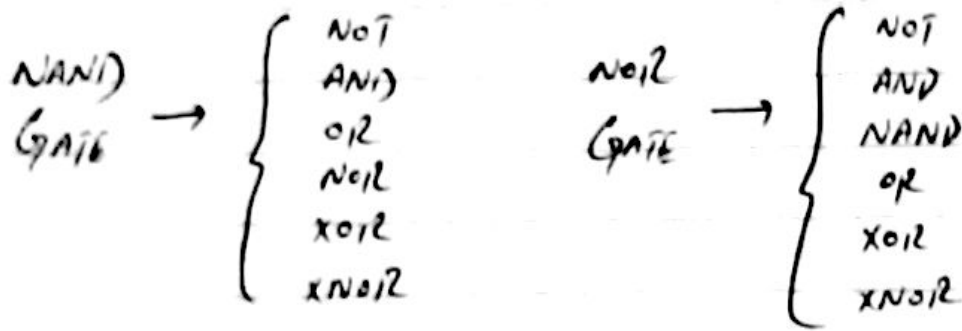


(Lecture 22)

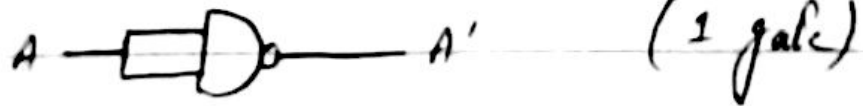
Universal Gates -

- There are two universal gates.
- NAND Gate
 - NOR Gate

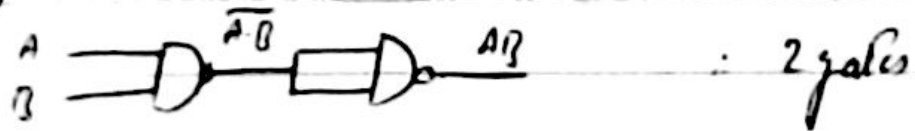


Designing different gates using NAND

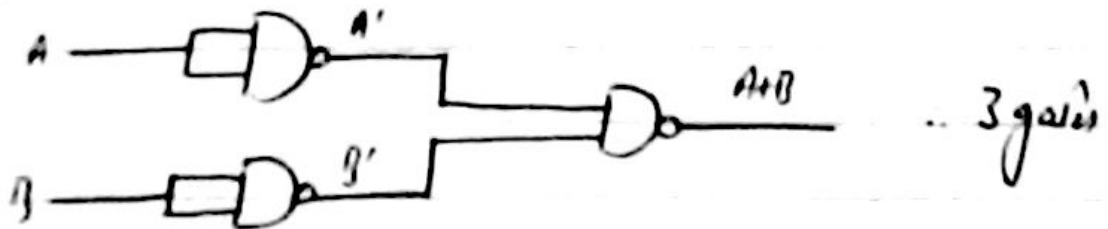
NAND → NOT



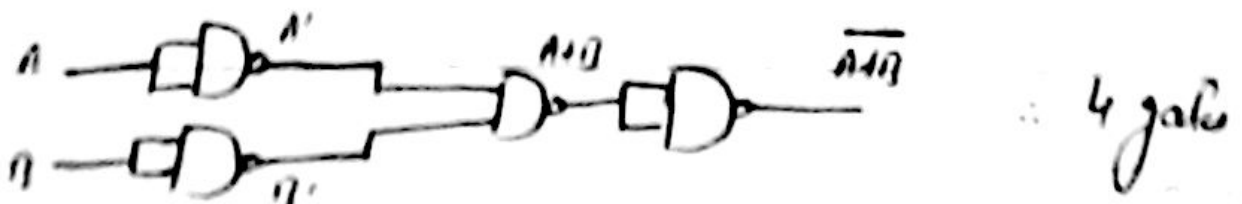
NAND → AND



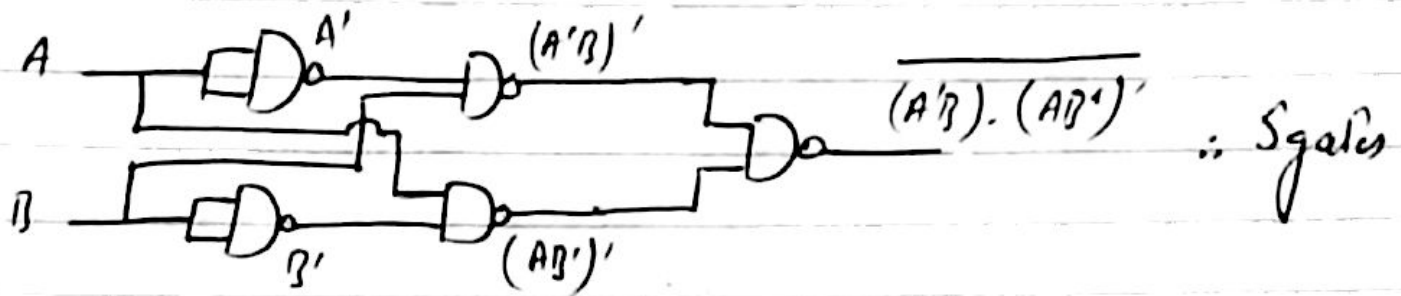
NAND → OR



NAND → NOR



NAND) → XOR ($A \oplus B = A'B + AB'$)

