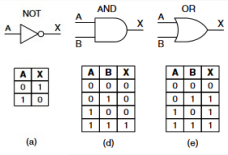
**PROBLEMA 1**

1. Relación entre el sistema binario y lógica de dos niveles eléctricos.

El sistema binario solo admite dos valores, 0 ó 1, mientras que un circuito de dos niveles las variables pueden tomar un valor de verdad (encendido ó apagado).

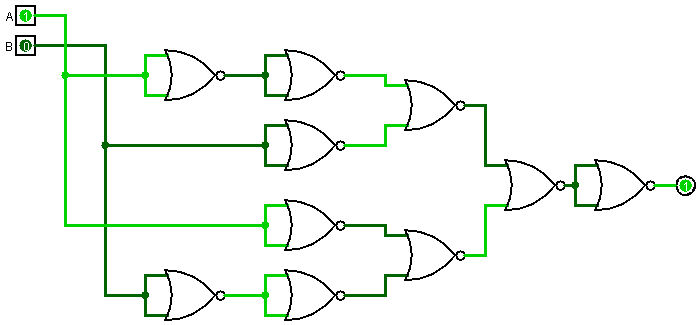
1. Las 3 funciones elementales lógicas son:

* AND
* OR
* NOT

1. Las tres maneras posibles es a través de la tabla de verdad, que muestra el valor de verdad de una proposición compuesta para cada combinación de verdad que se pueda asignar; luego está la función booleana que describe el circuito y que representa a la tabla de verdad, y por último el diagrama o esquemática que lo representa en sí mismo al circuito.

**PROBLEMA 2**

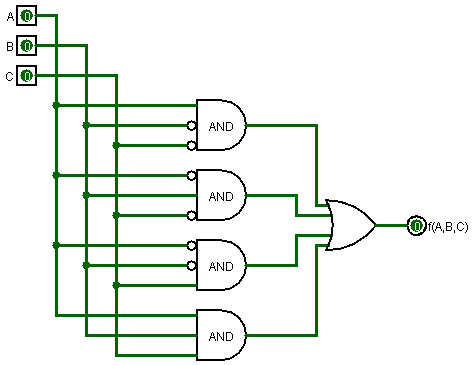
Circuito equivalente a la compuerta XOR:



**PROBLEMA 3**

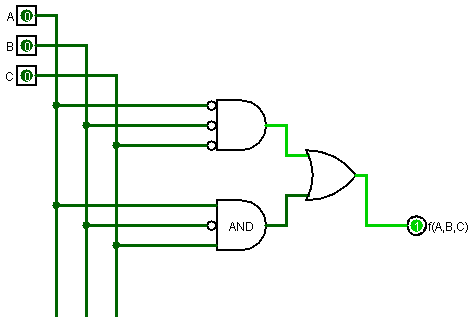
a) f(A,B,C) = A\*/B\*/C + /A\*B\*/C + /A\*/B\*C + A\*B\*C

|  |  |  |  |
| --- | --- | --- | --- |
| A | B | C | F |
| 0 | 0 | 0 | 0 |
| 0 | 0 | 1 | 1 |
| 0 | 1 | 0 | 1 |
| 0 | 1 | 1 | 0 |
| 1 | 0 | 0 | 1 |
| 1 | 0 | 1 | 0 |
| 1 | 1 | 0 | 0 |
| 1 | 1 | 1 | 1 |



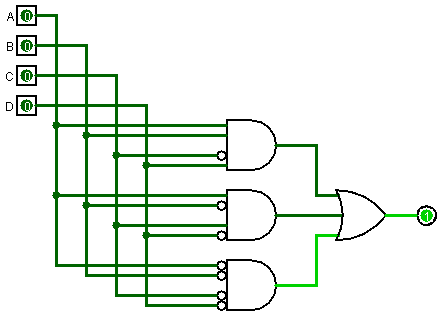
b) f(A,B,C) = /A\*/B\*/C + A\*/B\*C

|  |  |  |  |
| --- | --- | --- | --- |
| A | B | C | F |
| 0 | 0 | 0 | 1 |
| 0 | 0 | 1 | 0 |
| 0 | 1 | 0 | 0 |
| 0 | 1 | 1 | 0 |
| 1 | 0 | 0 | 0 |
| 1 | 0 | 1 | 1 |
| 1 | 1 | 0 | 0 |
| 1 | 1 | 1 | 0 |



