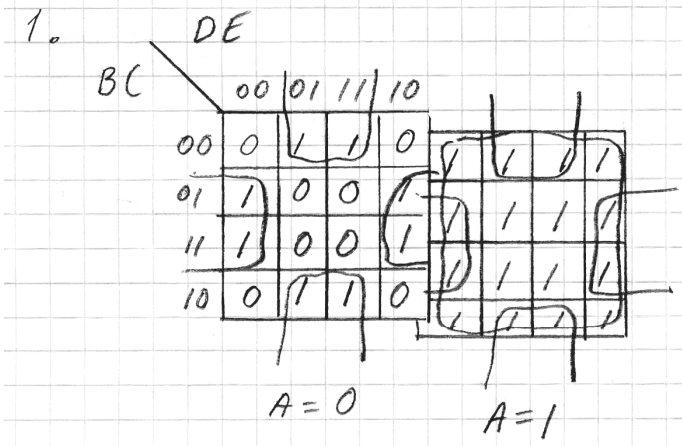
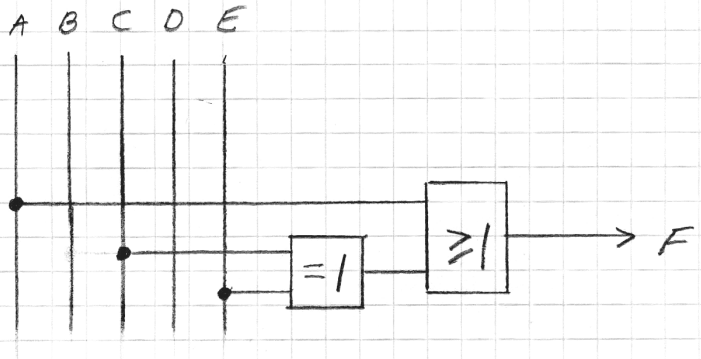
Lösningsförslag till dugga 2 i TMEL53 Digitalteknik 2015-02-04

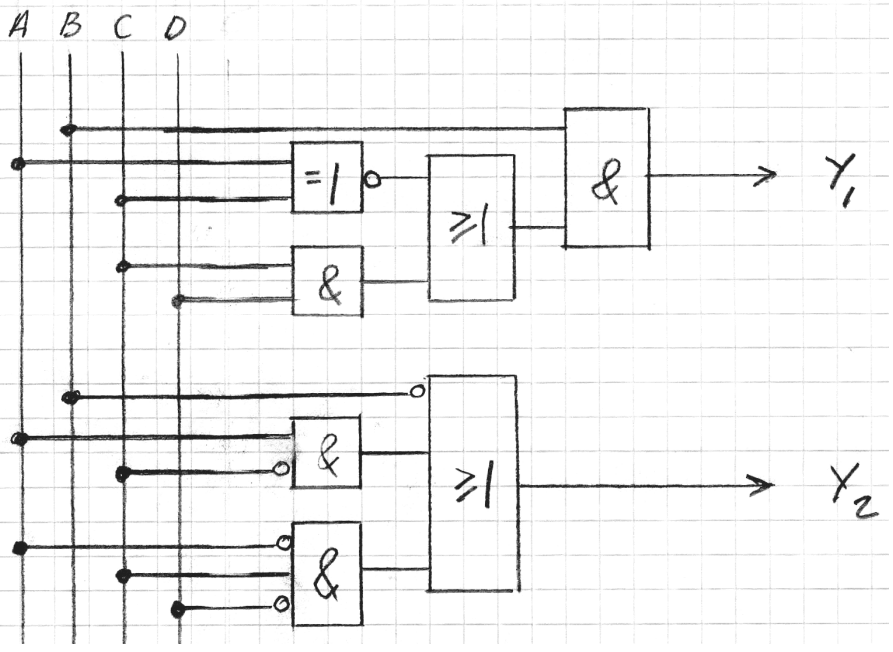
1.



$$F = A + C\bar{E} + \bar{C}E = A + (C \oplus E)$$



2a)



26/ STÄLL UPP FUNKTIONSTABELLER FÖR Y_1 OCH Y_2 OCH JÄMFÖR DEM.

A	B	C	D	$\overline{A \oplus C}$	CD	Y_1
0	0	0	0	1	0	0
0	0	0	1	1	0	0
0	0	1	0	0	0	0
0	0	1	1	0	1	0
0	1	0	0	1	0	1
0	1	0	1	1	0	1
0	1	1	0	0	0	0
0	1	1	1	0	1	1
1	0	0	0	0	0	0
1	0	0	1	0	0	0
1	0	1	0	1	0	0
1	0	1	1	1	1	0
1	1	0	0	0	0	0
1	1	0	1	0	0	0
1	1	1	0	1	0	1
1	1	1	1	1	1	1

A	B	C	D	$\bar{B}$	$A\bar{C}$	$\bar{A}C\bar{D}$	Y_2
0	0	0	0	1	0	0	0
0	0	0	1	1	0	0	0
0	0	1	0	1	0	1	0
0	0	1	1	1	0	0	0
0	1	0	0	0	0	0	1
0	1	0	1	0	0	0	1
0	1	1	0	0	0	1	0
0	1	1	1	0	0	0	1
1	0	0	0	1	1	0	0
1	0	0	1	1	1	0	0
1	0	1	0	1	0	0	0
1	0	1	1	1	0	0	0
1	1	0	0	0	1	0	0
1	1	0	1	0	1	0	0
1	1	1	0	0	0	0	1
1	1	1	1	0	0	0	1

AV TABELLERNA OVAN FRAMGÅR ATT $Y_2 = Y_1$ V. S. V.

ALTERNATIV : ANVÄND BOOLESK ALGEBRA

$$Y_2 = \overline{\bar{B} + A\bar{C} + \bar{A}C\bar{D}} = \bar{\bar{B}} \cdot \overline{A\bar{C}} \cdot \overline{\bar{A}C\bar{D}} =$$

$$= B(\bar{A} + C)(A + \bar{C} + D) = (\bar{A}B + BC)(A + \bar{C} + D)$$

$$= \underbrace{A\bar{A}B}_{0} + \bar{A}B\bar{C} + \bar{A}BD + ABC + \underbrace{BC\bar{C}}_{0} + BCD$$

$$= B(\bar{A}\bar{C} + \bar{A}D + AC + CD) =$$

$$= B(\bar{A}\bar{C} + \bar{A}(\bar{C} + C)D + AC + CD) =$$

$$= B(\bar{A}\bar{C} + \bar{A}\bar{C}D + \bar{A}CD + AC + CD) =$$

$$= B(\bar{A}\bar{C}(\underbrace{1 + D}_{1}) + CD(\underbrace{\bar{A} + 1}_{1}) + AC) =$$

$$= B(\bar{A}\bar{C} + AC + CD) =$$

$$= B((\overline{A \oplus C}) + CD) = Y_1 \qquad \text{V. S. V.}$$