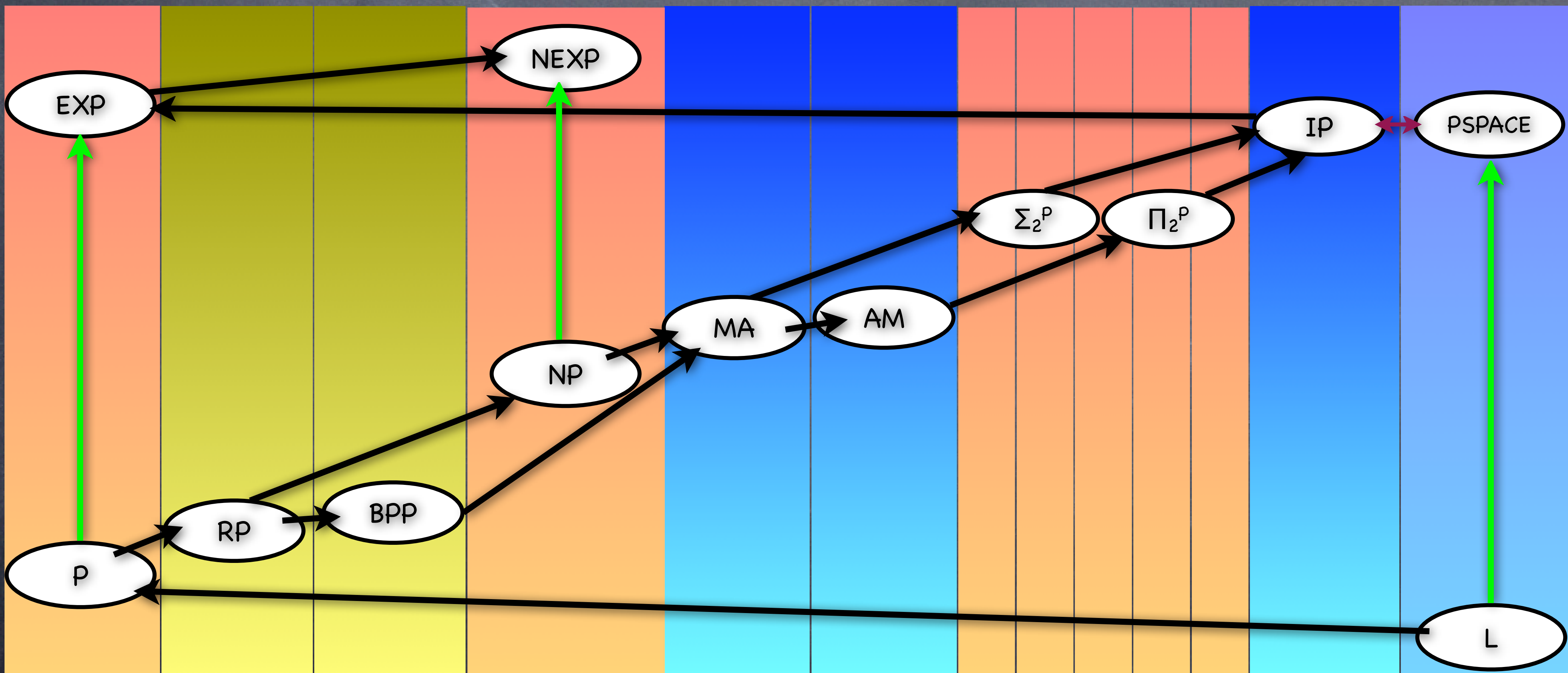


Zoo



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- Vendor: But I don't have a (nano-bio-quantum) implementation of the prover's program...

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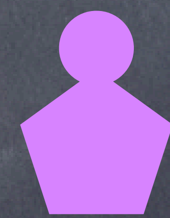

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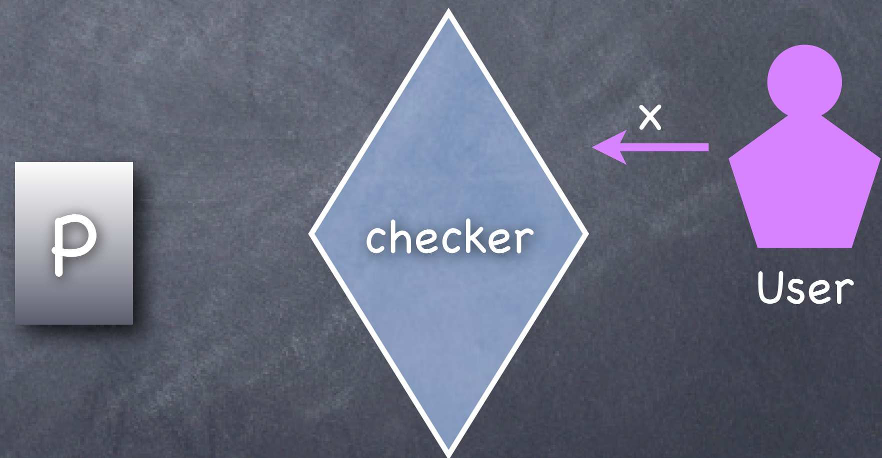

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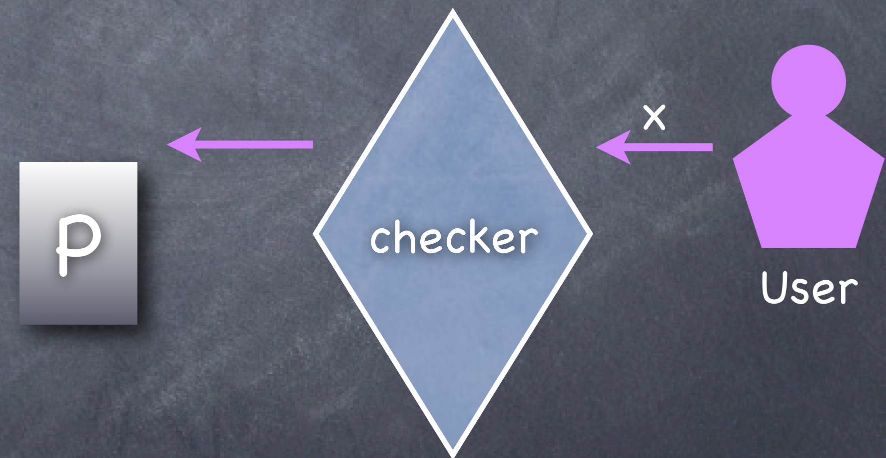

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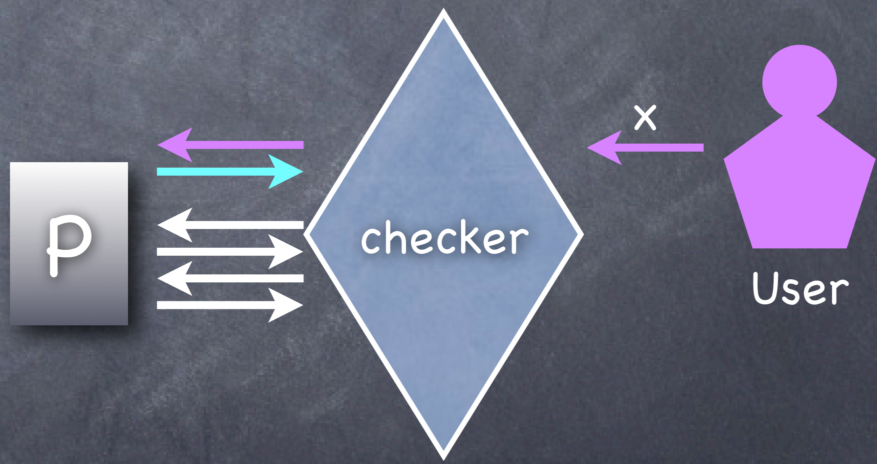