c) f(A,B,C,D) = A\*B\*/C\*D + A\*/B\*C\*/D + /A\*/B\*/C\*/D

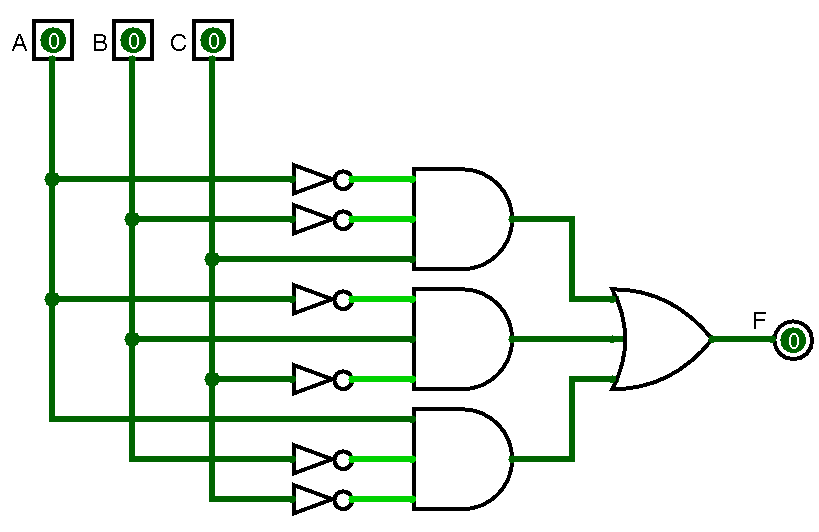
|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| A | B | C | D | F |
| 0 | 0 | 0 | 0 | 1 |
| 0 | 0 | 0 | 1 | 0 |
| 0 | 0 | 1 | 0 | 0 |
| 0 | 0 | 1 | 1 | 0 |
| 0 | 1 | 0 | 0 | 0 |
| 0 | 1 | 0 | 1 | 0 |
| 0 | 1 | 1 | 0 | 0 |
| 0 | 1 | 1 | 1 | 0 |
| 1 | 0 | 0 | 0 | 0 |
| 1 | 0 | 0 | 1 | 0 |
| 1 | 0 | 1 | 0 | 1 |
| 1 | 0 | 1 | 1 | 0 |
| 1 | 1 | 0 | 0 | 0 |
| 1 | 1 | 0 | 1 | 1 |
| 1 | 1 | 1 | 0 | 0 |
| 1 | 1 | 1 | 1 | 0 |



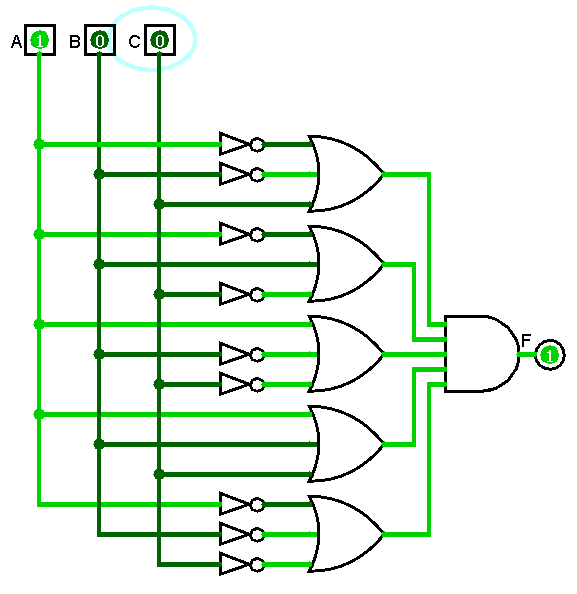
**PROBLEMA 4**

|  |  |  |  |
| --- | --- | --- | --- |
| A | B | C | F |
| 0 | 0 | 0 | 0 |
| 0 | 0 | 1 | 1 |
| 0 | 1 | 0 | 1 |
| 0 | 1 | 1 | 0 |
| 1 | 0 | 0 | 1 |
| 1 | 0 | 1 | 0 |
| 1 | 1 | 0 | 0 |
| 1 | 1 | 1 | 0 |