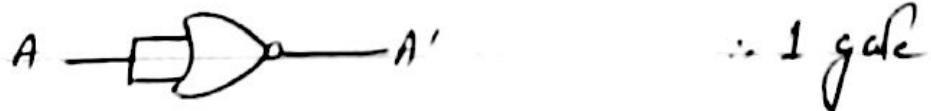


NAND) → XNOR:-

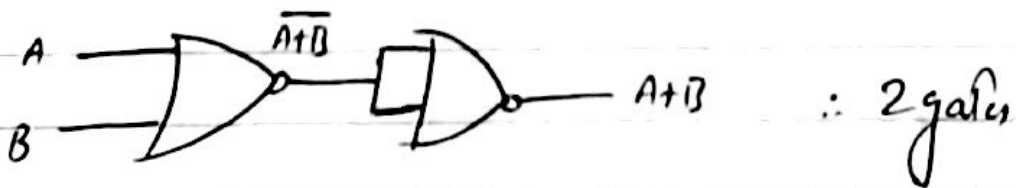
Add another NAND at the end of XOR ∴ 6 gates.
Then it will become (XNOR).

Designing different gates using NOR

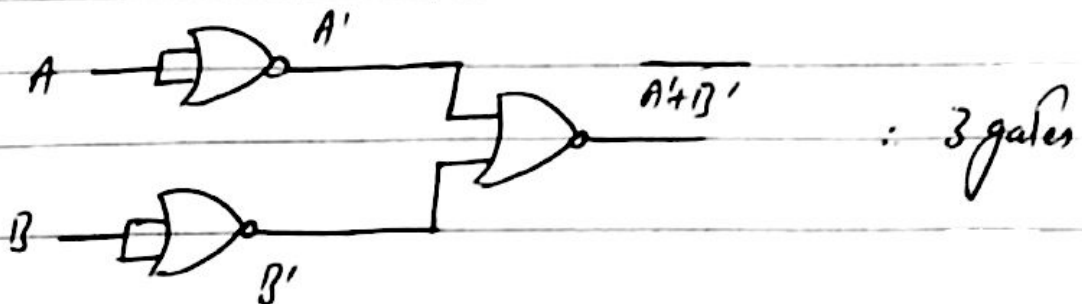
NOR → NOT:-



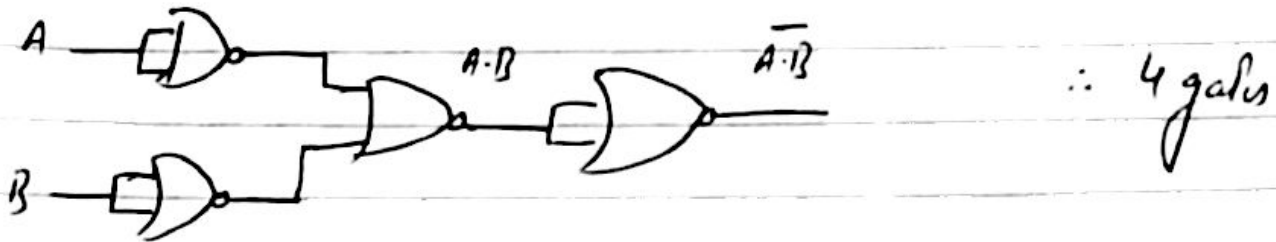
NOR → OR:-



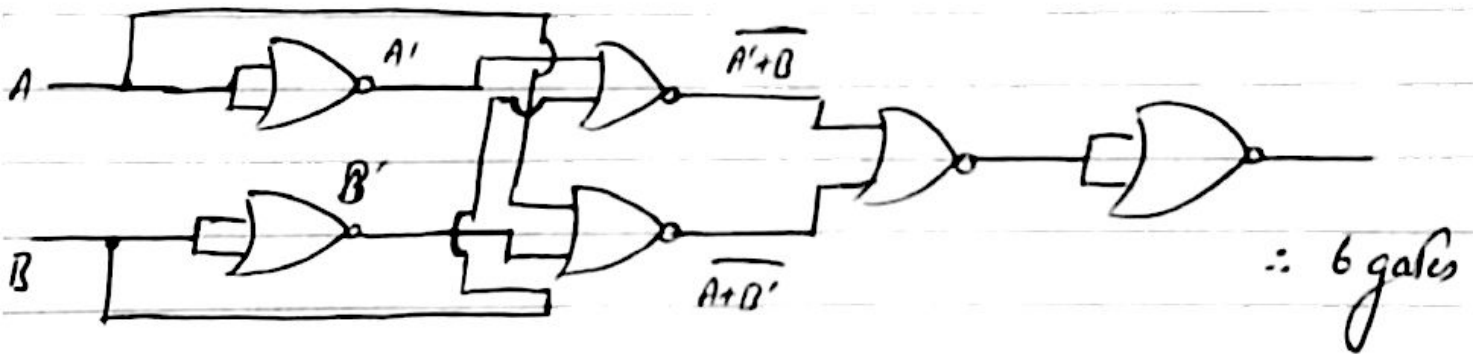
NOR → AND:-



No₁₂ → NAND :-



No₁₂ → XOR :-



No₁₂ → XNOR :-

This circuit is same as of XOR but will end at the fifth circuit.

∴ 5 gates.