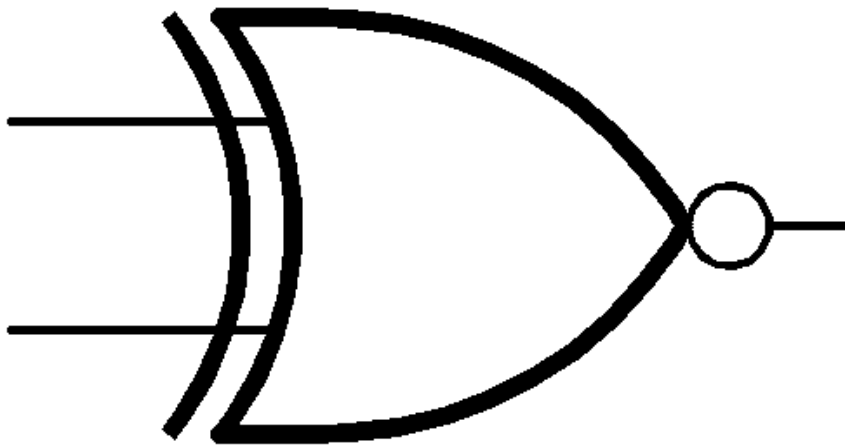
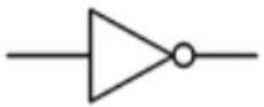
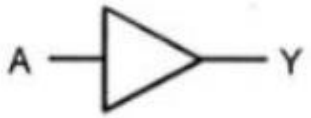
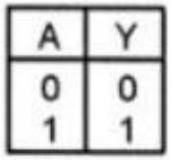
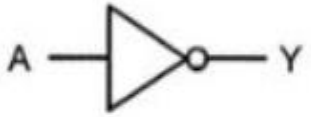
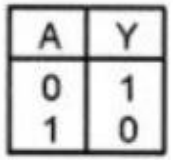
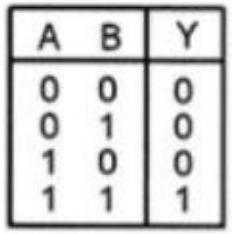
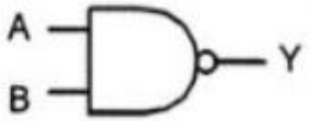
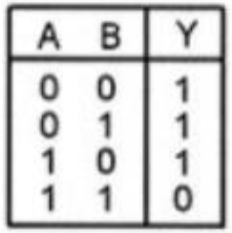


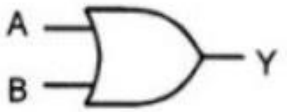
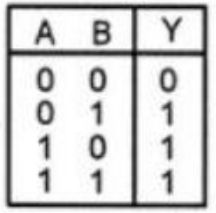
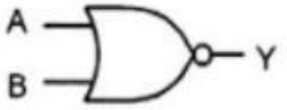
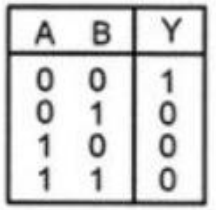
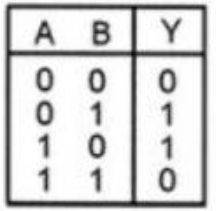
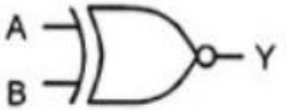
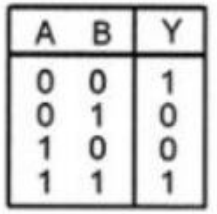
Boole grunnur, hlið, jöfnur og reglur

