Algèbre de Boole :

1) Obtenir ET avec OU et NON :

NON (X OU Y)=(NON X) ET (NON Y)=NON((NON X) OU (NON Y))=(X ET Y)

Obtenir OU avec ET et NON :

NON(X ET Y)=(NON X) OU (NON Y)=NON((NON X) ET (NON Y))=(X OU B)

# 2)Monter que A⊕B=NON A.B +A.NON B et que A⊕B=(A+B).(NON A+NON B) :

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| A | B | NON A | NON B | A⊕B | NON A.B | A.NON B | (NON A.B)+(A. NON B) |
| 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 |
| 1 | 0 | 0 | 1 | 1 | 0 | 1 | 1 |
| 0 | 1 | 1 | 0 | 1 | 1 | 0 | 1 |
| 0 | 0 | 1 | 1 | 0 | 0 | 0 | 0 |

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| A | B | NON A | NON B | A⊕B | A+B | NON A+NON B | (A+B).(NON A + NON B) |
| 1 | 1 | 0 | 0 | 0 | 1 | 0 | 0 |
| 1 | 0 | 0 | 1 | 1 | 1 | 1 | 1 |
| 0 | 1 | 1 | 0 | 1 | 1 | 1 | 1 |
| 0 | 0 | 1 | 1 | 0 | 0 | 1 | 0 |

# 3)Montrer que A+(NON A.B)=A+B et que A.(NON A+B)=A.B

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| A | B | NON A | NON A.B | A+(NON A.B) | = | A+B |
| 1 | 1 | 0 | 0 | 1 | = | 1 |
| 1 | 0 | 0 | 0 | 1 | = | 1 |
| 0 | 1 | 1 | 1 | 1 | = | 1 |
| 0 | 0 | 1 | 0 | 0 | = | 0 |

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| A | B | NON A | NON A+B | A.(NON A+B) | = | A.B |
| 1 | 1 | 0 | 1 | 1 | = | 1 |
| 1 | 0 | 0 | 0 | 0 | = | 0 |
| 0 | 1 | 1 | 1 | 0 | = | 0 |
| 0 | 0 | 1 | 1 | 0 | = | 0 |

4)Complément de A+NON B.C :

NON A.B+NON C

5) NON (A ⊕ B) :

A ⊕ B =A.B+A.B

NON(A.B+A.B)=NON A + NON B.NON A + NON B

6)A) NON A.B+A.B=

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| A | B | NON A | A.B | NON A.B | NON A.B+A.B |
| 0 | 0 | 1 | 0 | 0 | 0 |
| 1 | 0 | 0 | 0 | 0 | 0 |
| 0 | 1 | 1 | 0 | 1 | 1 |
| 1 | 1 | 0 | 1 | 0 | 1 |

NON A.B+A.B=B

B)(A+B).(A+NON B)

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| A | B | NON B | A+B | A+NON B | (A+B).(A+NON B) |
| 0 | 0 | 1 | 0 | 1 | 0 |
| 1 | 0 | 1 | 1 | 1 | 1 |
| 0 | 1 | 0 | 1 | 0 | 0 |
| 1 | 1 | 0 | 1 | 1 | 1 |

(A+B).(A+NON B)=A

C)A+A.B

|  |  |  |  |
| --- | --- | --- | --- |
| A | B | A.B | A+A.B |
| 0 | 0 | 0 | 0 |
| 1 | 0 | 0 | 0 |
| 0 | 1 | 0 | 0 |
| 1 | 1 | 1 | 1 |

A+A.B=A.B

D)A.(A+B)

|  |  |  |  |
| --- | --- | --- | --- |
| A | B | A+B | A.(A+B) |
| 0 | 0 | 0 | 0 |
| 1 | 0 | 1 | 1 |
| 0 | 1 | 1 | 0 |
| 1 | 1 | 1 | 1 |

A.(A+B)=A

E)NON A.NON B+NON(A+B+C+D)=NON A.NON B+NON A.NON B.NON C.NON D

(Le tableau est long)=NON A.NON B.NON C.NON D

F)A+B.NON C+NON A.NON(B.NON C).(A.D+B)

NON(NON a.NON B)

7)A)

i :