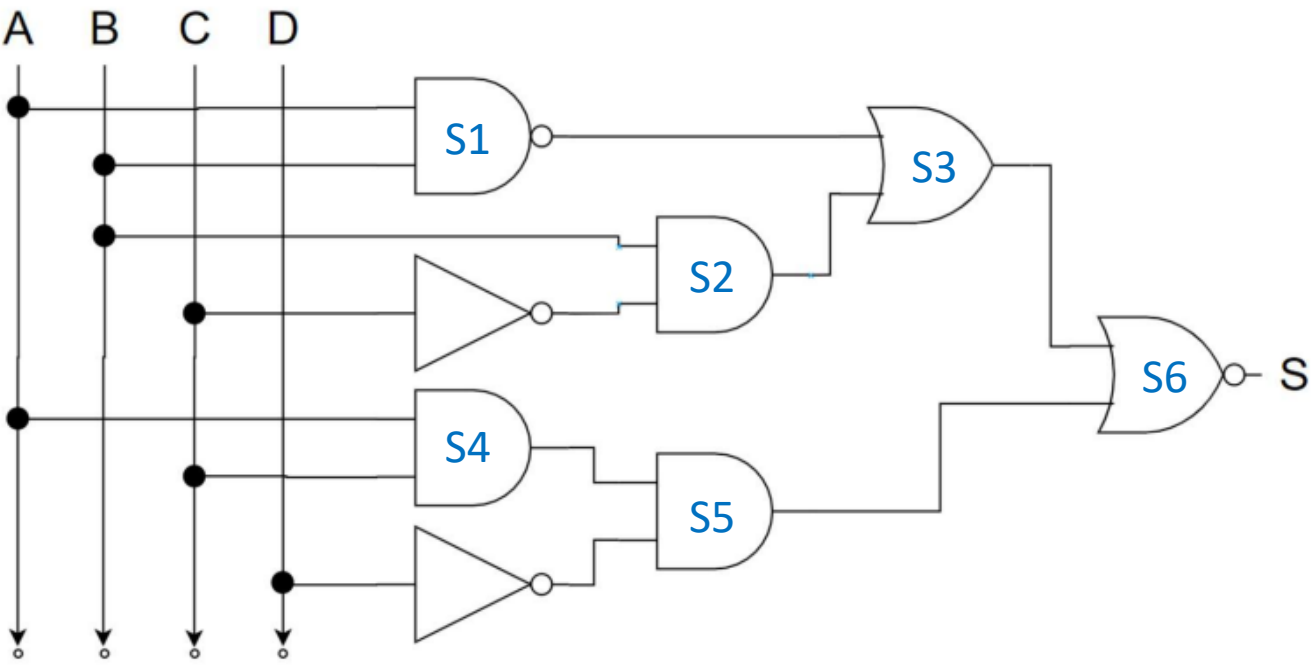
Activitat 2. Portes lògiques

1. Obté les taules de veritat i les funcions dels següents circuits:

a)



