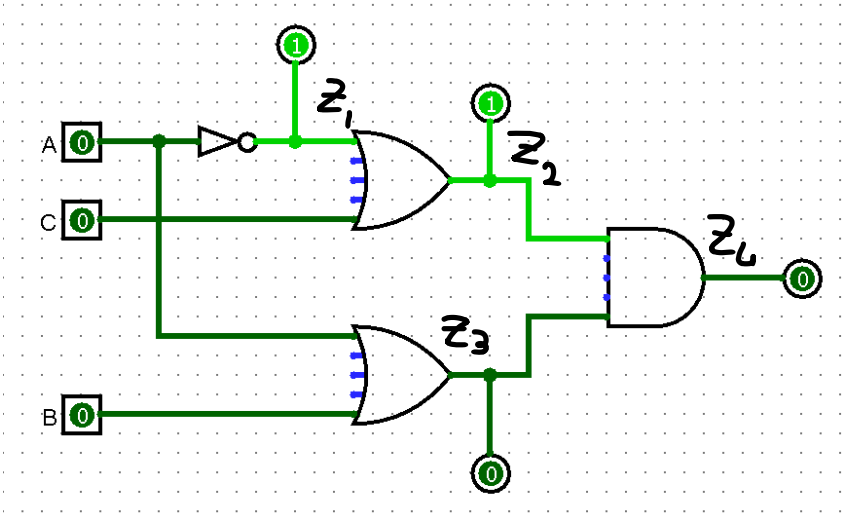
Esercizio 1



+=OR, *=AND, ~ =NOT

Z1 = ~A

Z2 = Z1+C=~A+C

Z3 = A+B

Z4 = Z2*Z3=(~A+C)*(A+B)

A	B	C	Z1=~A	Z2=~A+C	Z3=A+B	Z4=Z2*Z3
0	0	0	1	1	0	0
0	0	1	1	1	0	0
0	1	0	1	1	1	1
0	1	1	1	1	1	1
1	0	0	0	0	1	0
1	0	1	0	1	1	1
1	1	0	0	0	1	0
1	1	1	0	1	1	1

Esercizio 2

La XNOR identifica quando i due bit in ingresso sono identici. In questo caso l'output vale 1, altrimenti 0.

A	B	Z=A XNOR B
0	0	1
0	1	0
1	0	0
1	1	1

Z= (~A*~B)+(A*B) = ~(A+B) + (A*B)

Esercizio 3

X=~A+~(B+~C)

A	B	C	~A	~C	B+~C	~(B+~C)	X=~A+~(B+~C)
0	0	0	1	1	1	0	1
0	0	1	1	0	0	1	1
0	1	0	1	1	1	0	1
0	1	1	1	0	1	0	1
1	0	0	0	1	1	0	0
1	0	1	0	0	0	1	1
1	1	0	0	1	1	0	0
1	1	1	0	0	1	0	0

Esercizio 4

DISTRIBUTIVA(AND) = X*(Y+Z) = X*Y + X*Z

ASSORBIMENTO II = X*(-X + Y) = X*Y

E1=~(~A*B*~C+A*B*~C)*A

E2=(~B*A)+(A*C)

E1=E2?

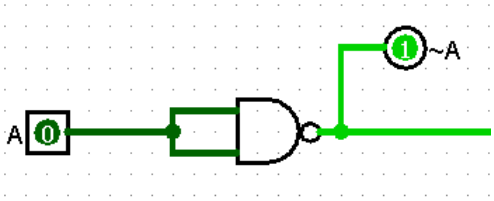
E1=~(~A*B*~C+A*B*~C)*A = DISTRIBUTIVA(AND), COMMUTATIVA(AND) = ~((~A*B+A*B)*~C)*A = DISTRIBUTIVA(AND), COMMUTATIVA(AND) = ~(((~A+A)*B)*~C)*A = INVERSO(OR) = ~((1*B)*~C)*A = IDENTITA'(AND) = ~(B*~C)*A=DeMorgan(AND)=(~B + C)*A = DISTRIBUTIVA(AND) = ~B*A + C*A = COMMUTATIVA(AND) = ~B*A + A*C