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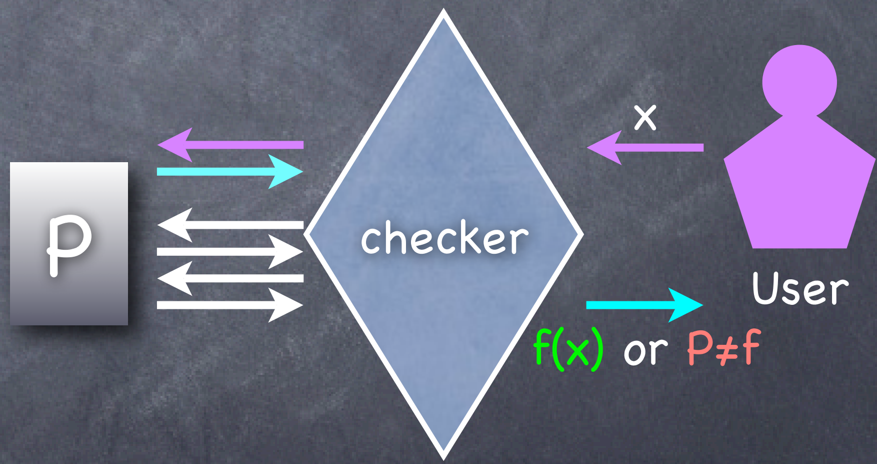

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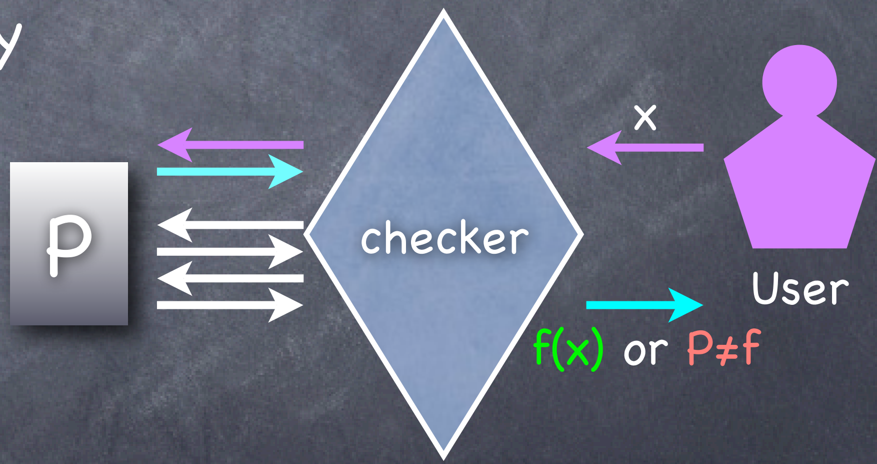

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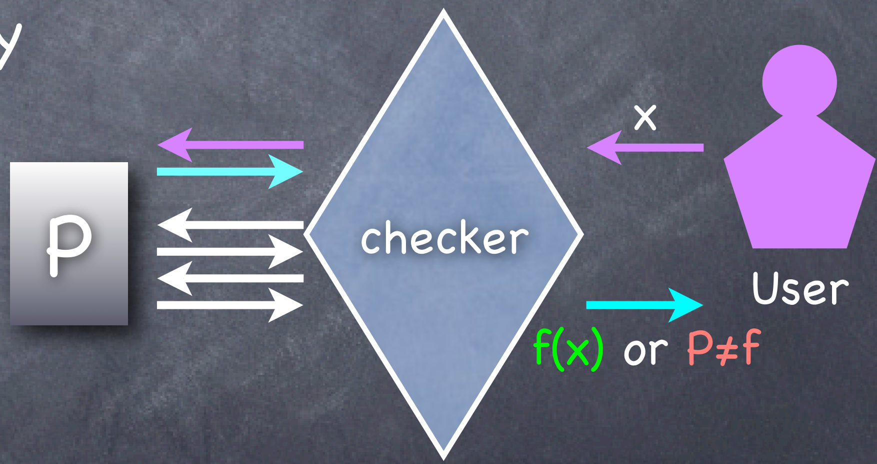

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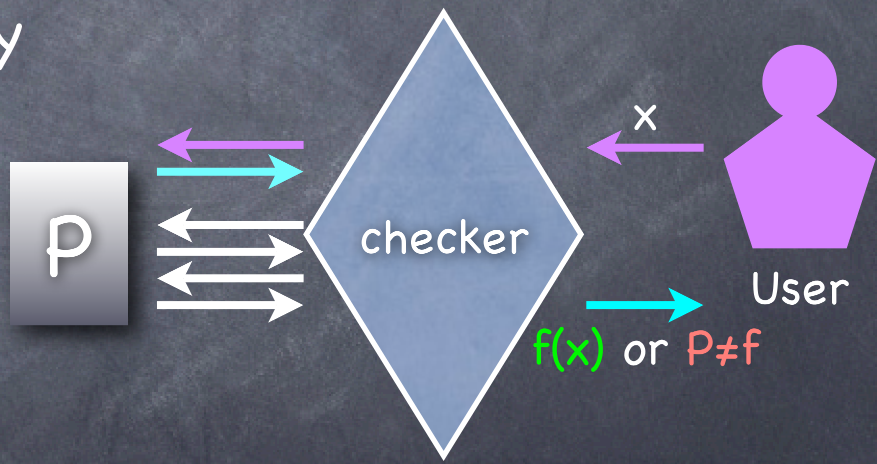