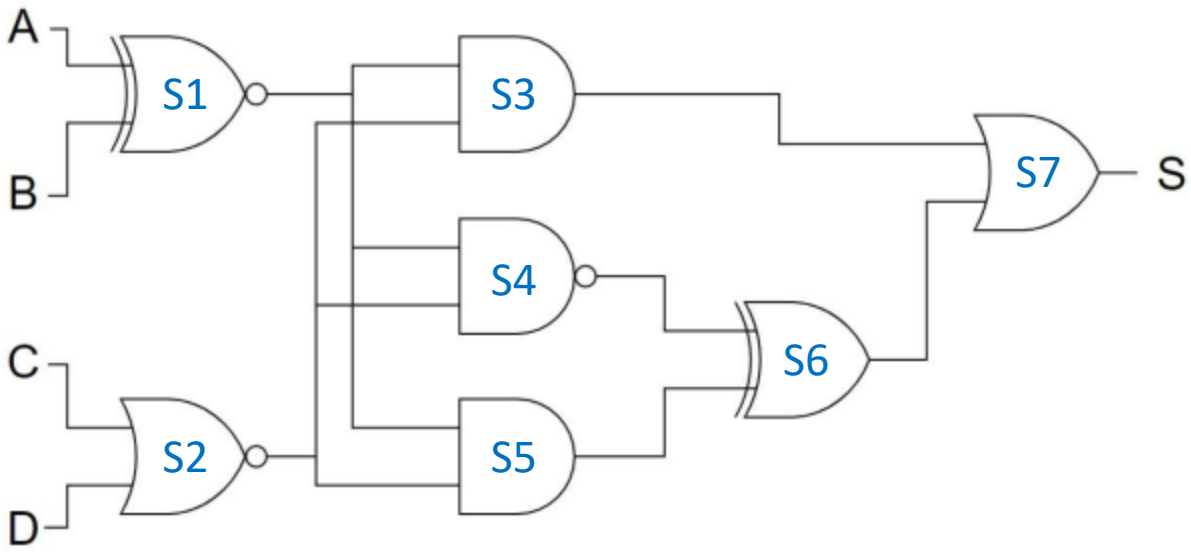
Taula de veritat

A	B	C	D	A'	B'	C'	D'	S1 (A · B)'	S2 B · C'	S3 S1 + S2	S4 A · C	S5 S4 · D'	S6 (S3 + S5)'
0	0	0	0	1	1	1	1	1	0	1	0	0	0
0	0	0	1	1	1	1	0	1	0	1	0	0	0
0	0	1	0	1	1	0	1	1	0	1	0	0	0
0	0	1	1	1	1	0	0	1	0	1	0	0	0
0	1	0	0	1	0	1	1	1	1	1	0	0	0
0	1	0	1	1	0	1	0	1	1	1	0	0	0
0	1	1	0	1	0	0	1	1	0	1	0	0	0
0	1	1	1	1	0	0	0	1	0	1	0	0	0
1	0	0	0	0	1	1	1	1	0	1	0	0	0
1	0	0	1	0	1	1	0	1	0	1	0	0	0
1	0	1	0	0	1	0	1	1	0	1	1	1	0
1	0	1	1	0	1	0	0	1	0	1	1	0	0
1	1	0	0	0	0	1	1	0	1	1	0	0	0
1	1	0	1	0	0	1	0	0	1	1	0	0	0
1	1	1	0	0	0	0	1	0	0	0	1	1	0
1	1	1	1	0	0	0	0	0	0	0	1	0	1

Funció del circuit

$$((A \cdot B)' + B \cdot C' + A \cdot C \cdot D')'$$

b)



