המכללה האקדמית להנדסה בת"א
המגמה להנדסת תוכנה וניהול

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תרגיל בית מס' 3 – פתרון
מערכות ספרתיות

מקרא:

סמל	משמעות
'	NOT
+	OR
*	AND

שאלה מספר 1

א.

X = A + (B*C+A*B)'
= A + (B*C)' * (A*B)'
= (A + (B*C)') * (A + (A*B)')
= (A + B' + C') * (A + A' + B')
= (A + B' + C') * (1 + B')
= (A + B' + C') * 1
= (A + B' + C')

ב.

X = A*B + (A*B + A*C)'
= A*B + (A*B)' * (A*C)'
= (A*B + (A*B)') * ((A*B) + (A * C)')
= (A * B) + (A * C)'
= (A * B) + A' + C'
= (A' + A) * (A' + B) + C'
= A' + B + C'

ג.

A + (B + C)' + C'
= A + B'*C' + C'
= A + C' * (B' + 1)
= A + C'

ד.

A + B’ + (A*B + C)’
= A + B’ + (A*B)’ * C’
= A + (B’ + (A*B)’) * (B’ + C’)
= A + (B’ + A’ + B’) * (B’ + C’)
= A + (1 + A’) * (B’ + C’)
= A + B’ + C’

ה.

(A + A*B*C + B*C)’
= (A + B*C*(A+1))’
= (A + B*C)’

ו.

A + (A + (A*B))’
= A + (A * (1+B))’
= A + A’
= 1

ז.

A + (A*D + C*D)’ + C*D
= A + (A*B)’*(C*D)’ + C*D
= A + (A*B)’*(C*D)’ + (C*D)
= (A + (A*B)’) * (A + (C*D)’) + C*D
= A + A’ + B’) * (A + (C*D)’) + C*D
= 1*(A + (C*D)’) + C*D
= A + (C*D)’ + C*D
= A + 1
= 1

<u>שאלה מספר 2</u>

א. (A+B+C+D)’ = A’ * B’ * C’ * D’
ב. (A + B*C + A*C)’ = (A + B*C)’
ג. (A + (B’ * C*D) + D)’ = (A + D)’
ד. (A + B*C*D’ + D)’ = (A + B*C +D)’
ה. (A + B*C + (A*C)’)’ = 0

שאלה מספר 3

א. (A*B*C*D)' = A' + B' + C' + D'

ב. (A * (B*C)' * D)' = A' + B*C + D'

ג. (A + (B*C)' + (A*B*C'))' = A' B*C

ד. (A + (B *C' *D) + C*D)' = A' + B' + C' + D'

שאלה מספר 4

א. $Y = A'C'D' + AB'CD' + BC'D + ABCD'$

CD \ AB	00	01	11	10
00	1	1		
01	1	1	1	1
11				
10				

$Y = C'D + A'C'$

ב. $Y = AB'C'D + A'B'C' + A'BC + A'C'D'$

CD \ AB	00	01	11	10
00	1	1		
01	1			1
11		1		
10		1		

$Y = A'C'D' + B'C'D + A'BC$

ג. $Y = AB'C' + A'B'C + A'B'D + AC'D' + BC'D' + B'CD'$

CD \ AB	00	01	11	10
00				1
01	1	1		1
11	1			
10	1			

$Y = AB'C' + A'C'D + A'B'C$

שאלה מספר 5

$$F = \sum(1,2,4,11,15) = ACD + A'B'C'D + A'B'CD' + A'BC'D'$$
$$F = \sum(0,3,6,12,15) = A'B'C'D' + A'B'CD + A'BCD' + + ABC'D' + ABCD$$
$$F = \sum(3,8,10,11,12) = AC'D' + AB'C + B'CD$$
$$F = \sum(10,12,14,15) = ACD' + ABC + ABD'$$
$$F = \sum(1,2,3,7) = A'CD + A'B'D + A'B'C$$

שאלה מספר 6

$$F = \sum(1,2,4,11,15) + \sum\phi(3,12) = ACD + BC'D' + A'B'(D + C)$$
$$F = \sum(0,6,15) + \sum\phi(3,10,11) = ACD + A'BCD' + A'B'C'D'$$
$$F = \sum(3,8,12) + \sum\phi(2,4) = AC'D' + A'B'C$$
$$F = \sum(1,10) + \sum\phi(2,5,6) = B'CD' + A'C'D$$
$$F = \sum(1,2,3,7) + \sum\phi(4) = A'CD + AB(C + D)$$