



## Structure machine

### Chapitre VII

(Normalisation d'un circuit)

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## Normalisation d'un circuit combinatoire

Un ensemble d'opérateurs forme un système logique

s'il peut réaliser les trois opérations de bases :

Non (NOT), Et (AND) et Ou (OR).

### Exemples

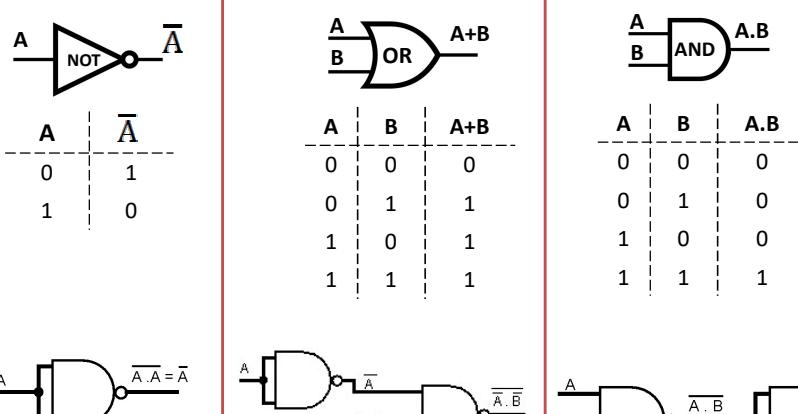
- {Not, AND} forme un système logique complet:  

$$A + B = \overline{\overline{A} + \overline{B}} = \overline{\overline{A} \cdot \overline{B}}$$
- {Not, OR} forme un système logique complet:  

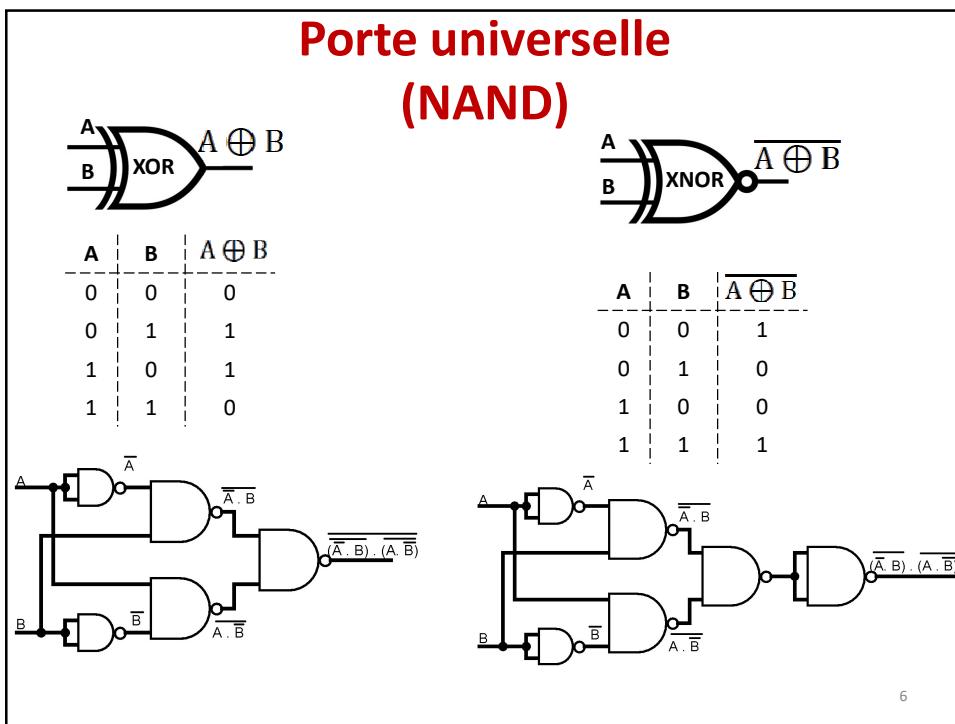
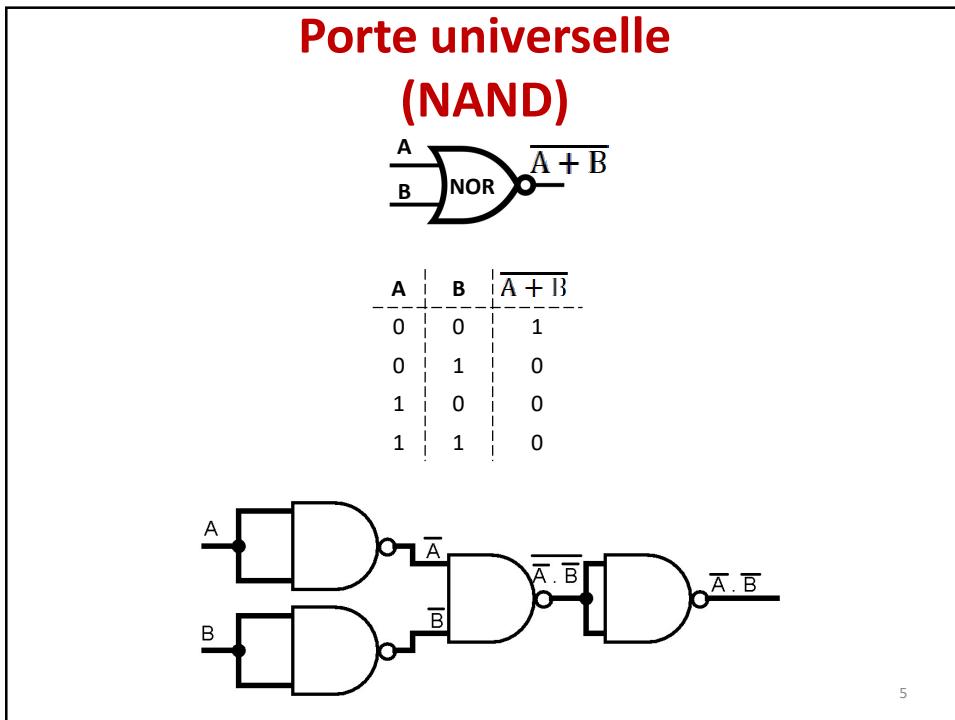
$$A \cdot B = \overline{\overline{A} \cdot \overline{B}} = \overline{\overline{A}} + \overline{\overline{B}}$$
- {NAND} forme un système logique complet.
- {NOR} forme un système logique complet.