1. f(A,B,C) = (/A \* /B \* C) + (/A \* B \* /C) + (A \* /B \* /C) **FND-Suma de Productos**

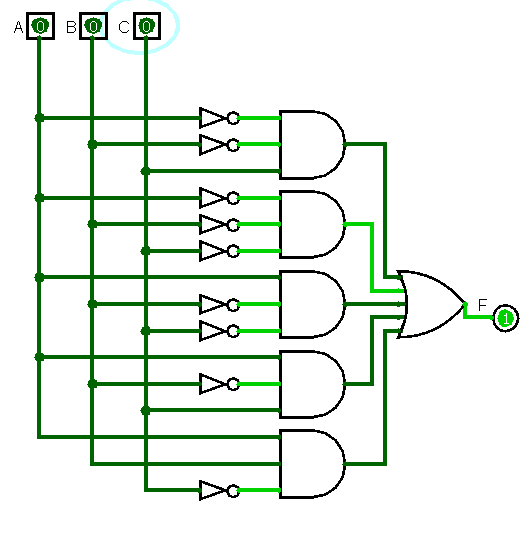


F(A,B,C)=(A+B+C)\*(A+/B+/C)\*(/A+B+/C)\*(/A+/B+C)\*(/A+/B+/C) **FNC- Producto de sumas**

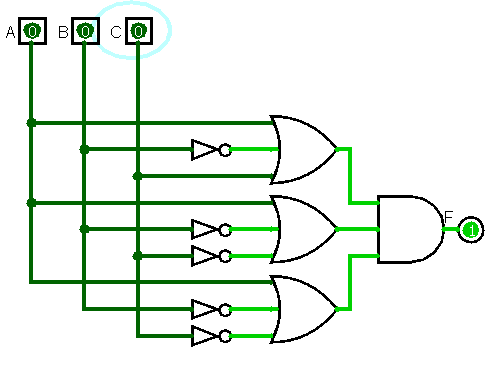


|  |  |  |  |
| --- | --- | --- | --- |
| A | B | C | F |
| 0 | 0 | 0 | 1 |
| 0 | 0 | 1 | 1 |
| 0 | 1 | 0 | 0 |
| 0 | 1 | 1 | 0 |
| 1 | 0 | 0 | 1 |
| 1 | 0 | 1 | 1 |
| 1 | 1 | 0 | 1 |
| 1 | 1 | 1 | 0 |

1. f(A,B,C) = (/A \* /B \* /C) + (/A \* /B \* C) + (A \* /B \* /C) + (A \* /B \* C) + (A \* B \* /C) **FND-Suma de Prod**