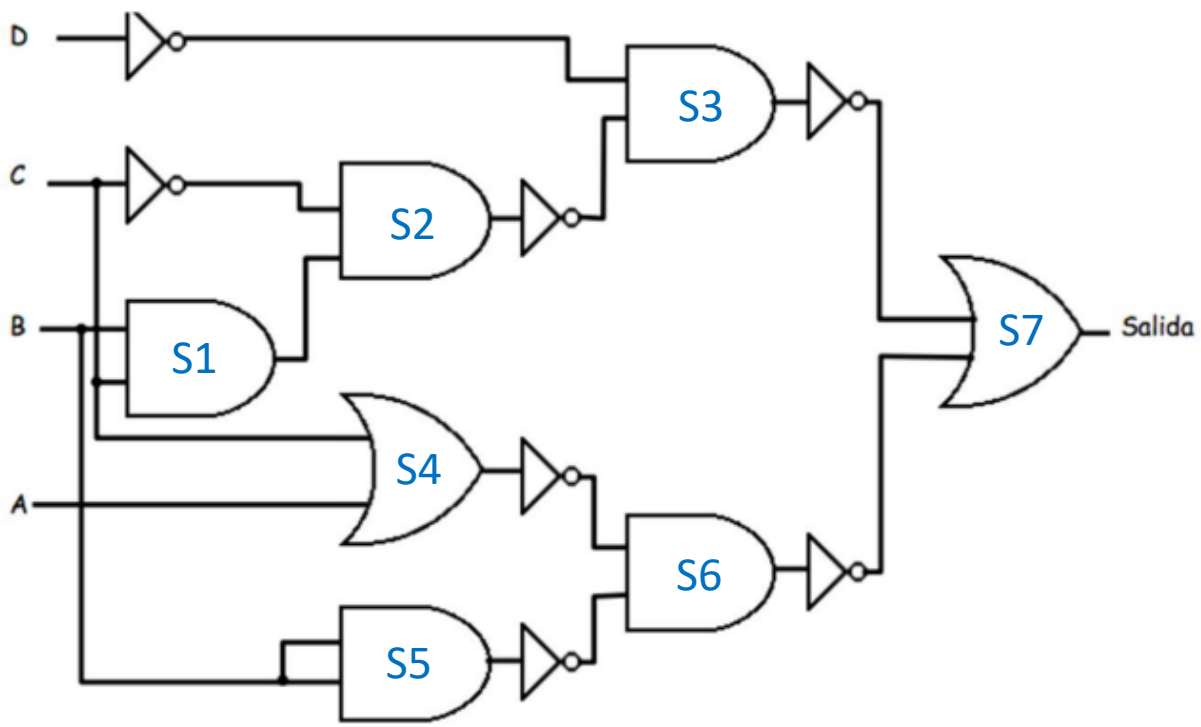
Taula de veritat

A	B	C	D	A'	B'	C'	D'	S1 A ⊙ B	S2 (C + D)'	S3 S1 · S2	S4 (S1 · S2)'	S5 S1 · S2	S6 S4 ⊕ S5	S7 S3 + S6
0	0	0	0	1	1	1	1	1	1	1	0	1	1	1
0	0	0	1	1	1	1	0	1	0	0	1	0	1	1
0	0	1	0	1	1	0	1	1	0	0	1	0	1	1
0	0	1	1	1	1	0	0	1	0	0	1	0	1	1
0	1	0	0	1	0	1	1	0	1	0	1	0	1	1
0	1	0	1	1	0	1	0	0	0	0	1	0	1	1
0	1	1	0	1	0	0	1	0	0	0	1	0	1	1
0	1	1	1	1	0	0	0	0	0	0	1	0	1	1
1	0	0	0	0	1	1	1	0	1	0	1	0	1	1
1	0	0	1	0	1	1	0	0	0	0	1	0	1	1
1	0	1	0	0	1	0	1	0	0	0	1	0	1	1
1	0	1	1	0	1	0	0	0	0	0	1	0	1	1
1	1	0	0	0	0	1	1	1	1	1	0	1	1	1
1	1	0	1	0	0	1	0	1	0	0	1	0	1	1
1	1	1	0	0	0	0	1	1	0	0	1	0	1	1
1	1	1	1	0	0	0	0	1	0	0	1	0	1	1

Funció del circuit

$$(A \odot B) \cdot (C + D)' + ((A \odot B) \cdot (C + D)')' \oplus (A \odot B) \cdot (C + D)'$$

c)