Rökrásarhlið, virkni og jöfnur hliða

AND		Útgangur hefur stöðuna 1 þegar allir inngangar hliðs hafa stöðuna 1	$X = A \cdot B$
OR		Útgangur hefur stöðuna 1 þegar einn eða fleiri inngangar hliðs hafa stöðuna 1	$X = A + B$
NAND		Útgangur hefur stöðuna 0 þegar allir inngangar hliðs hafa stöðuna 1, annars er útgangur = 1	$X = \overline{A \cdot B}$
NOR		Útgangur hefur stöðuna 0 þegar einn eða fleiri inngangar hliðs hafa stöðuna 1. Ef allir inngangar hafa stöðuna 0 er útgangur = 1	$X = \overline{A + B}$
XOR		Útgangur hefur stöðuna 1 þegar eingöngu einn inngangur hliðs hefur stöðuna 1, annars er útgangur = 0	$X = A \oplus B$
XNOR		Útgangur hefur stöðuna 0 þegar eingöngu einn inngangur hliðs hafa stöðuna 1, annars er útgangur 1	$X = \overline{A \oplus B}$
NOT		Útgangur hefur stöðuna 1 þegar inngangur hliðs hefur stöðuna 0, en stöðuna 1 þegar inngangur er = 0	$X = \overline{A}$

Rökrásarhlið ásamt jöfnum og sannleikstöflum

Virkni	Tákn	Sannleikstafla	Jafna
Buffer			$Y = A$
Innverter (NOT hlið)			$Y = \overline{A}$
Tveggja innganga AND hlið			$Y = A \bullet B$
Tveggja innganga NAND hlið			$Y = \overline{A \bullet B}$

Virkni	Tákn	Sannleikstafla	Jafna
Tveggja innganga OR hlið			$Y = A + B$
Tveggja innganga NOR hlið			$Y = \overline{A + B}$
Tveggja innganga X-OR hlið			$Y = A \oplus B$
Tveggja innganga X-NOR hlið			$Y = \overline{A \oplus B}$

Bool reglur

Name	AND form	OR form
Identity law	$1A = A$	$0 + A = A$
Null law	$0A = 0$	$1 + A = 1$
Idempotent law	$AA = A$	$A + A = A$
Inverse law	$A\bar{A} = 0$	$A + \bar{A} = 1$
Commutative law	$AB = BA$	$A + B = B + A$
Associative law	$(AB)C = A(BC)$	$(A + B) + C = A + (B + C)$
Distributive law	$A + BC = (A + B)(A + C)$	$A(B + C) = AB + AC$
Absorption law	$A(A + B) = A$	$A + AB = A$
De Morgan's law	$\overline{AB} = \bar{A} + \bar{B}$	$\overline{A + B} = \bar{A}\bar{B}$