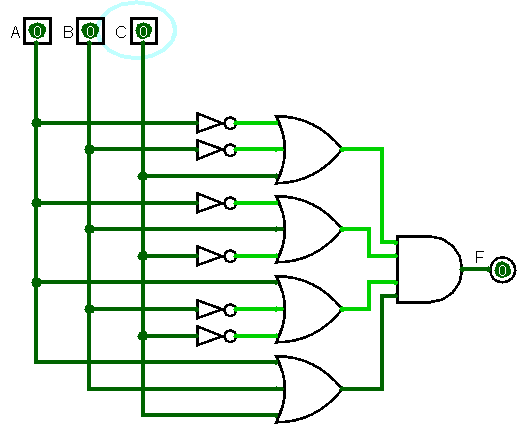


f(A,B,C) = (A +/B +C) \*(A + /B + /C)\*(/A + /B + /C) **FNC- Producto de Sumas**

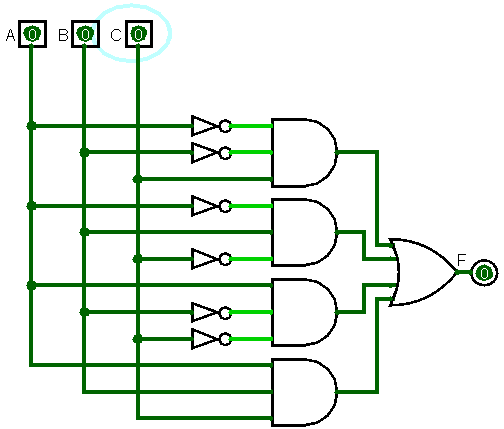


|  |  |  |  |
| --- | --- | --- | --- |
| A | B | C | F |
| 0 | 0 | 0 | 0 |
| 0 | 0 | 1 | 1 |
| 0 | 1 | 0 | 1 |
| 0 | 1 | 1 | 0 |
| 1 | 0 | 0 | 1 |
| 1 | 0 | 1 | 0 |
| 1 | 1 | 0 | 0 |
| 1 | 1 | 1 | 1 |

1. f(A,B,C) = (A+/B+/C) \*(/A+B+/C) \* (/A+/B+C) \* (A+B+C) **FNC- Producto de Sumas**

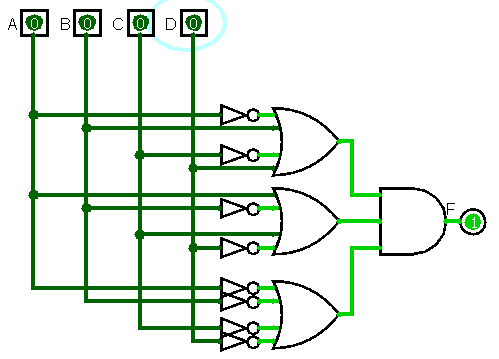


f(A,B,C) = (/A\*/B\*C) + (/A\*B\*/C) + (A\*/B\*/C) + (A\*B\*C) **FND- Suma de Productos**

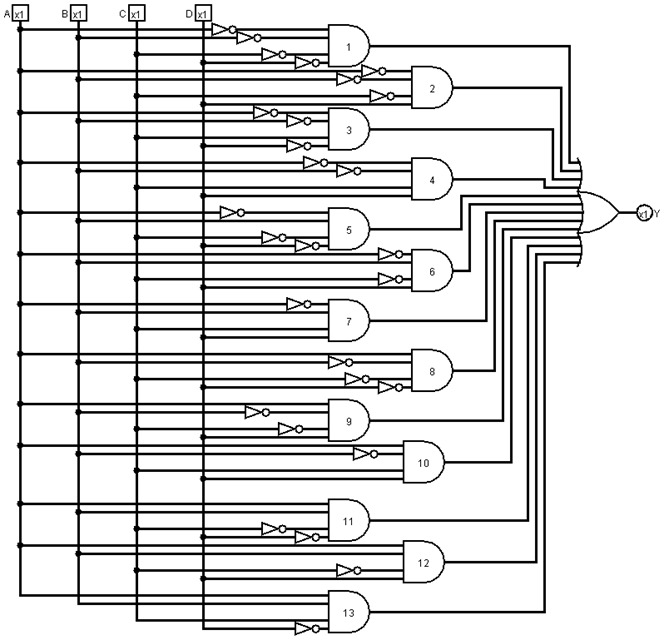


|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| A | B | C | D | F |
| 0 | 0 | 0 | 0 | 1 |
| 0 | 0 | 0 | 1 | 1 |
| 0 | 0 | 1 | 0 | 1 |
| 0 | 0 | 1 | 1 | 1 |
| 0 | 1 | 0 | 0 | 1 |
| 0 | 1 | 0 | 1 | 0 |
| 0 | 1 | 1 | 0 | 1 |
| 0 | 1 | 1 | 1 | 1 |
| 1 | 0 | 0 | 0 | 1 |
| 1 | 0 | 0 | 1 | 1 |
| 1 | 0 | 1 | 0 | 0 |
| 1 | 0 | 1 | 1 | 1 |
| 1 | 1 | 0 | 0 | 1 |
| 1 | 1 | 0 | 1 | 1 |
| 1 | 1 | 1 | 0 | 1 |
| 1 | 1 | 1 | 1 | 0 |