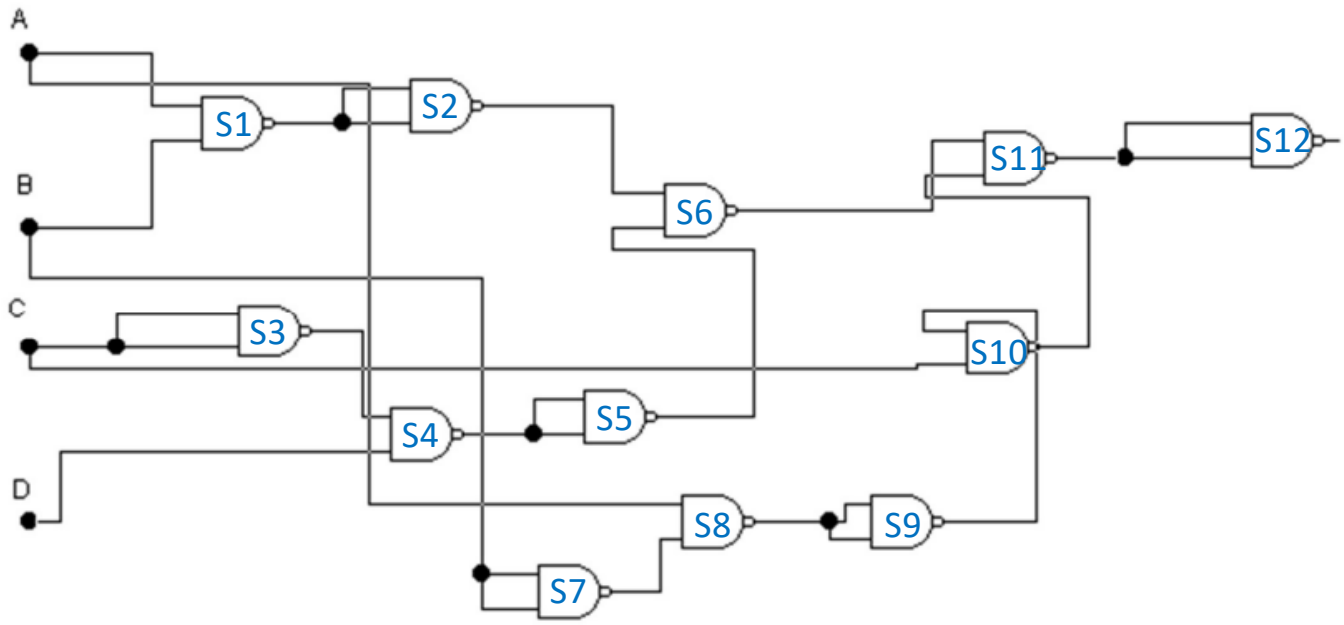
Taula de veritat

								S1	S2	S3	S4	S5	S6	S7
A	B	C	D	A'	B'	C'	D'	B · C	(C' · S1)'	(D' · S2)'	(C + A)'	(B · B)'	(S4 · S5)'	S3 + S6
0	0	0	0	1	1	1	1	0	1	0	1	1	0	0
0	0	0	1	1	1	1	0	0	1	1	1	1	0	1
0	0	1	0	1	1	0	1	0	1	0	0	1	1	1
0	0	1	1	1	1	0	0	0	1	1	0	1	1	1
0	1	0	0	1	0	1	1	0	1	0	1	0	1	1
0	1	0	1	1	0	1	0	0	1	1	1	0	1	1
0	1	1	0	1	0	0	1	1	1	0	0	0	1	1
0	1	1	1	1	0	0	0	1	1	1	0	0	1	1
1	0	0	0	0	1	1	1	0	1	0	0	1	1	1
1	0	0	1	0	1	1	0	0	1	1	0	1	1	1
1	0	1	0	0	1	0	1	0	1	0	0	1	1	1
1	0	1	1	0	1	0	0	0	1	1	0	1	1	1
1	1	0	0	0	0	1	1	0	1	0	0	0	1	1
1	1	0	1	0	0	1	0	0	1	1	0	0	1	1
1	1	1	0	0	0	0	1	1	1	0	0	0	1	1
1	1	1	1	0	0	0	0	1	1	1	0	0	1	1

Funció del circuit

$$(D' \cdot (C' \cdot B \cdot C)')' + ((C + A)' \cdot (B \cdot B))'$$

d)



Taula de veritat (pt. 1)

A	B	C	D	A'	B'	C'	D'	S1 (A · B)'	S2 (S1 · S1)'	S3 (C · C)'	S4 (S3 · D)'	S5 (S4 · S4)'
0	0	0	0	1	1	1	1	1	0	1	1	0
0	0	0	1	1	1	1	0	1	0	1	0	1
0	0	1	0	1	1	0	1	1	0	0	1	0
0	0	1	1	1	1	0	0	1	0	0	1	0
0	1	0	0	1	0	1	1	1	0	1	1	0
0	1	0	1	1	0	1	0	1	0	1	0	1
0	1	1	0	1	0	0	1	1	0	0	1	0
0	1	1	1	1	0	0	0	1	0	0	1	0
1	0	0	0	0	1	1	1	1	0	1	1	0
1	0	0	1	0	1	1	0	1	0	1	0	1
1	0	1	0	0	1	0	1	1	0	0	1	0
1	0	1	1	0	1	0	0	1	0	0	1	0
1	1	0	0	0	0	1	1	0	1	1	1	0
1	1	0	1	0	0	1	0	0	1	1	0	1
1	1	1	0	0	0	0	1	0	1	0	1	0
1	1	1	1	0	0	0	0	0	1	0	1	0

Taula de veritat (pt. 2)

S6 (S2 · S5)'	S7 (B · B)'	S8 (A · S7)'	S9 (S8 · S8)'	S10 (S9 · C)'	S11 (S6 · S10)'	S12 (S11 · S11)'
1	1	1	0	1	0	1
1	1	1	0	1	0	1
1	1	1	0	1	0	1
1	1	1	0	1	0	1
1	0	1	0	1	0	1
1	0	1	0	1	0	1
1	0	1	0	1	0	1
1	0	1	0	1	0	1
1	1	0	1	1	0	1
1	1	0	1	1	0	1
1	1	0	1	0	1	0
1	1	0	1	0	1	0
1	0	1	0	1	0	1
0	0	1	0	1	1	0
1	0	1	0	1	0	1
1	0	1	0	1	0	1

