How to Use Indistinguishability Obfuscation:Deniable Encryption, and More

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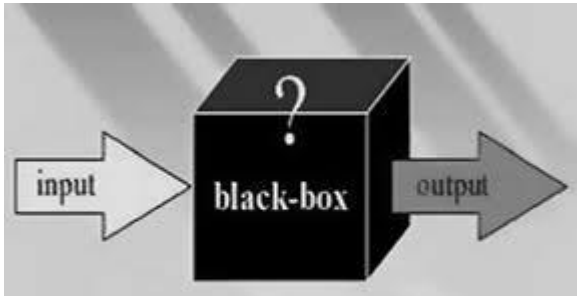
Two Notions[BGIRSVY01]



- Black Box Obfuscation

Learn no more than oracle interaction

Natural, easy to use, but impossible for *some* functions

- Indistinguishability Obfuscation

Cannot tell two equivalent circuits apart

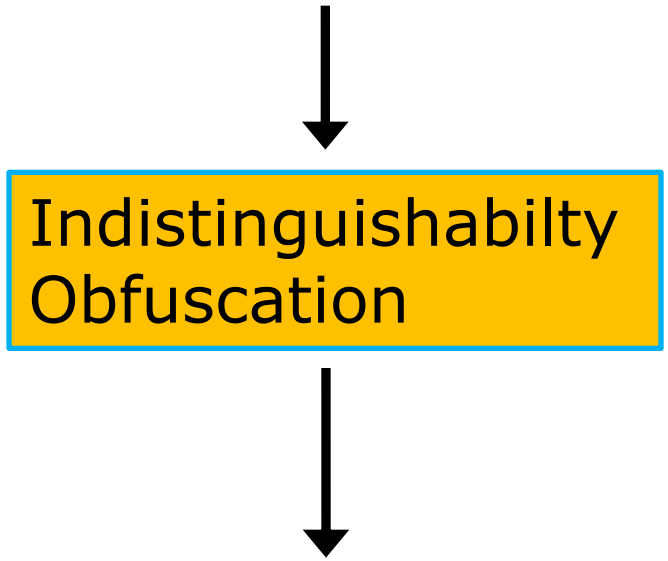
E.g. a (b+c) vs. ab + ac

Application is less immediate

Candidate! [GGHRSW13]

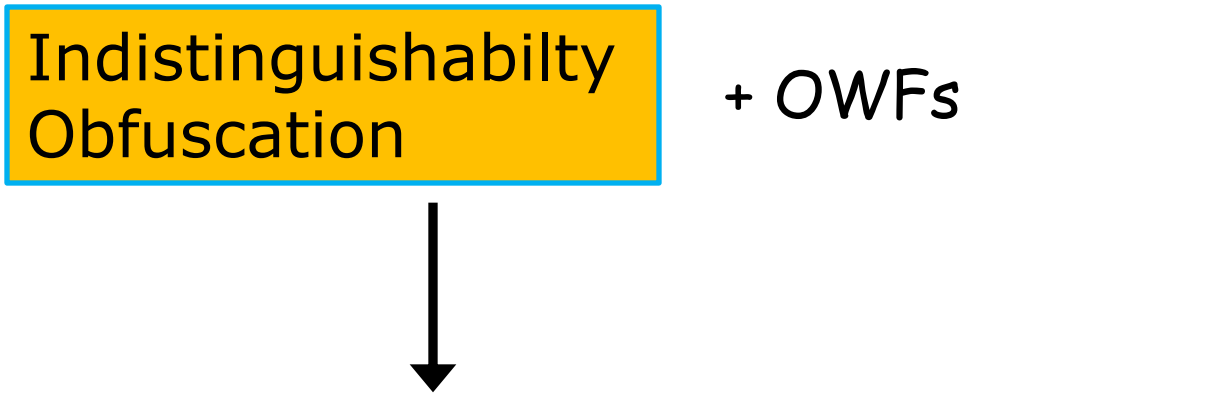
Vision: IO as hub for cryptography

Standard Assumption (e.g. LWE) (w/complexity leveraging?)



"Most" of cryptography

Result 1: Building up crypto



PKE, short signatures, NIZK, OT, TDF, CCA-PKE

Punctured Programming:

Surgically remove key elements w/o changing input/output

Uses Confined PRFs [BW13,BGI13,KPTZ13]

Result 2: Deniable Encryption [CDNO97]

Claim a different message, even if attacker demands your random coins

MIT 1998

OMG NSYNC is kewl

"Hidden Trigger" Technique

Make any existing key deniable