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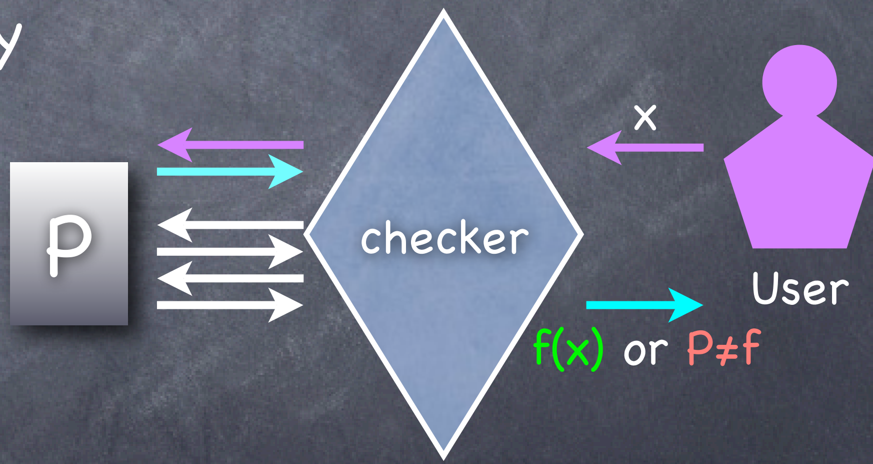
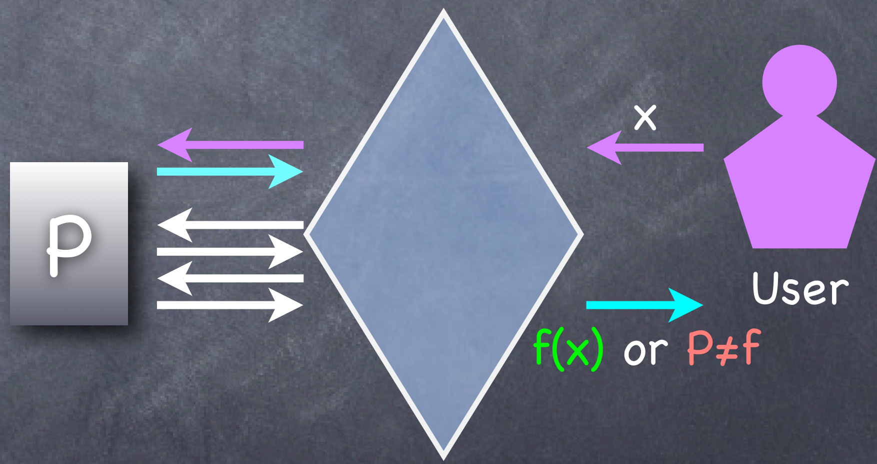
- Will consider boolean f (i.e., a language L)



Program Checking and IP



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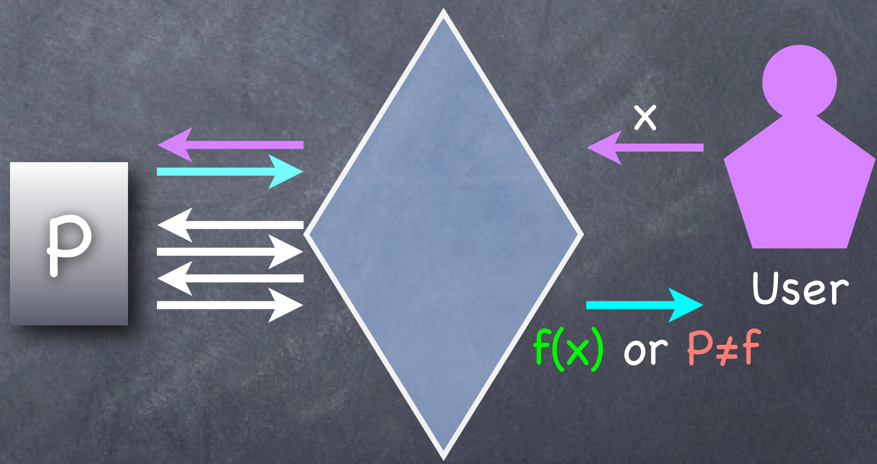

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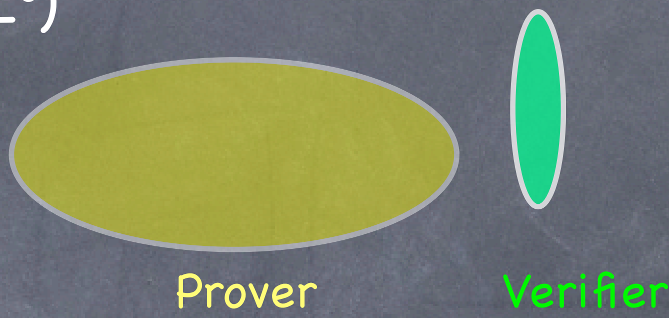

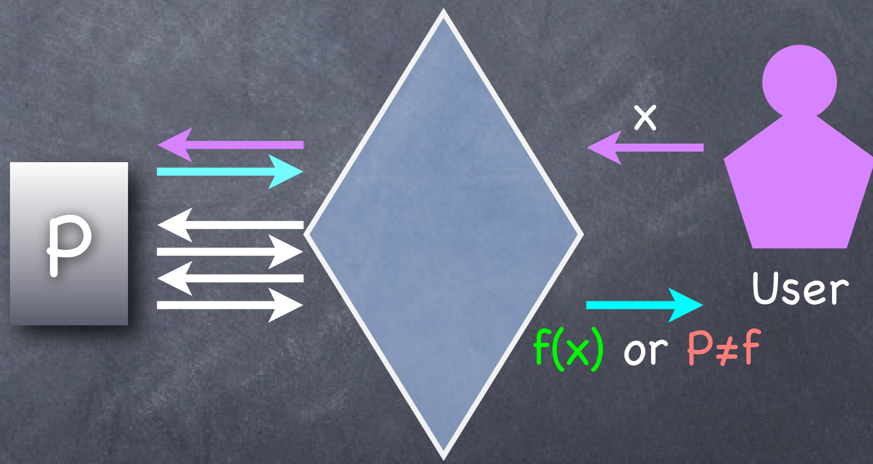

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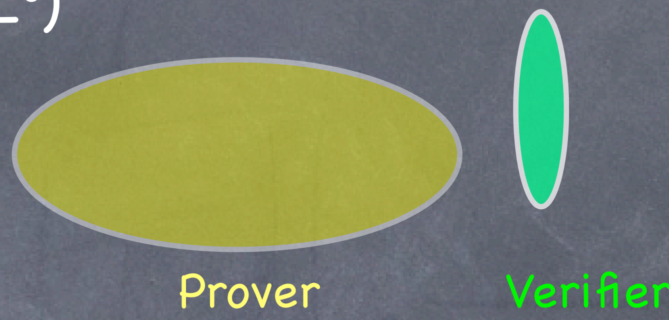

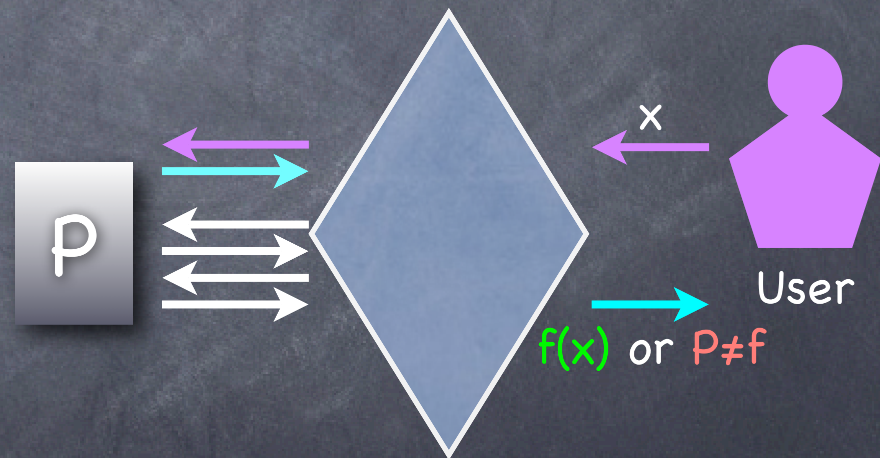

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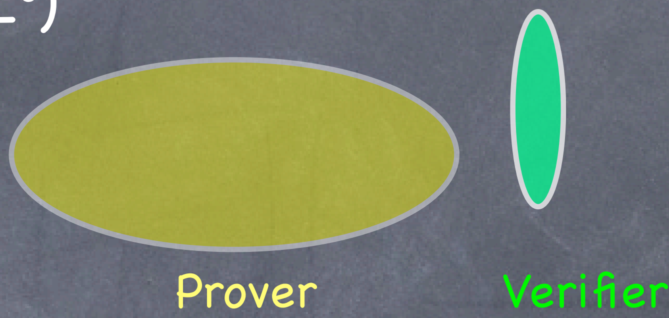