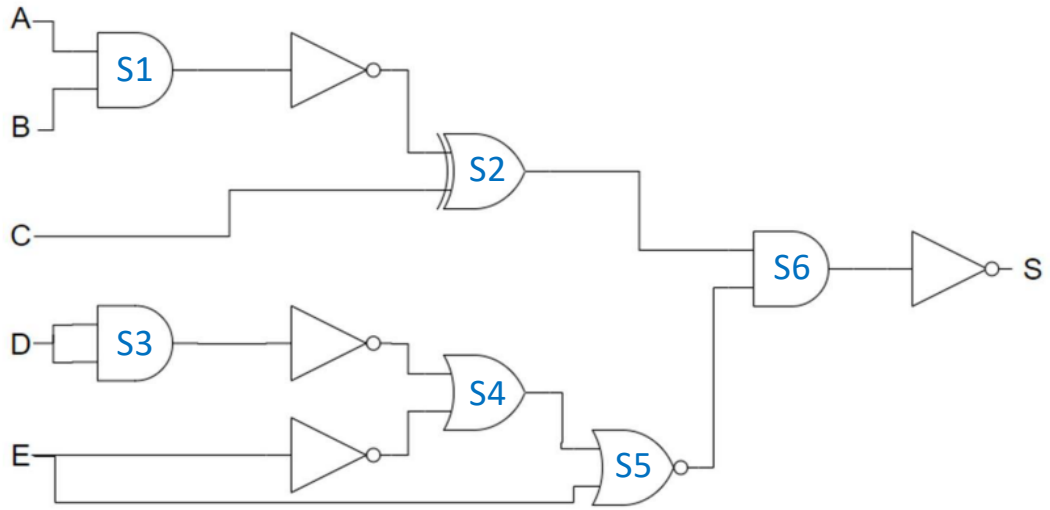
Funció del circuit

(((((A · B)' · (A · B)')' · (((C · C)' · D)' · ((C · C)' · D)')')' · (((A · (B · B)')' · (A · (B · B)')')' · C)')'

.

((((A · B)' · (A · B)')' · (((C · C)' · D)' · ((C · C)' · D)')')' · (((A · (B · B)')' · (A · (B · B)')')' · C)')')'

e)



Taula de veritat

A	B	C	D	E	A'	B'	C'	D'	E'	S1 (A · B)'	S2 S1 ⊕ C	S3 (D · D)'	S4 S3 + E'	S5 (S4 + E)'	S6 (S2 · S5)'
0	0	0	0	0	1	1	1	1	1	1	1	1	1	0	1
0	0	0	0	1	1	1	1	1	0	1	1	1	1	0	1
0	0	0	1	0	1	1	1	0	1	1	1	0	1	0	1
0	0	0	1	1	1	1	1	0	0	1	1	0	0	0	1
0	0	1	0	0	1	1	0	1	1	1	0	1	1	0	1
0	0	1	0	1	1	1	0	1	0	1	0	1	1	0	1
0	0	1	1	0	1	1	0	0	1	1	0	0	1	0	1
0	0	1	1	1	1	1	0	0	0	1	0	0	0	0	1
0	1	0	0	0	1	0	1	1	1	1	1	1	1	0	1
0	1	0	0	1	1	0	1	1	0	1	1	1	1	0	1
0	1	0	1	0	1	0	1	0	1	1	1	0	1	0	1
0	1	0	1	1	1	0	1	0	0	1	1	0	0	0	1
0	1	1	0	0	1	0	0	1	1	1	0	1	1	0	1
0	1	1	0	1	1	0	0	1	0	1	0	1	1	0	1
0	1	1	1	0	1	0	0	0	1	1	0	0	1	0	1
0	1	1	1	1	1	0	0	0	0	1	0	0	0	0	1
1	0	0	0	0	0	1	1	1	1	1	1	1	1	0	1
1	0	0	0	1	0	1	1	1	0	1	1	1	1	0	1
1	0	0	1	0	0	1	1	0	1	1	1	0	1	0	1
1	0	0	1	1	0	1	1	0	0	1	1	0	0	0	1
1	0	1	0	0	0	1	0	1	1	1	0	1	1	0	1
1	0	1	0	1	0	1	0	1	0	1	0	1	1	0	1
1	0	1	1	0	0	1	0	0	1	1	0	0	1	0	1
1	0	1	1	1	0	1	0	0	0	1	0	0	0	0	1
1	1	0	0	0	0	0	1	1	1	0	0	1	1	0	1
1	1	0	0	1	0	0	1	1	0	0	0	1	1	0	1
1	1	0	1	0	0	0	1	0	1	0	0	0	1	0	1
1	1	0	1	1	0	0	1	0	0	0	0	0	0	0	1
1	1	1	0	0	0	0	0	1	1	0	1	1	1	0	1
1	1	1	0	1	0	0	0	1	0	0	1	1	1	0	1
1	1	1	1	0	0	0	0	0	1	0	1	0	1	0	1
1	1	1	1	1	0	0	0	0	0	0	1	0	0	0	1

Funció del circuit

$$(((A \cdot B)' \oplus C) \cdot (((D \cdot D)' + E') + E)')'$$