1. f(A,B,C,D) = (/A+B+/C+D) \* (A+/B+C+/D) \* (/A+/B+/C+/D) **FNC- Producto de Sumas**

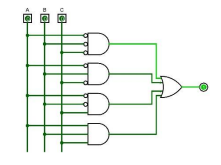
****

f(A,B,C) = (A\*B\*C\*D)+ (A\*B\*C\*/D)+ (A\*B\*/C\*D)+ (A\*/B\*C\*D)+ (A\*B\*/C\*/D)+ (A\*/B\*/C\*D)+ (A\*/B\*/C\*/D)+ (/A\*B\*C\*D)+ (/A\*B\*/C\*/D)+ (/A\*/B\*C\*D)+ (/A\*/B\*C\*/D)+ (/A\*/B\*/C\*D)+ (/A\*B\*C\*/D) **FND- Suma de Productos**



**PROBLEMA 5**

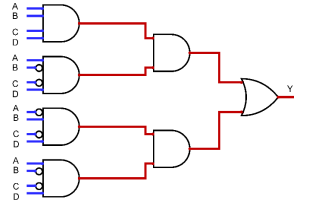
a)



f(A,B,C) = (A’ B’ C’) + (A’ B C’) + (A’ B’ C) + (A B C)

|  |  |  |  |
| --- | --- | --- | --- |
| A | B | C | F |
| 0 | 0 | 0 | 1 |
| 0 | 0 | 1 | 0 |
| 0 | 1 | 0 | 1 |
| 0 | 1 | 1 | 0 |
| 1 | 0 | 0 | 0 |
| 1 | 0 | 1 | 0 |
| 1 | 1 | 0 | 1 |
| 1 | 1 | 1 | 1 |

b)



f(A,B,C,D) = (A B C D)\*(A B’ C’ D) + (A’ B C’ D)\*(A B’ C’ D)

f(A,B,C,D) = (A B’ C’ D) \* [ ( A B C D) + (A’ B C’ D) ]

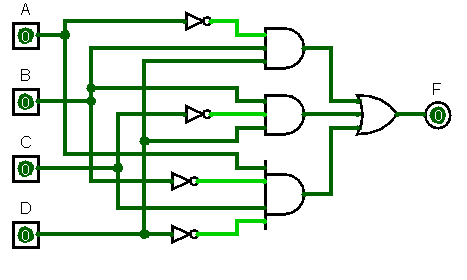
f(A,B,C,D) = 0

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| A | B | C | D | F |
| 0 | 0 | 0 | 0 | 0 |
| 0 | 0 | 0 | 1 | 0 |
| 0 | 0 | 1 | 0 | 0 |
| 0 | 0 | 1 | 1 | 0 |
| 0 | 1 | 0 | 0 | 0 |
| 0 | 1 | 0 | 1 | 0 |
| 0 | 1 | 1 | 0 | 0 |
| 0 | 1 | 1 | 1 | 0 |
| 1 | 0 | 0 | 0 | 0 |
| 1 | 0 | 0 | 1 | 0 |
| 1 | 0 | 1 | 0 | 0 |
| 1 | 0 | 1 | 1 | 0 |
| 1 | 1 | 0 | 0 | 0 |
| 1 | 1 | 0 | 1 | 0 |
| 1 | 1 | 1 | 0 | 0 |
| 1 | 1 | 1 | 1 | 0 |

**PROBLEMA 6**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| A | B | C | D | F |
| 0 | 0 | 0 | 0 | 0 |
| 0 | 0 | 0 | 1 | 0 |
| 0 | 0 | 1 | 0 | 0 |
| 0 | 0 | 1 | 1 | 0 |
| 0 | 1 | 0 | 0 | 0 |
| 0 | 1 | 0 | 1 | 1 |
| 0 | 1 | 1 | 0 | 0 |
| 0 | 1 | 1 | 1 | 1 |
| 1 | 0 | 0 | 0 | 0 |
| 1 | 0 | 0 | 1 | 0 |
| 1 | 0 | 1 | 0 | 1 |
| 1 | 0 | 1 | 1 | 0 |
| 1 | 1 | 0 | 0 | 0 |
| 1 | 1 | 0 | 1 | 1 |
| 1 | 1 | 1 | 0 | 0 |
| 1 | 1 | 1 | 1 | 0 |

