Lecture 27

Diffie-Hellman Key Exchange

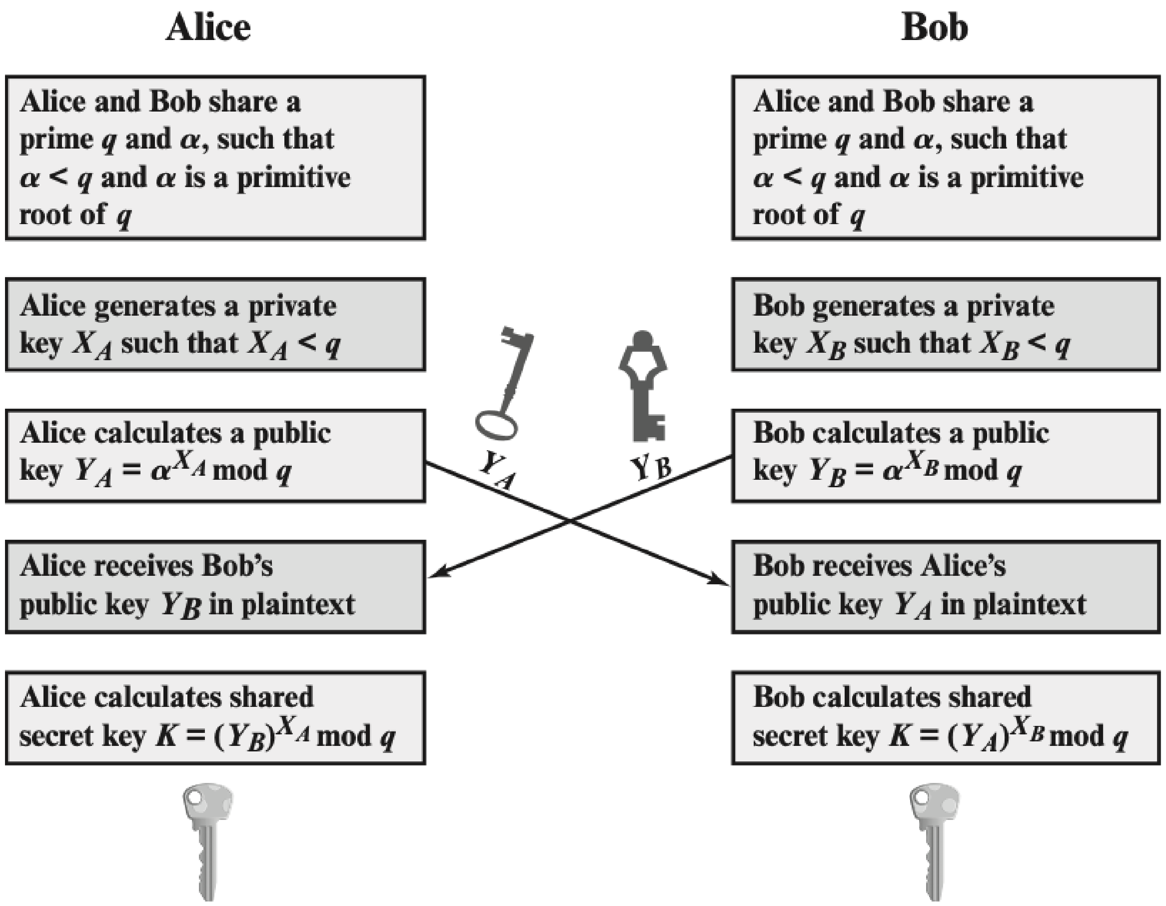
Section 3.5

Diffie-Hellman Key Exchange

- No third party involved
- After a common shared key, is established, it can be used to encrypt message
- A common shared key is symmetric

The Diffie-Hellman Key Exchange

- From B's view



Example

- A computes B computes
- Then communication key exchange - ,
- A receives . B receives
- A computes

  B computes

Attack

- Adversary gets ,
- She needs to compute either or
- Secure?

Discrete Log Problem

Two cryptographic assumptions:

- **Discrete logarithm problem** (**discrete log problem**): Given for random , it is computationally hard to find
- **Diffie-Hellman assumption**: Given and for random , , no polynomial time attacker can distinguish between a random value R and .
  - Intuition: The best known algorithm is to first calculate and then compute , but this requires solving the discrete log problem, which is hard!
- Note: Multiplying the values doesn't work, since you get