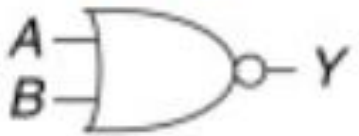
Regla De Morgan

NAND

$$Y = \overline{AB} = \overline{A} + \overline{B}$$

A	B	Y
0	0	1
0	1	1
1	0	1
1	1	0

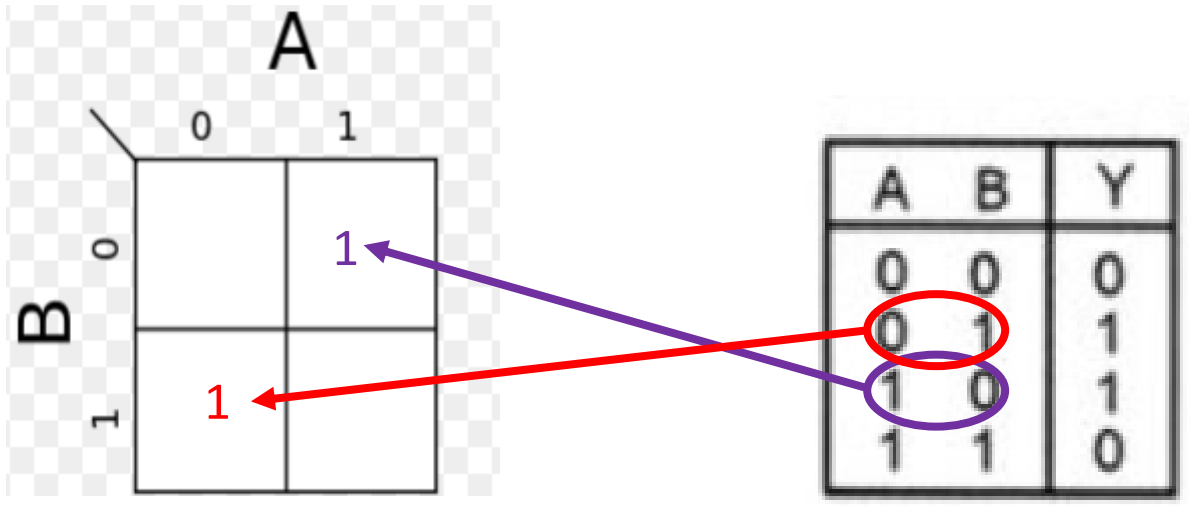
NOR



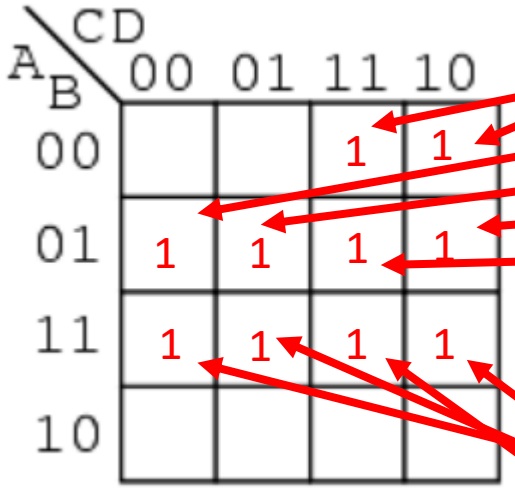
$$Y = \overline{A + B} = \overline{A}\,\overline{B}$$

