GKR: Journey to NIZK
Final presentation

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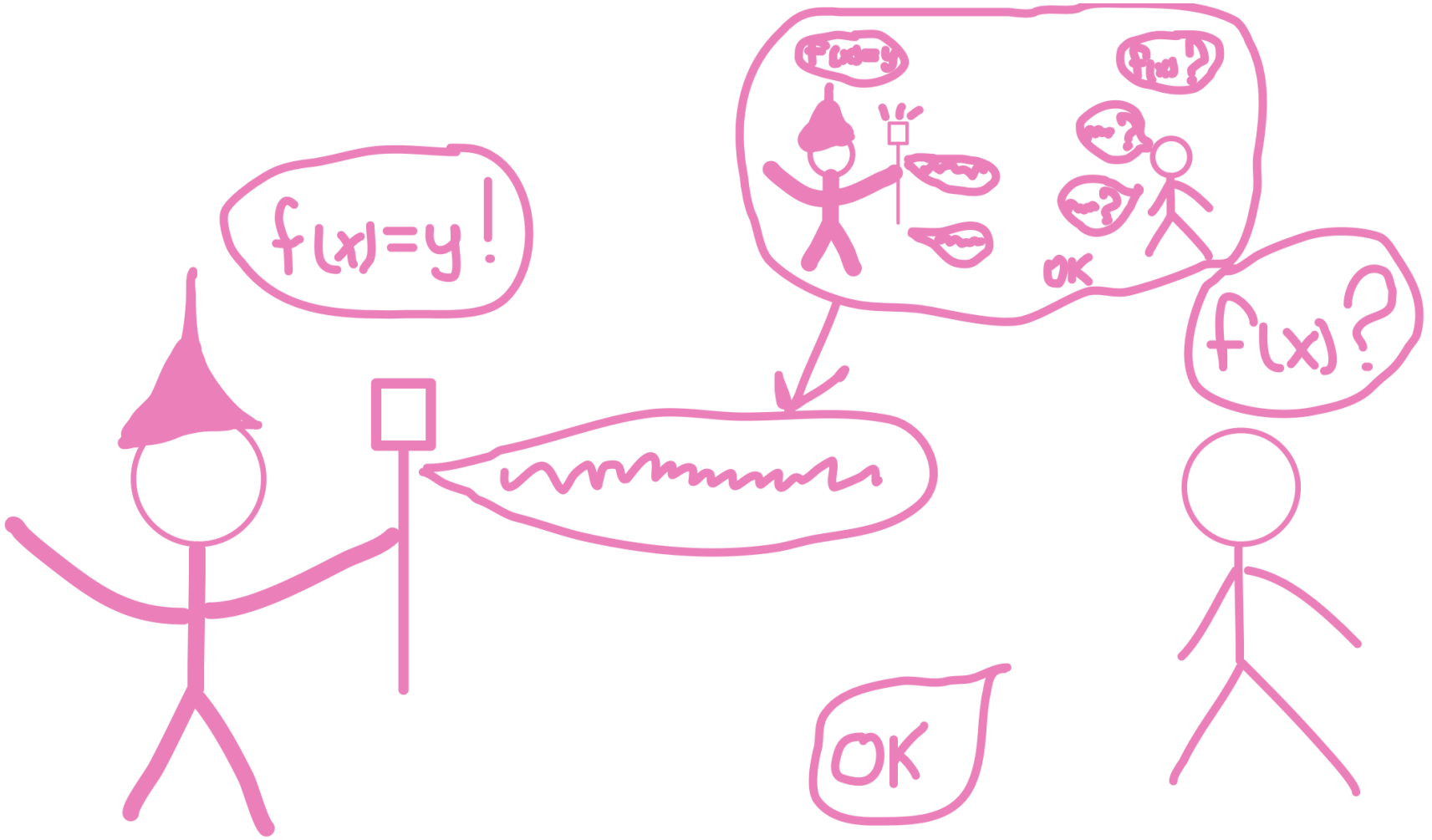
Proof system