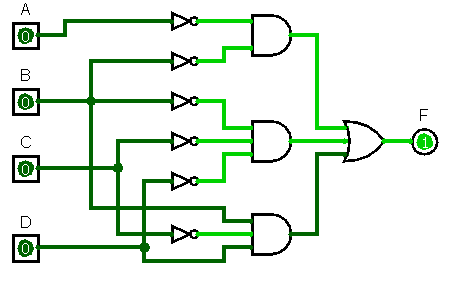
F(A,B,C,D)=(/A\*/B\*C\*/D)+(/A\*/B\*C\*D) +(/A\*B\*C\*D) +(A\*/B\*C\*/D) +(A\*B\*/C\*D)



**PROBLEMA 7**

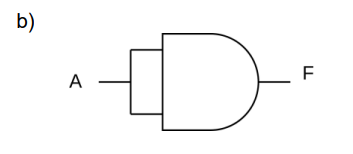
|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| A | B | C | D | F |
| 0 | 0 | 0 | 0 | 1 |
| 0 | 0 | 0 | 1 | 1 |
| 0 | 0 | 1 | 0 | 1 |
| 0 | 0 | 1 | 1 | 1 |
| 0 | 1 | 0 | 0 | 0 |
| 0 | 1 | 0 | 1 | 1 |
| 0 | 1 | 1 | 0 | 0 |
| 0 | 1 | 1 | 1 | 0 |
| 1 | 0 | 0 | 0 | 1 |
| 1 | 0 | 0 | 1 | 0 |
| 1 | 0 | 1 | 0 | 0 |
| 1 | 0 | 1 | 1 | 0 |
| 1 | 1 | 0 | 0 | 0 |
| 1 | 1 | 0 | 1 | 1 |
| 1 | 1 | 1 | 0 | 0 |
| 1 | 1 | 1 | 1 | 0 |

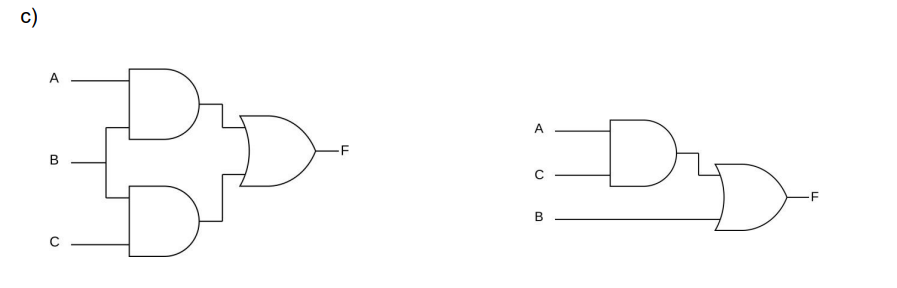
F(A,B,C,D)=(/A\*/B)+(/A\*B\*/C\*D) +(/A\*/B\*/C\*/D) +(A\*/B\*/C\*/D) +(A\*B\*/C\*D)