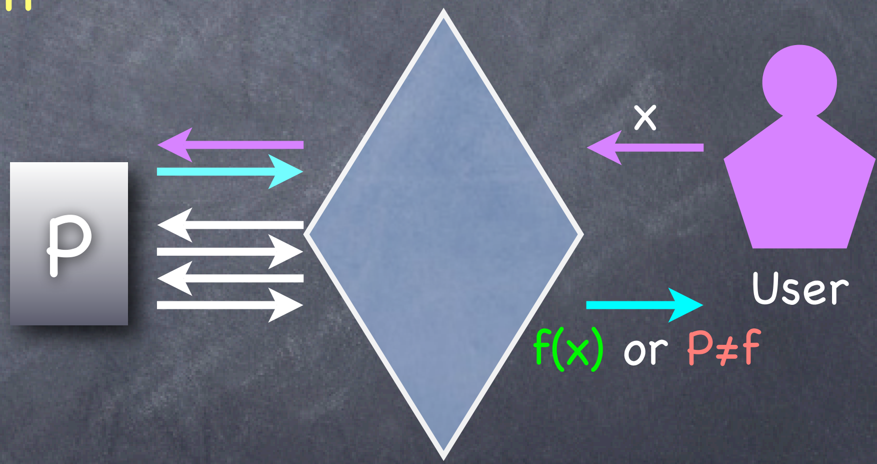

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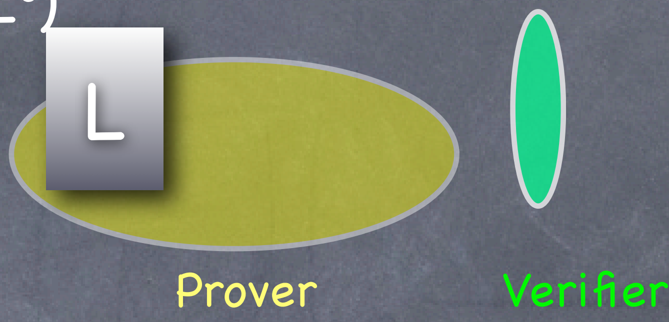

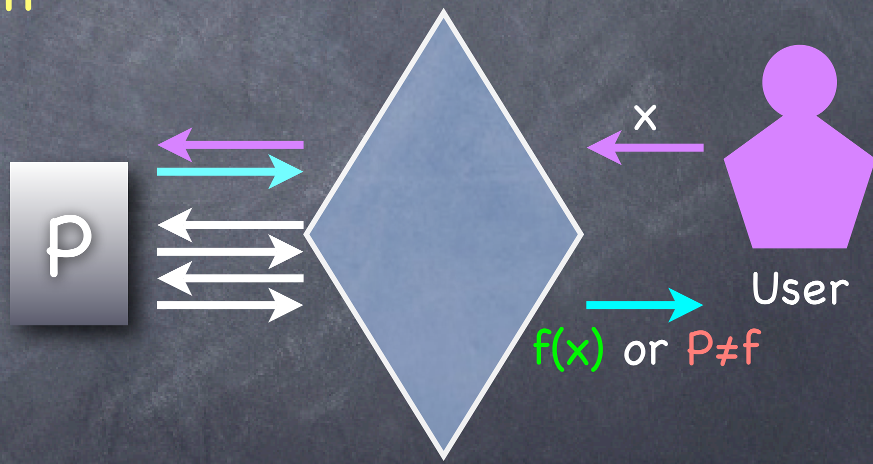

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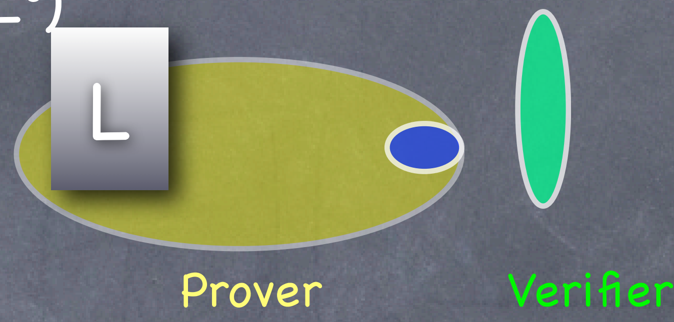

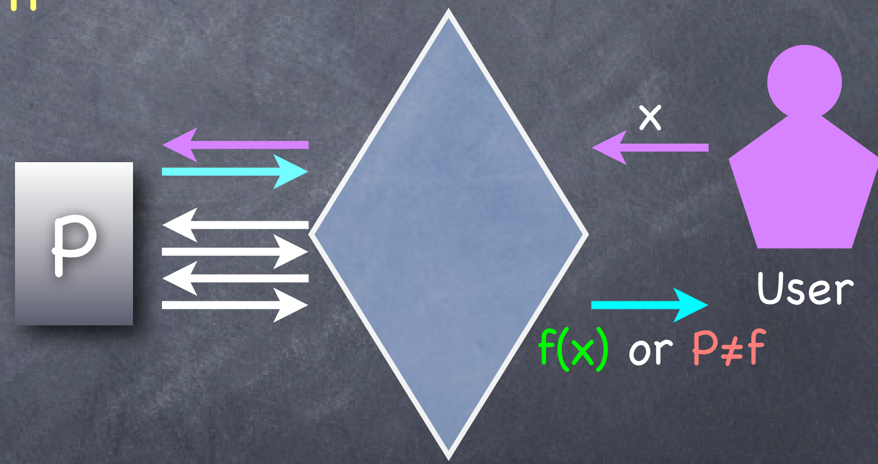

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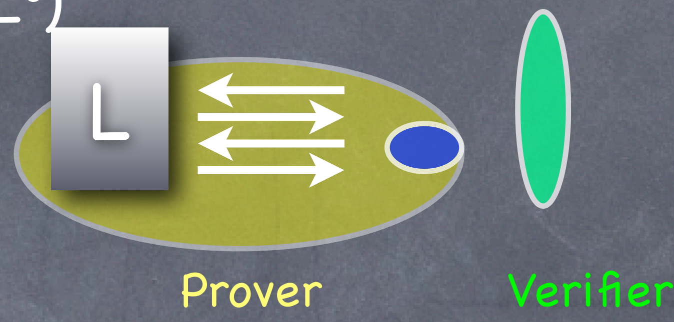