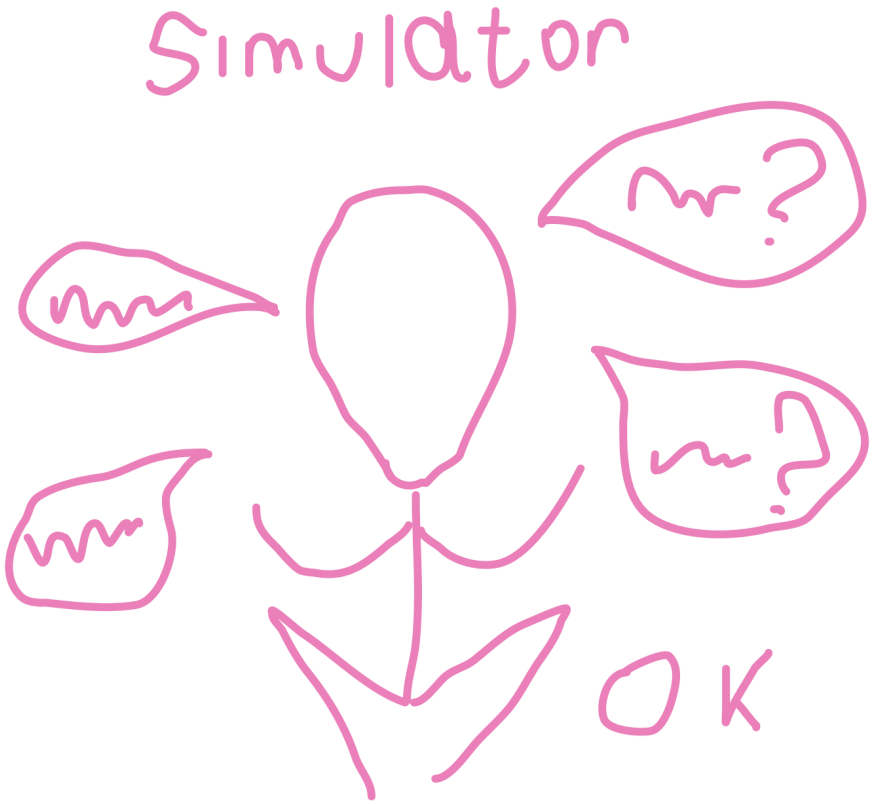
Non-interactivity via Fiat-Shamir



Classical Zero-knowledge

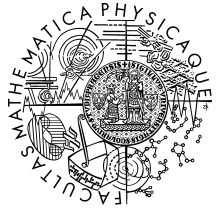
Verifier learns no information he can't *efficiently* compute himself.

This is formalised by showing that verifier has a *simulator* which can simulate prover-verifier interaction **in polynomial time**.



What about problems in P?

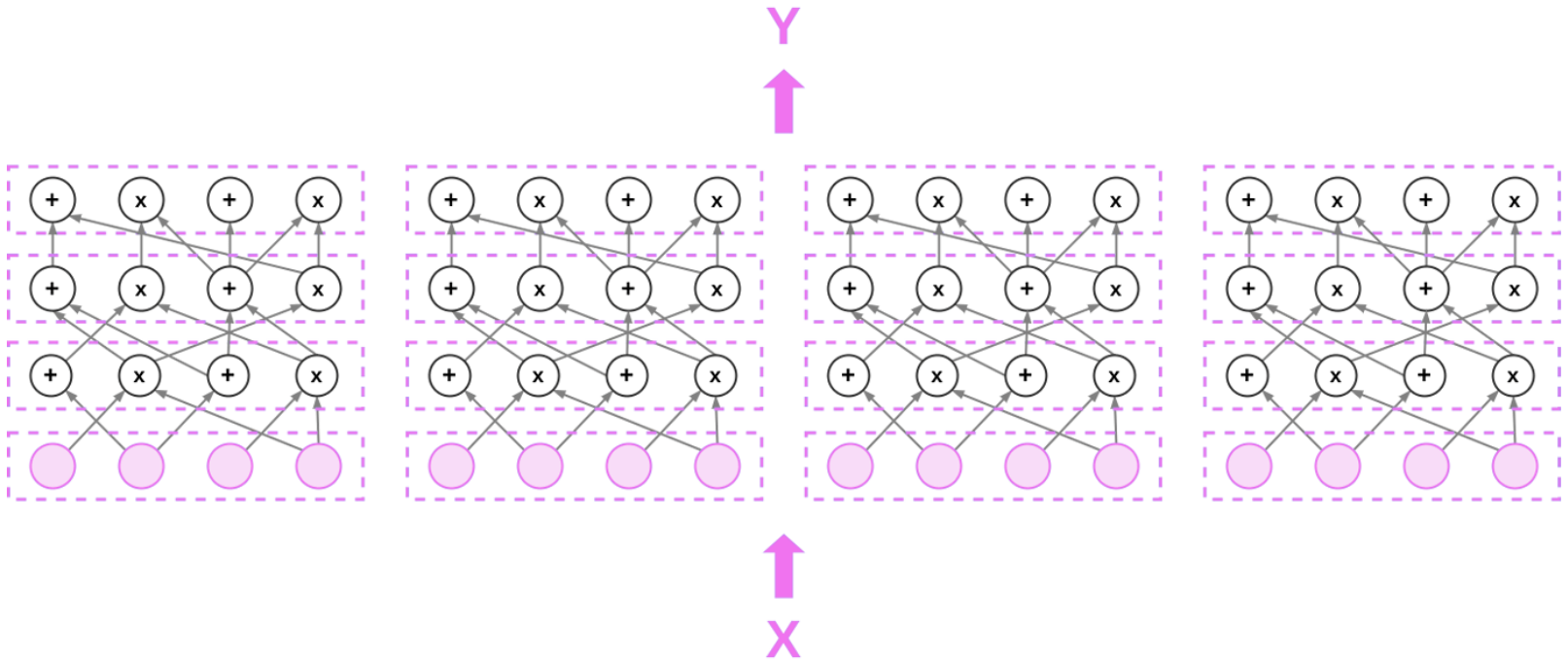
They are ZK by default!