Esercizio 5

E1=(A NOR B)*(C+~B) tramite solo porte NAND

A	B	Z=A NAND B=~(A*B)
0	0	1
0	1	1
1	0	1
1	1	0

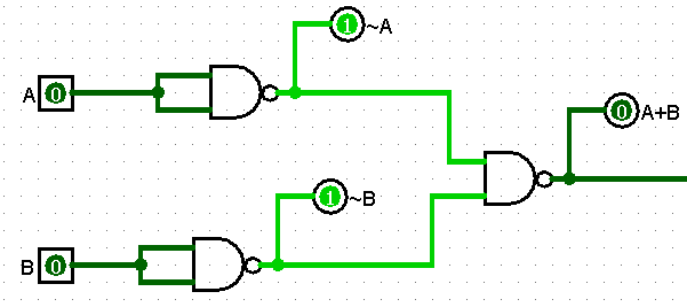
~A=A NAND A



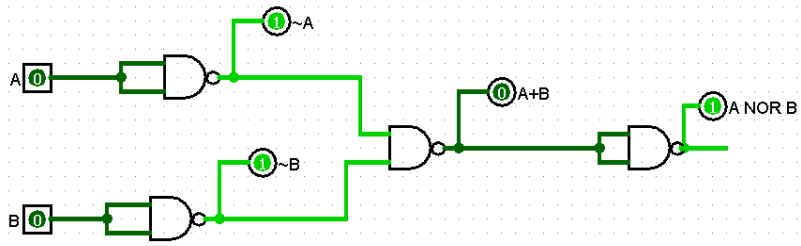
A	B	Z=A NOR B=~(A+B)
0	0	1

0	1	0
1	0	0
1	1	0

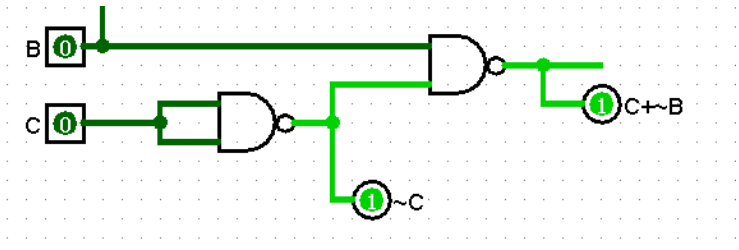
A+B = ~~(A+B) = DeMorgan(OR) = ~(~A * ~B) = ~A NAND ~B



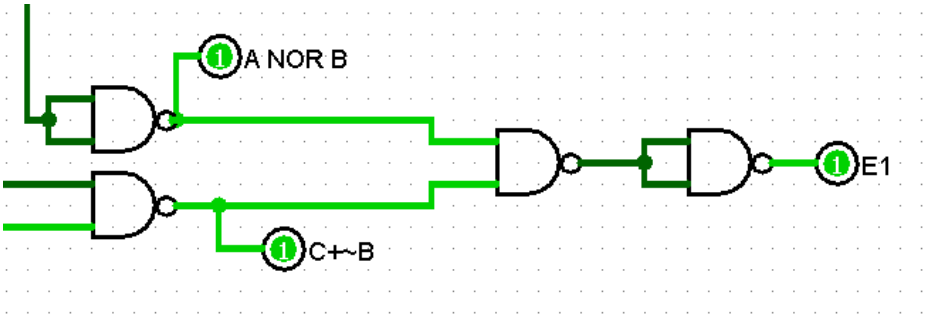
A NOR B = ~(A+B) = (~A NAND ~B) NAND (~A NAND ~B) = ((A NAND A) NAND (B NAND B)) NAND ((A NAND A) NAND (B NAND B))



C+~B = ~C NAND B



E1=(A NOR B)*(C+~B)



E2 = ~A*~B

E1=E2?

E1=~(A+B)*(C+~B)=DeMorgan(OR)=(~A*~B)*(C+~B)=DISTRIBUTIVA(AND)=(~A*~B*C)+(~A*~B)=DISTRIBUTIVA(AND)=~A*~B*(C+1)=ELEMENTO NULL(OR)=~A*~B