A	B	Y
0	0	1
0	1	0
1	0	0
1	1	0

Karnough kort



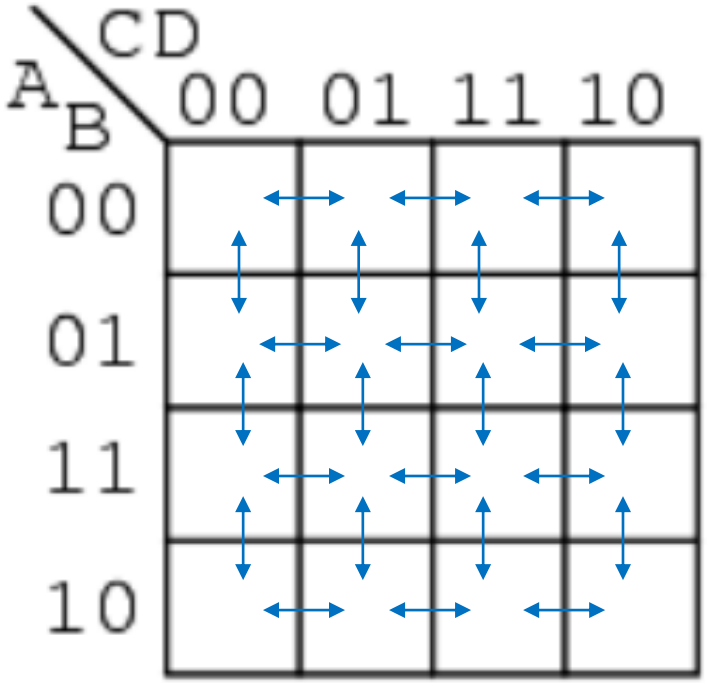
Karnough kort

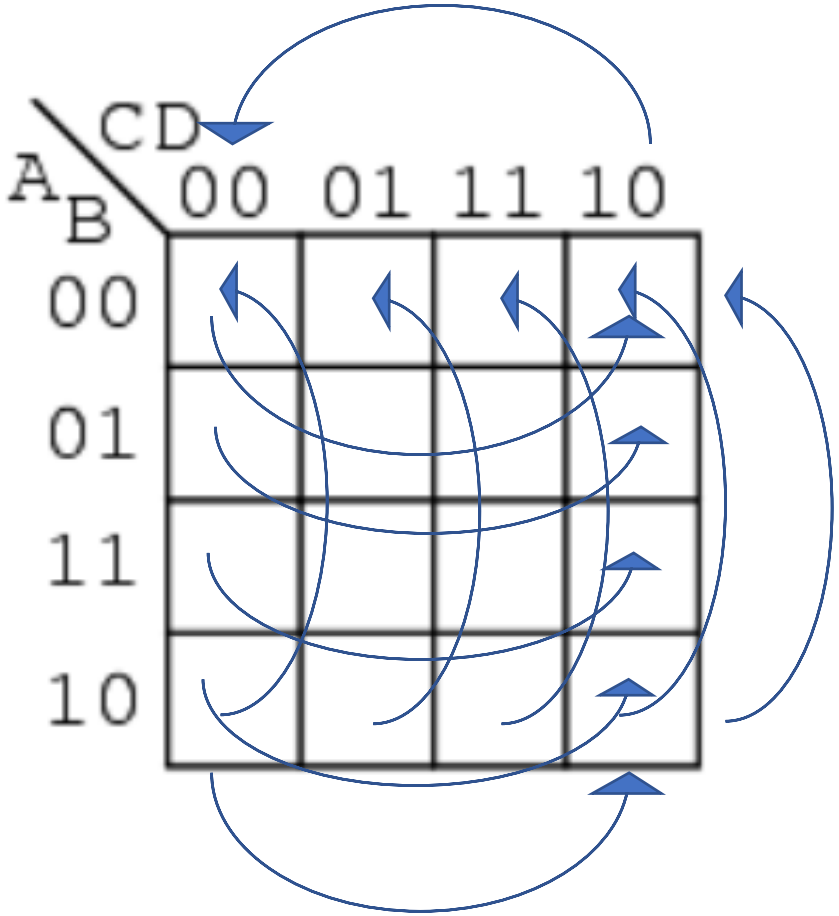


A	B	C	D	X
0	0	0	0	0
0	0	0	1	0
0	0	1	0	1
0	0	1	1	1
0	1	0	0	1
0	1	0	1	1
0	1	1	0	1
0	1	1	1	1
1	0	0	0	0
1	0	0	1	0
1	0	1	0	0
1	0	1	1	0
1	1	0	0	1
1	1	0	1	1
1	1	1	0	1
1	1	1	1	1

Karnough kort

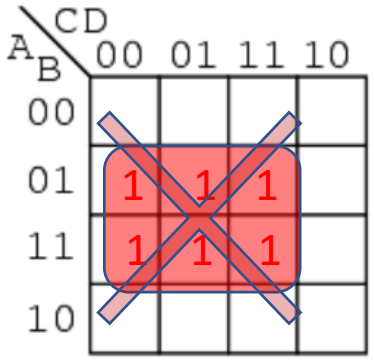
Pörun reita í Karnough kortum.

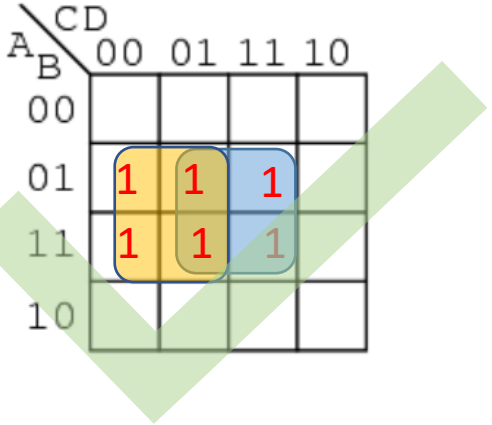




Karnough kort

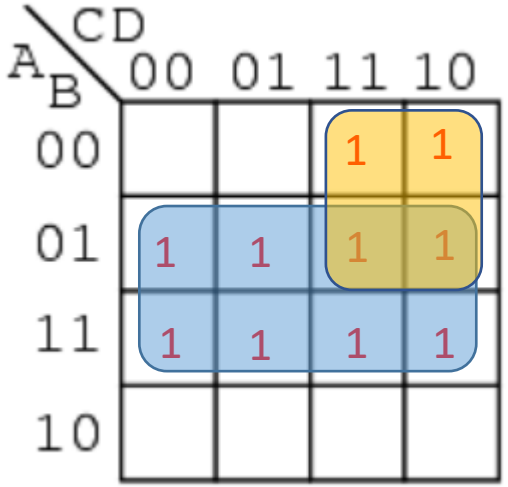
Pörun reita í Karnough kortum.