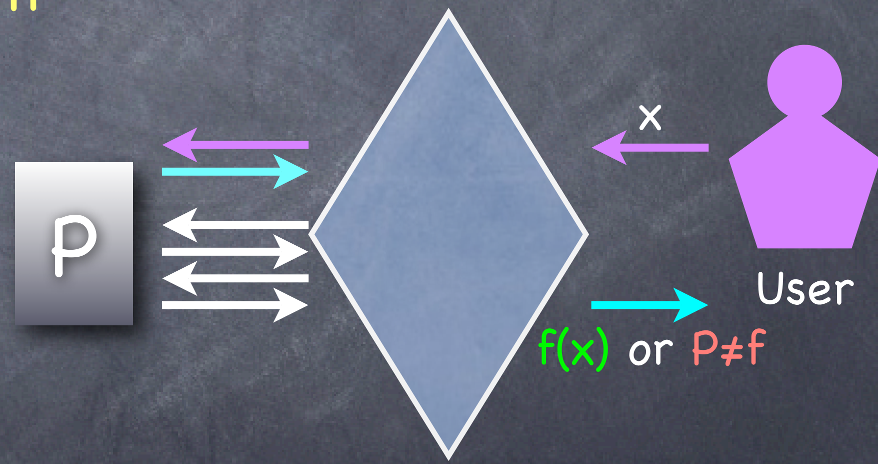

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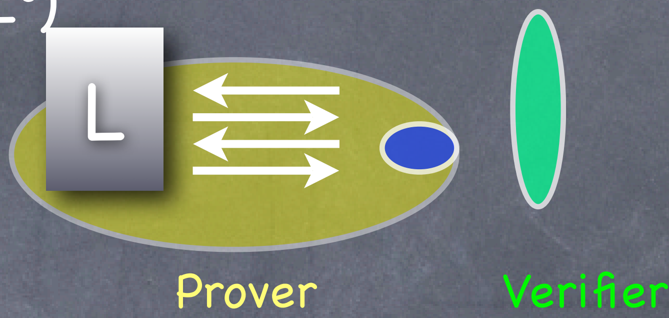

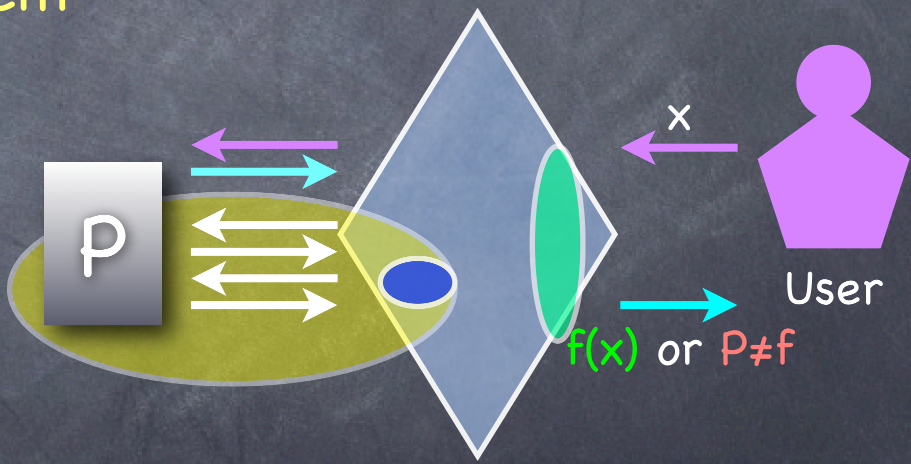

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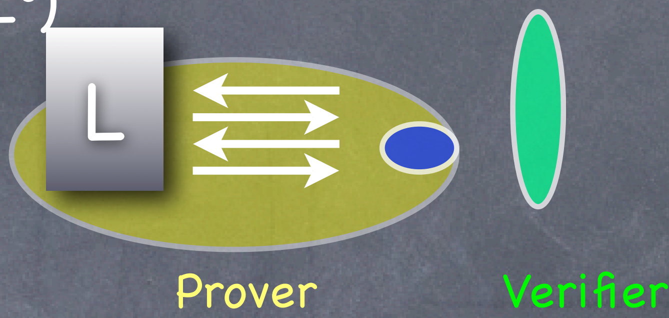

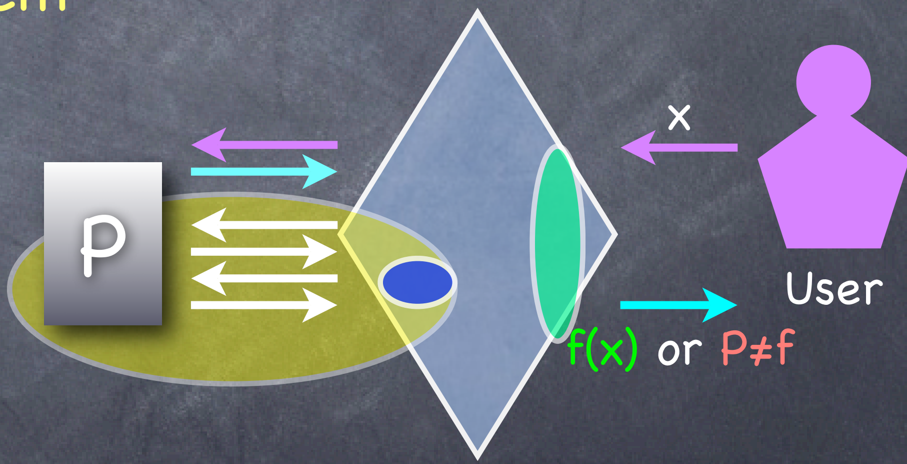

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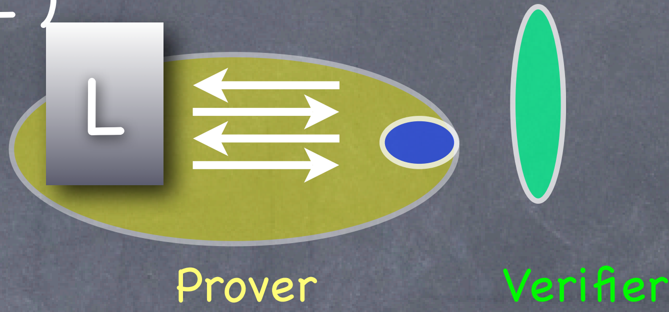