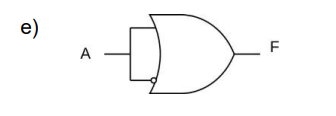
**PROBLEMA 8**

Postulados de Huntington y propiedades: Ley de identidad

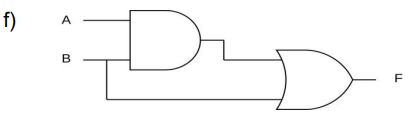
Ley de Idempotencia

Ley distributiva

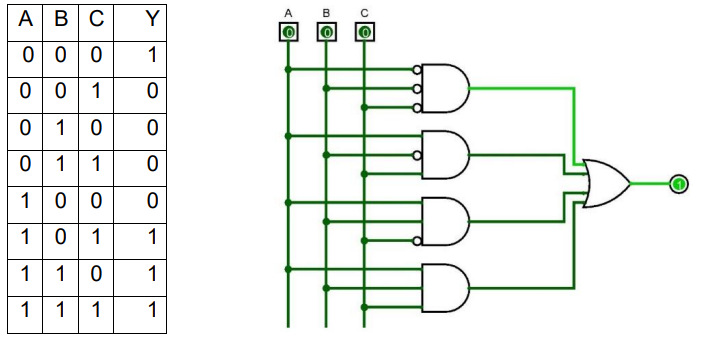
Ley de Morgan



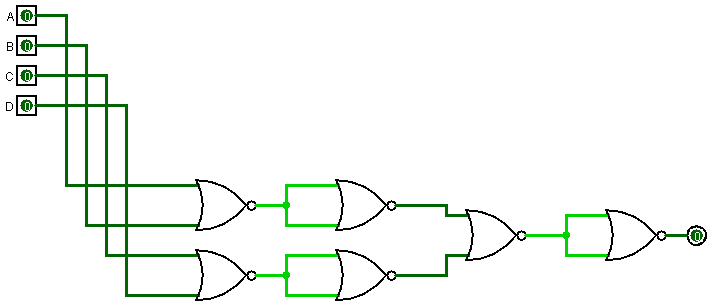
Ley inversa o ley de complementación

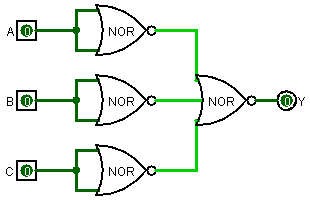
  
  
  
  
  
  
  
Ley de absorción

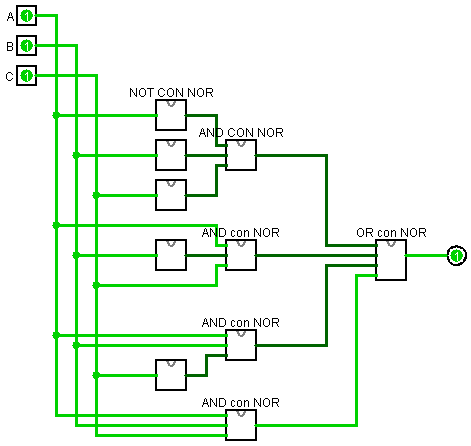
**PROBLEMA 9**



OR CON NOR

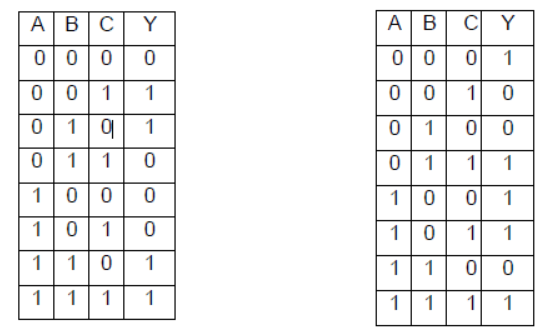


NOT CON OR AND CON NOR

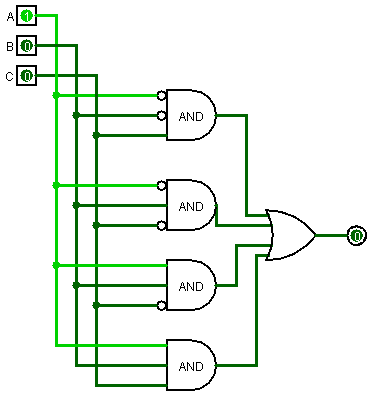
Circuito equivalente implementado con compuertas NOR:

**PROBLEMA 10**

De las siguientes tablas de verdad, realice el circuito más óptimo correspondiente y su función booleana.



a) f(A,B,C) = (A’B’C) + (A’BC’) + (ABC’) + (ABC)



b) f(A,B,C) = (A+B+C’)\*(A+B’+C)\*(A’+B’+C)