GKR

*G*oldwasser, *K*alai, and *R*othblum described a interactive proof protocol which allows verifier to solve most problems in P **much** faster than it would be possible without prover.

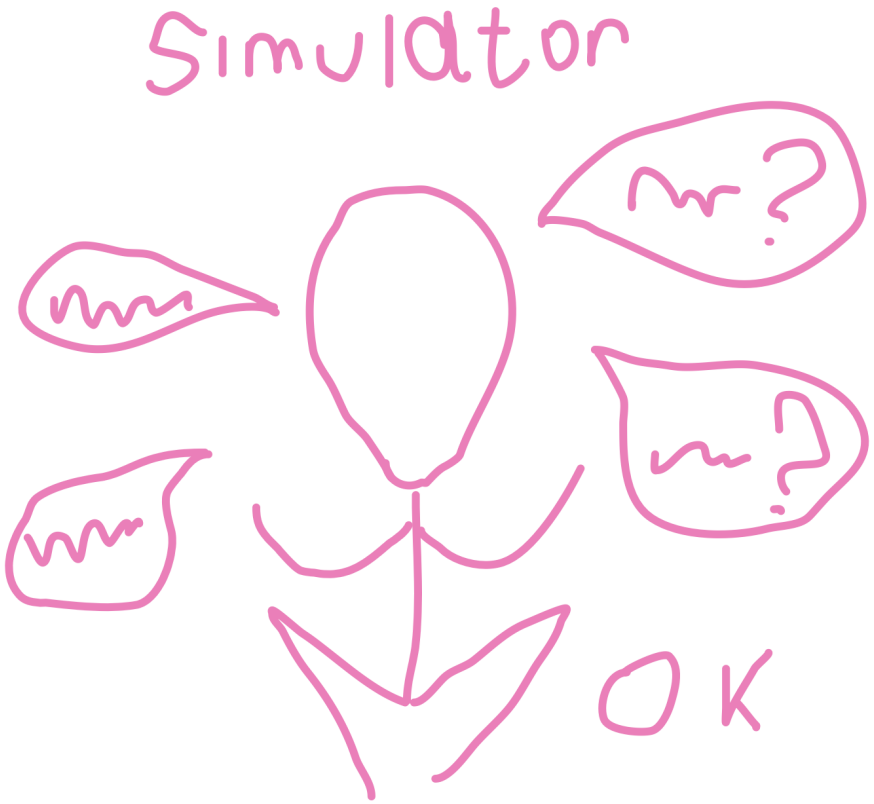
Specifically, in **quasi-linear** time doing little more than reading the input.



Precise Zero-knowledge

Verifier learns no information he can't *efficiently* compute himself.

This is formalised by showing that verifier has a *simulator* which can simulate prover-verifier interaction **in time proportional to verifier's runtime**.