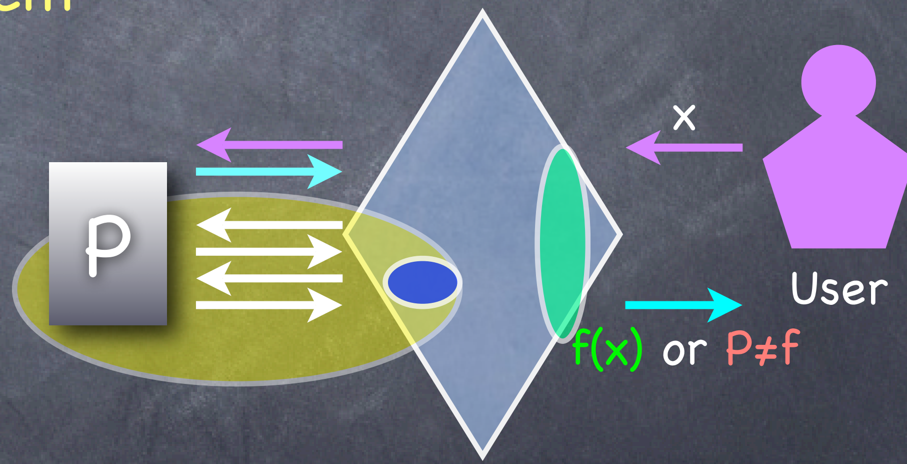

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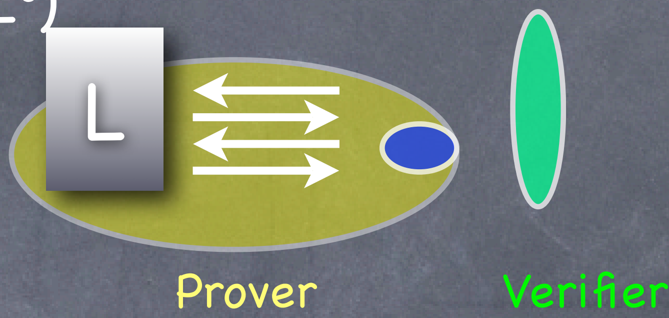
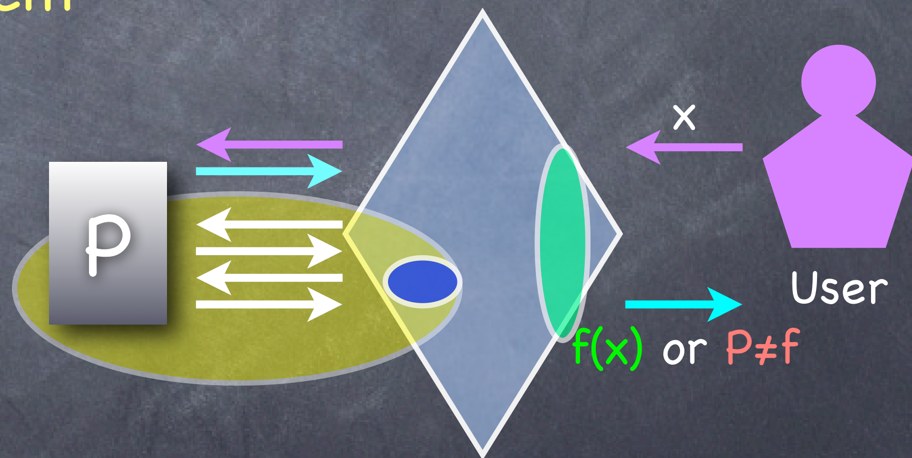
- How about Graph Isomorphism?





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- Note: An IP protocol (i.e., an NP proof) for GI, where prover is in P^{GI}

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- Note: Prover in the IP protocol for GNI is in P^{GI}

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    - Also useful in certain cryptographic protocols

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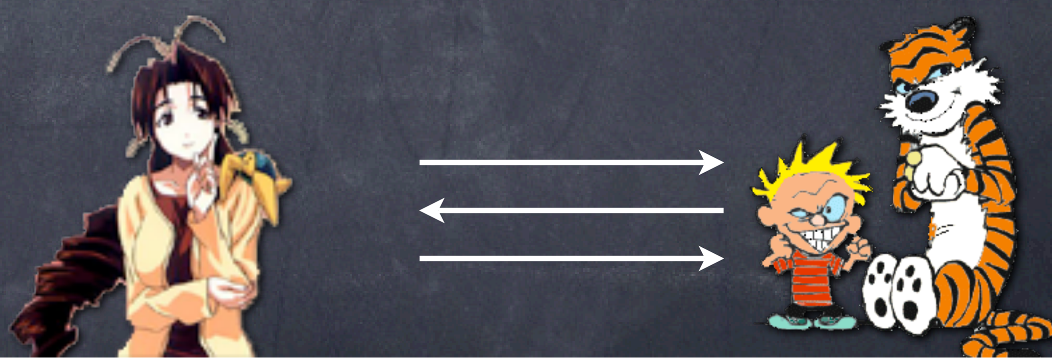

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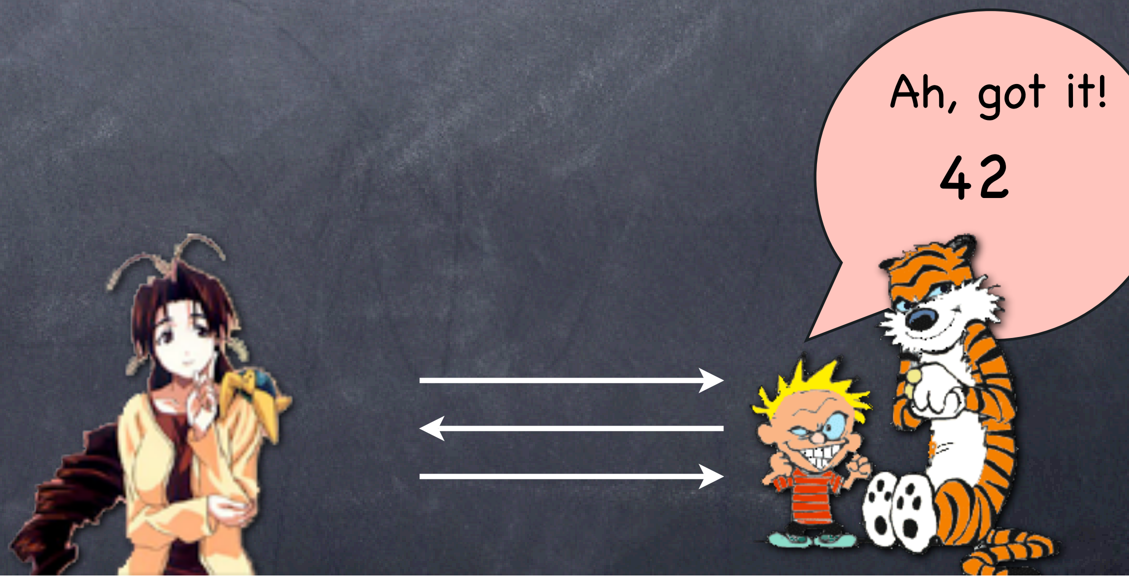

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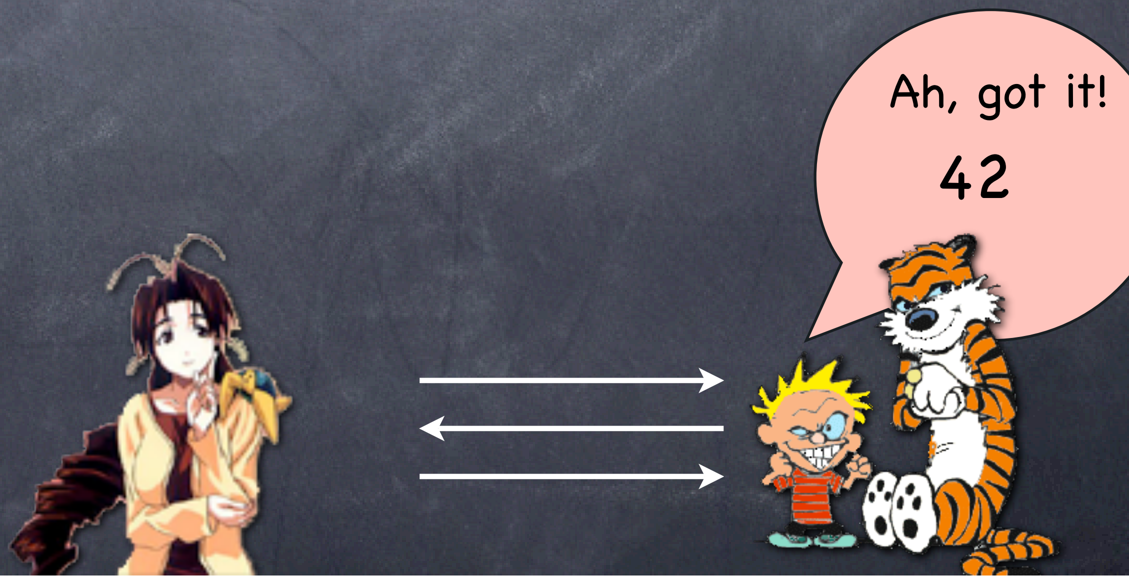