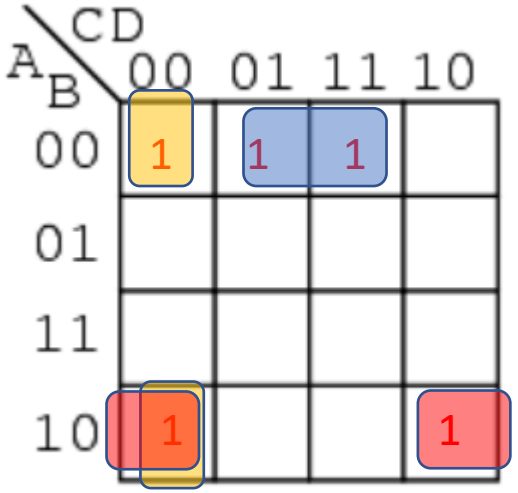




Karnough kort

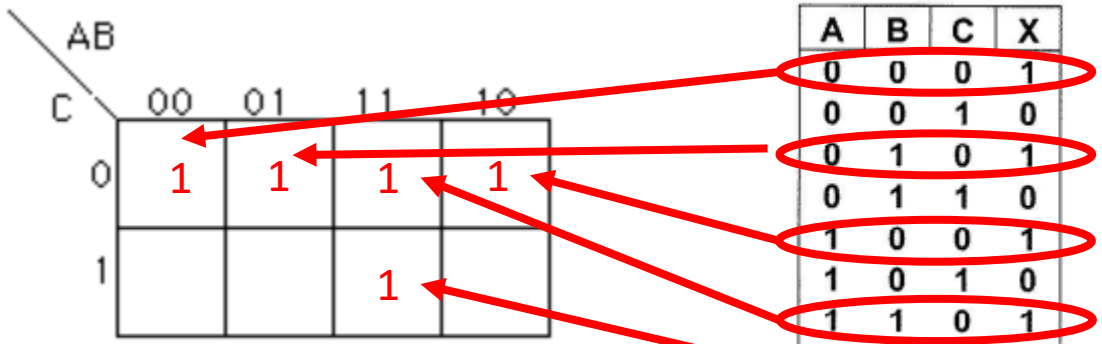
Pörun reita í Karnough kortum.



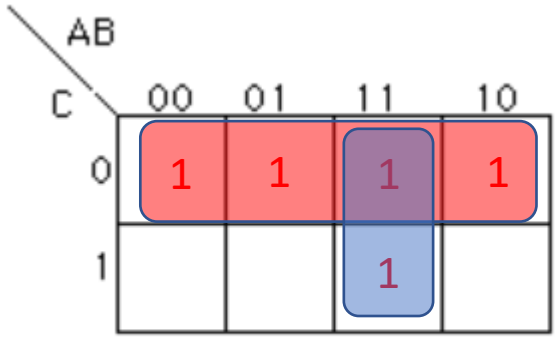


Karnough kort

Pörun reita í Karnough kortum.