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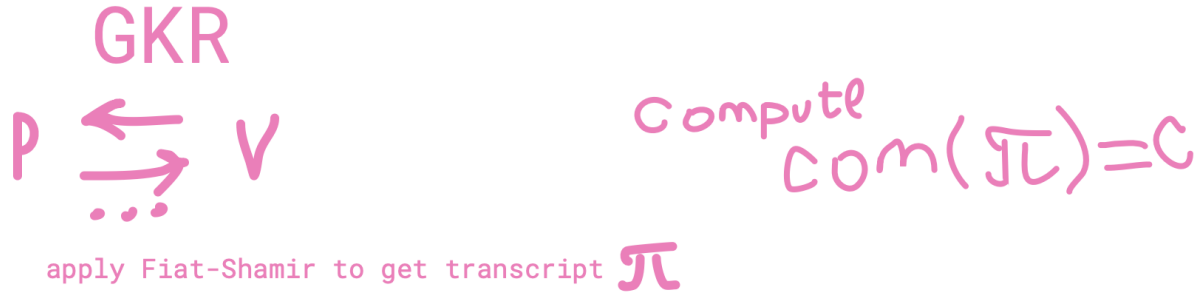
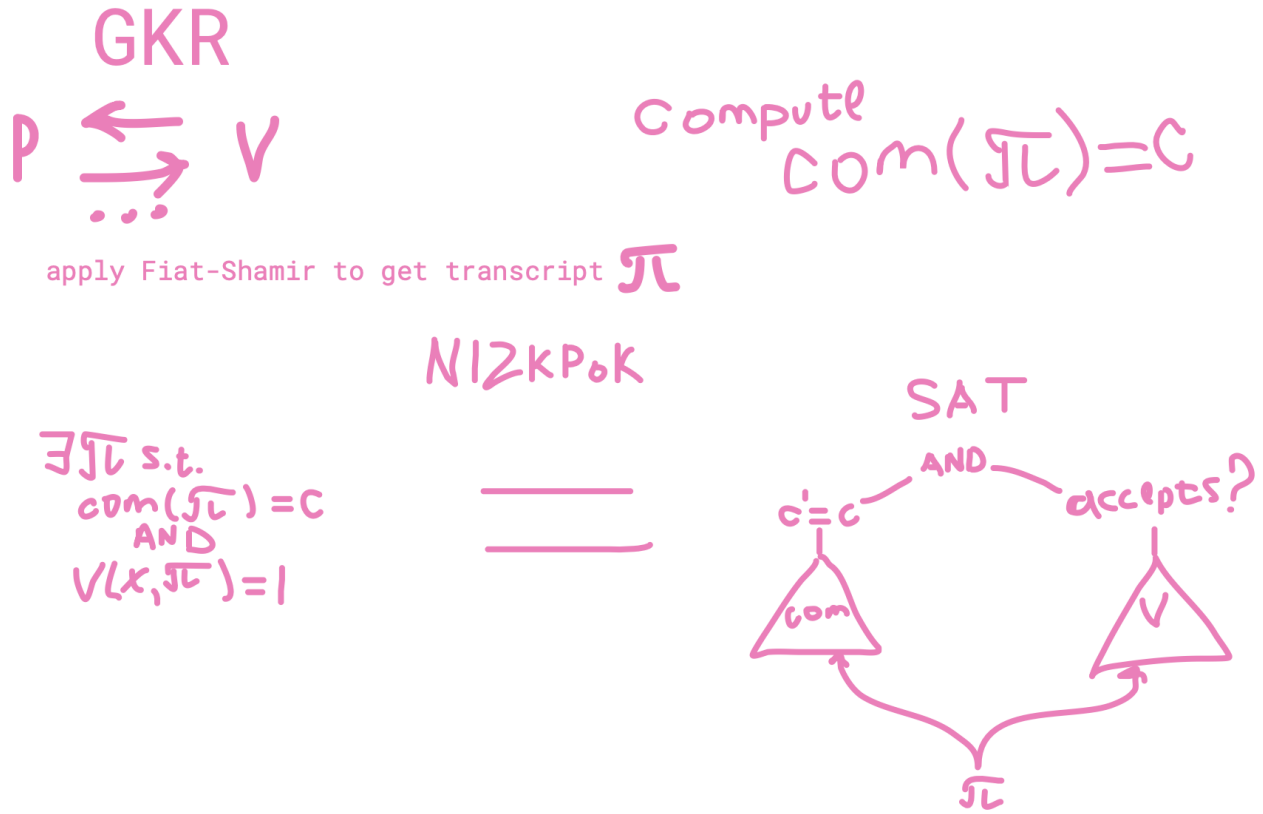