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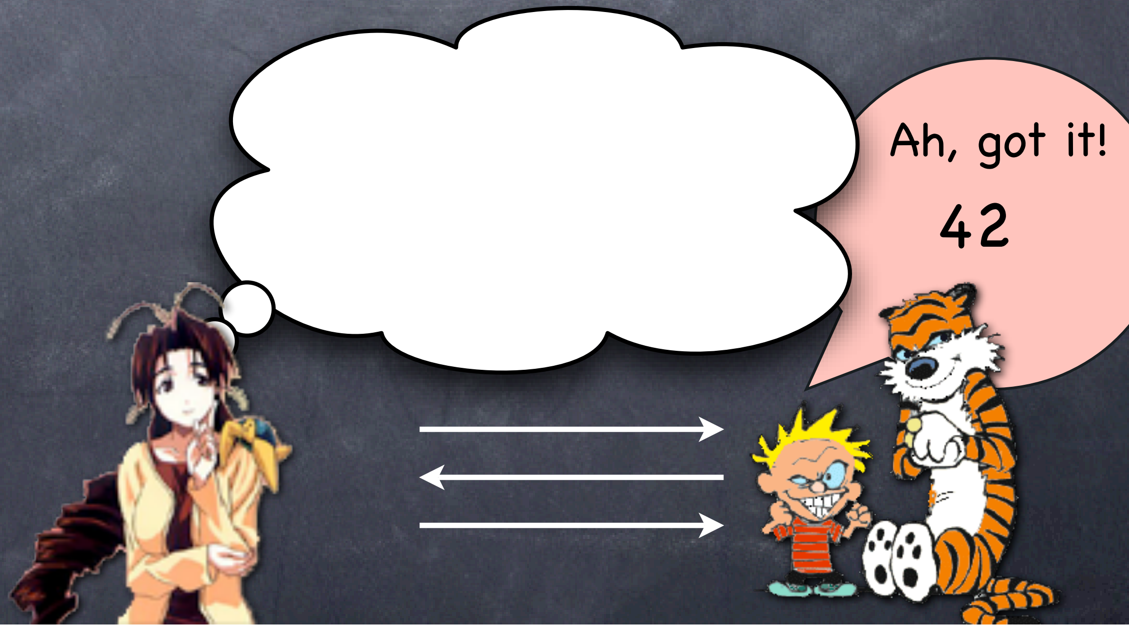

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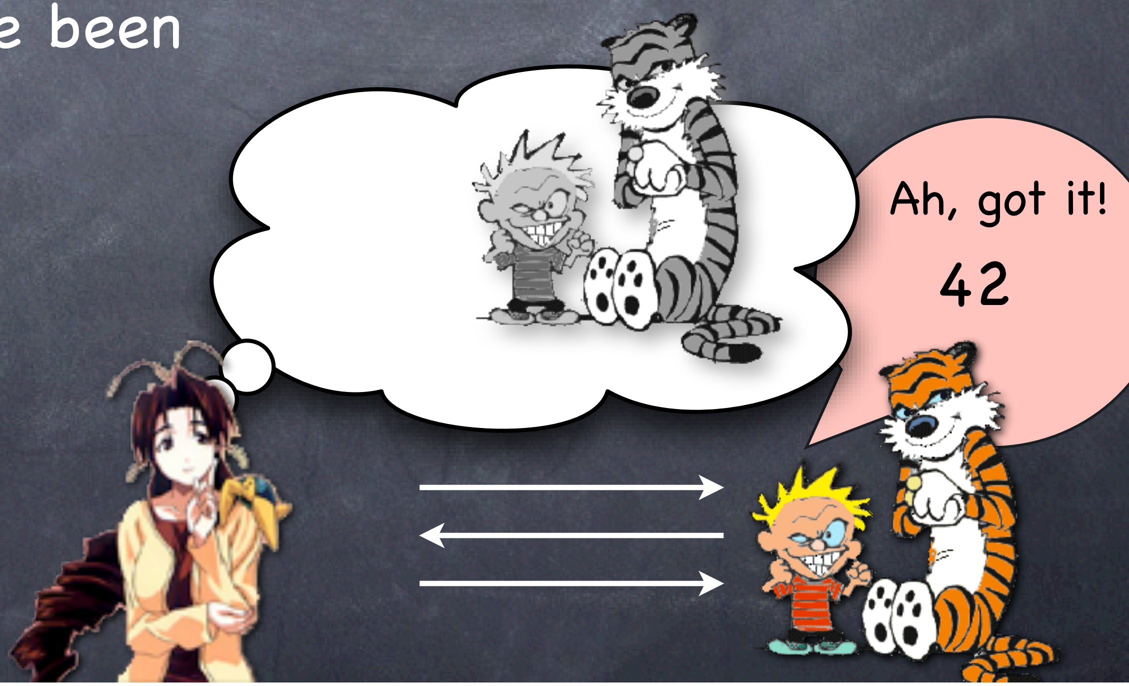

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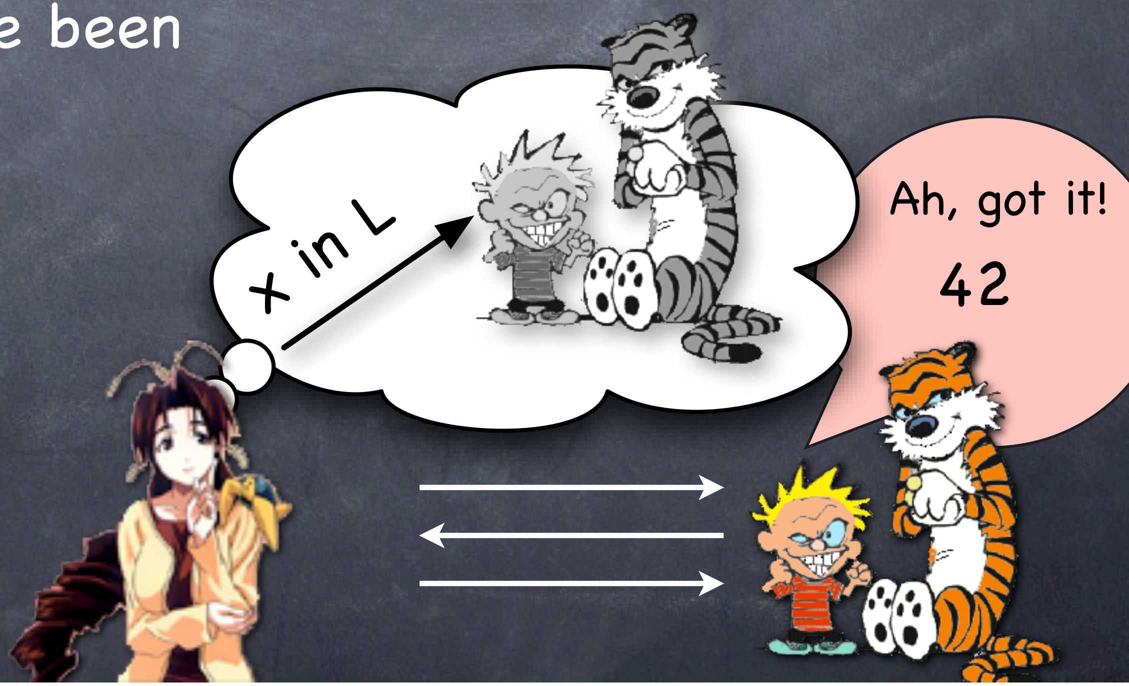

