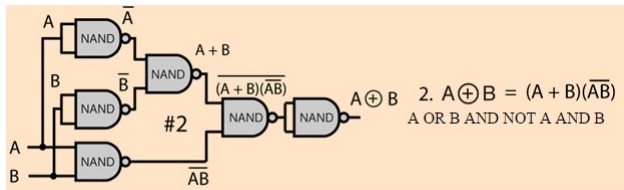


## Proof XOR from nands

The schematic of the NANDS and formula:



$f = a \oplus b$	the function
$= (a + b) \cdot (\overline{a \cdot b})$	the form
$= (a + b) \cdot (\overline{a} + \overline{b})$	De Morgan
$= a \cdot \overline{a} + a \cdot \overline{b} + b \cdot \overline{a} + b \cdot \overline{b}$	multiply out
$= 0 + a \cdot \overline{b} + b \cdot \overline{a} + 0$	reduce
$= a \cdot \overline{b} + b \cdot \overline{a}$	skip 0
$= a \cdot \overline{b} + \overline{a} \cdot b$	commutative law
$= \overline{a} \cdot b + a \cdot \overline{b}$	commutative law
$= a \oplus b$	the XOR

(1)