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## Porte universelle (NAND)

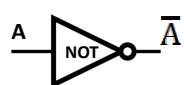


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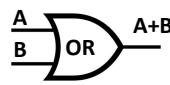


## Porte universelle (NOR)

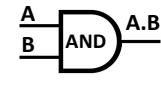
### Porte universelle (NOR)



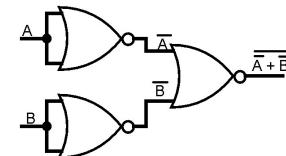
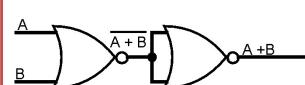
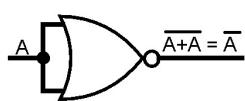
A	$\bar{A}$
0	1
1	0



A	B	$A+B$
0	0	0
0	1	1
1	0	1
1	1	1



A	B	$A \cdot B$
0	0	0
0	1	0
1	0	0
1	1	1



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## Exemple

## Exercice

Soit la fonction suivante:

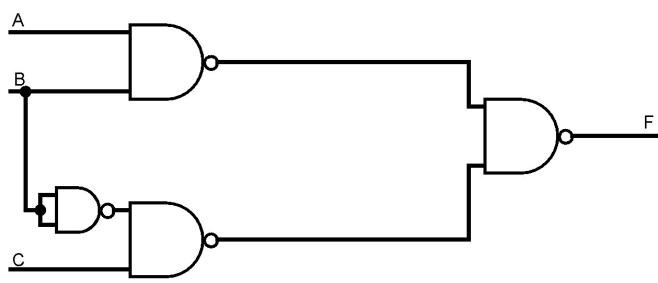
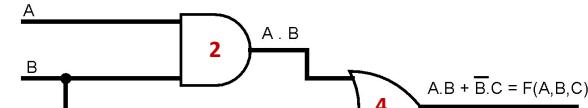
$$F(A, B, C) = A \cdot B + \overline{B} \cdot C$$

Normaliser cette fonction en utilisant des portes :

1. NAND seulement;
2. NOR seulement;

## Utilisation de la porte NAND (Méthode schématique)

$$F(A, B, C) = A \cdot B + \overline{B} \cdot C$$



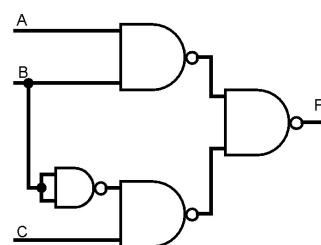
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## Utilisation de la porte NAND (Méthode algébrique)

$$F(A, B, C) = A \cdot B + \overline{B} \cdot C$$

$$= \overline{\overline{A} \cdot B + \overline{B} \cdot C}$$

$$= \overline{\overline{A} \cdot B} \cdot \overline{\overline{B} \cdot C}$$



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## Conclusion

- Système complet d'opérateur.
- Normalisation: Utilisation des portes NAND, et NOR.
- Exercices

<https://elearning.univ-boumerdes.dz/enrol/index.php?id=411>

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