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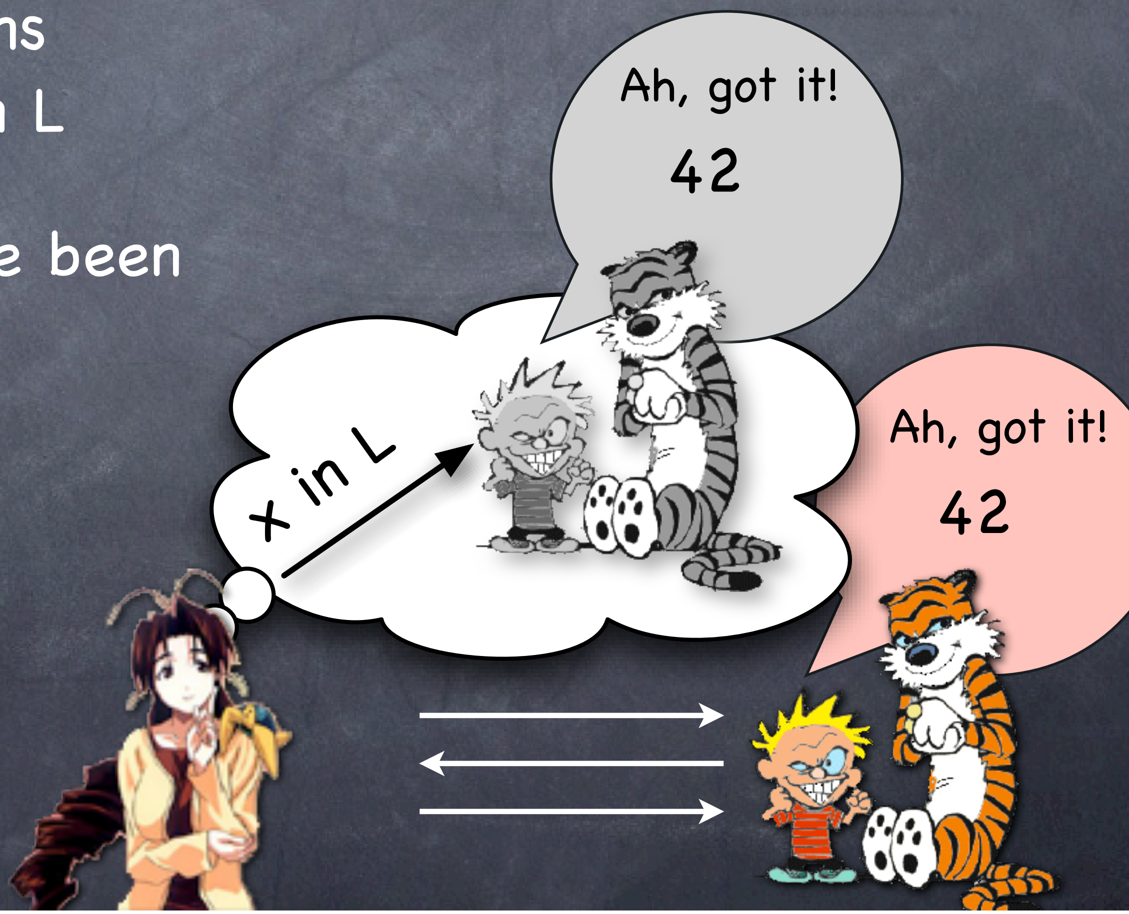

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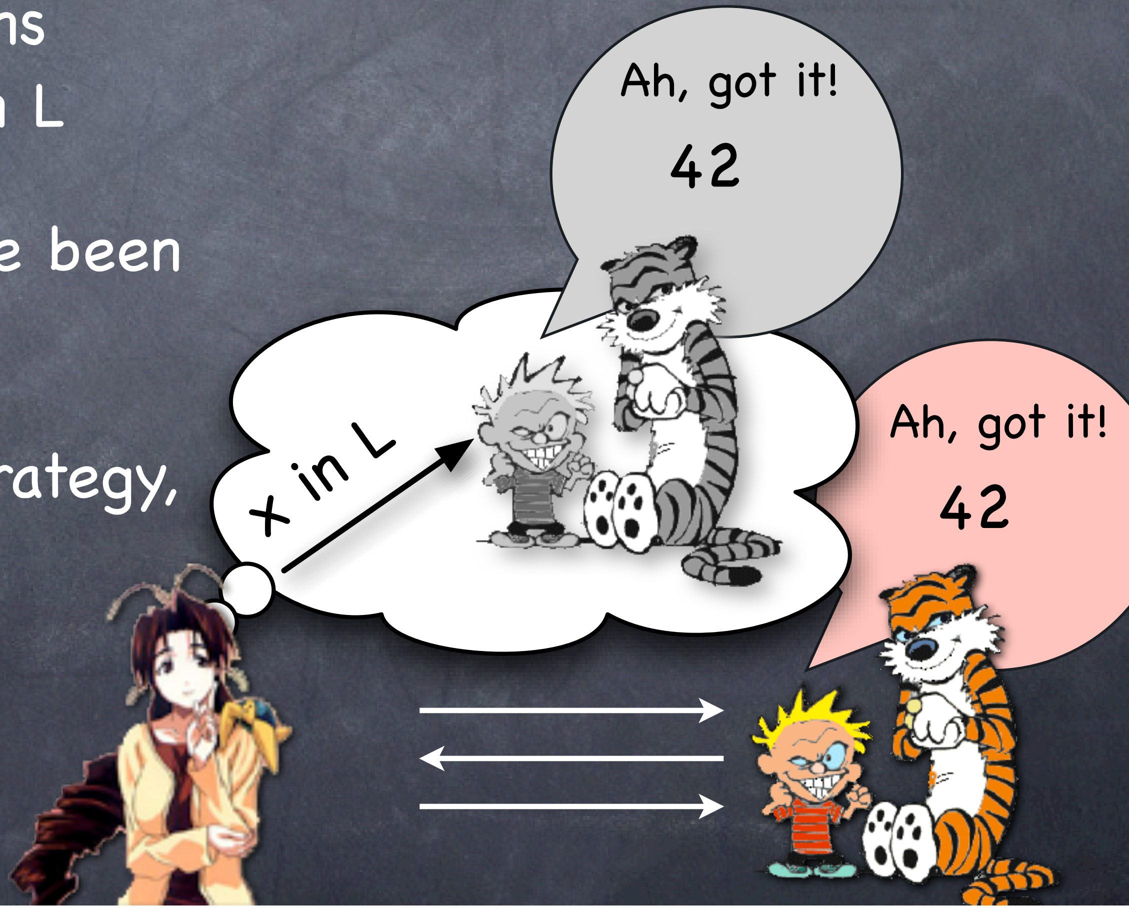

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  - Useful in "hardness of approximation", in cryptography, ...