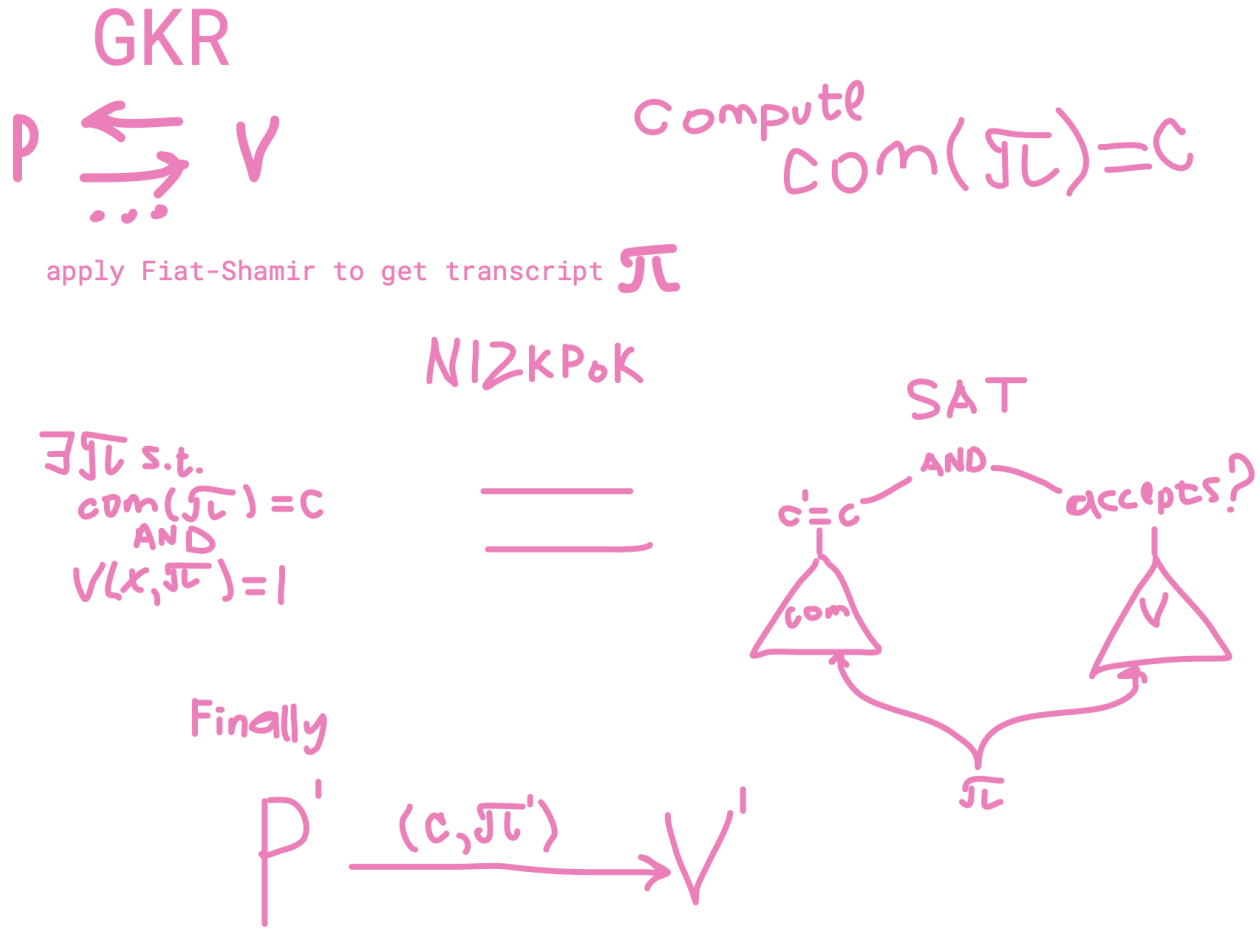


How to construct precise NIZK from GKR?



How to construct precise NIZK from GKR?



Thank you for attention!