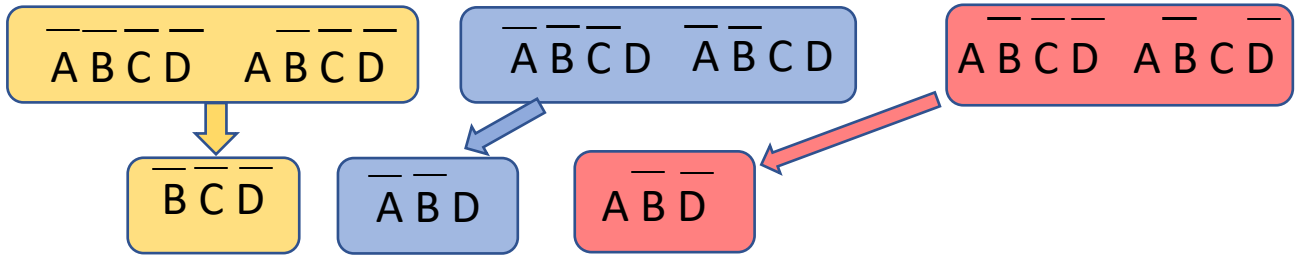


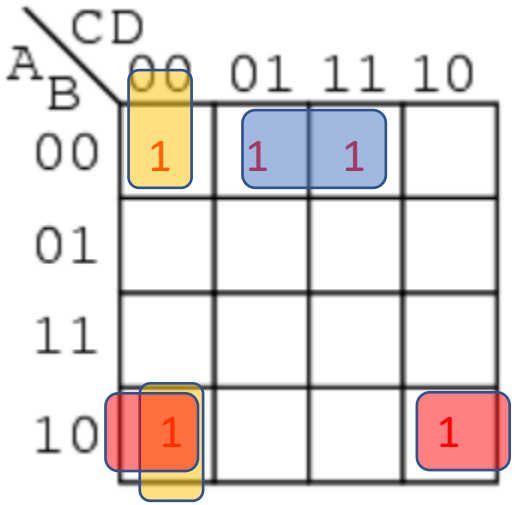
A	B	C	X
0	0	0	1
0	0	1	0
0	1	0	1
0	1	1	0
1	0	0	1
1	0	1	0
1	1	0	1
1	1	1	1



Karnough kort

Einföldun jafna með Karnough kortum.

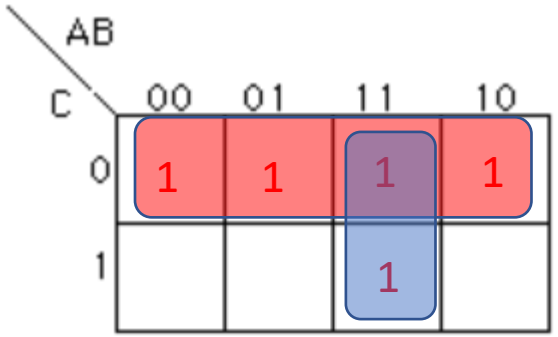




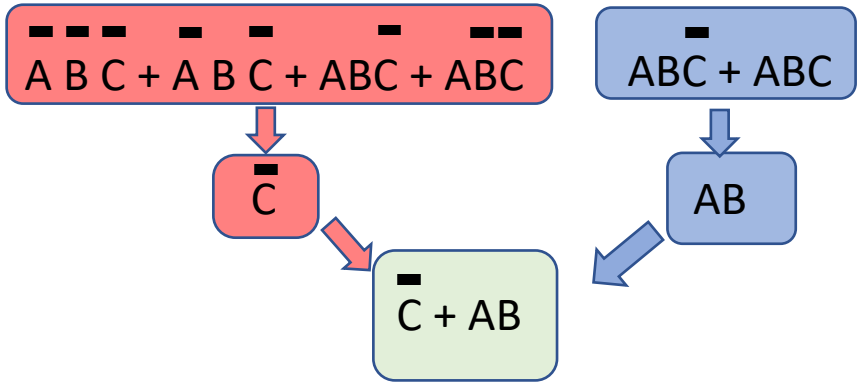
Karnough kort

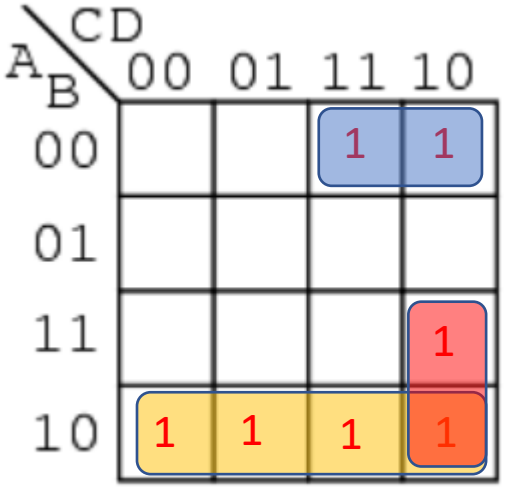
Einföldun jafna með Karnough kortum.

