

# Asymmetric keys



Alice generates a pair of asymmetric keys

- $K_{s_A}$  is the secret key that Alice keeps for herself
  - $K_{p_A}$  is the public key that Alice gives to everyone (even Mallory)
- ➔ These two keys  $K_{s_A}$  and  $K_{p_A}$  work together

# Asymmetric Keys - Functional Requirements

$D_{K_s}(E_{K_p}(m)) = m$  and  $D_{K_p}(E_{K_s}(m)) = m$  for every pair  $(K_p, K_s)$

- ✓ Generating a pair  $(K_p, K_s)$  is easy to compute (polynomial)
- ✓ Encryption is easy to compute (either polynomial or linear)
- ✓ Decryption is easy to compute (either polynomial or linear)
- Finding a matching key  $K_s$  for a given  $K_p$  is hard (exponential)
- Decryption without knowing the corresponding key is hard (exponential)