Einföldun jafna með Karnough kortum. (Dæmi 4 og 1 úr Könnun)

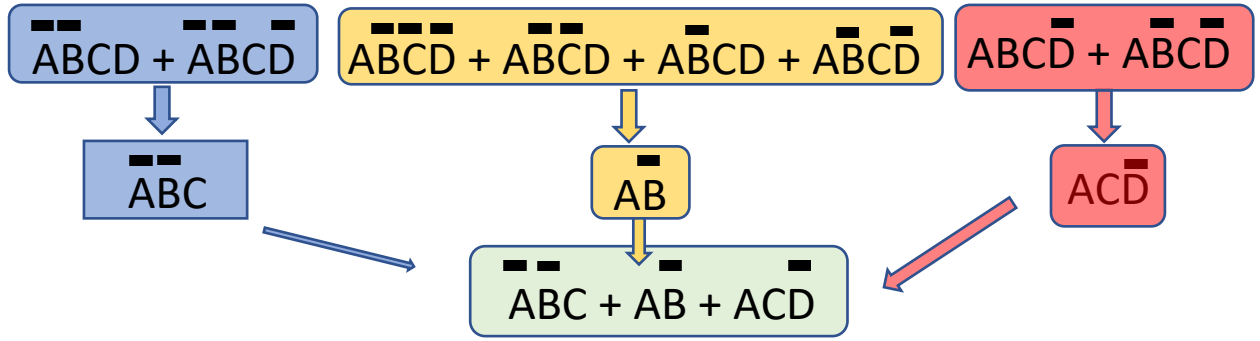


A	B	C	X
0	0	0	1
0	0	1	0
0	1	0	1
0	1	1	0
1	0	0	1
1	0	1	0
1	1	0	1
1	1	1	1



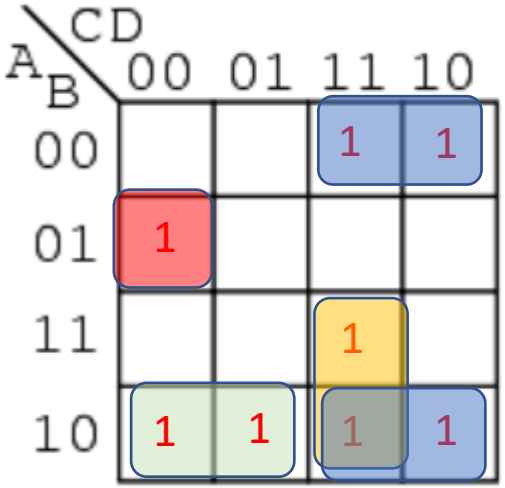


A	B	C	D	X
0	0	0	0	0
0	0	0	1	0
0	0	1	0	1
0	0	1	1	1
0	1	0	0	0
0	1	0	1	0
0	1	1	0	0
0	1	1	1	0
1	0	0	0	1
1	0	0	1	1
1	0	1	0	1
1	0	1	1	1
1	1	0	0	0
1	1	0	1	0
1	1	1	0	1
1	1	1	1	0



Karnough kort

Einföldun jafna með Karnough kortum. (Dæmi 5 úr Könnun)



A	B	C	D	X
0	0	0	0	0
0	0	0	1	0
0	0	1	0	1
0	0	1	1	1
0	1	0	0	1
0	1	0	1	0
0	1	1	0	0
0	1	1	1	0
1	0	0	0	1
1	0	0	1	1
1	0	1	0	1
1	0	1	1	1
1	1	0	0	0
1	1	0	1	0
1	1	1	0	0
1	1	1	1	1