আন্তর্জাতিক ইসলামী বিশ্ববিদ্যালয় চট্টগ্রাম
الجامعة الإسلامية العالمية شيتاغونغ
International Islamic University Chittagong

ASSIGNMENT

COURSE CODE: CSE-2323
COURSE TITLE: Digital Logic Design
ASSIGNMENT NO: 01
ASSIGNMENT NAME: K-MAP

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SUBMISSION DATE: 11 March 2025

Remarks

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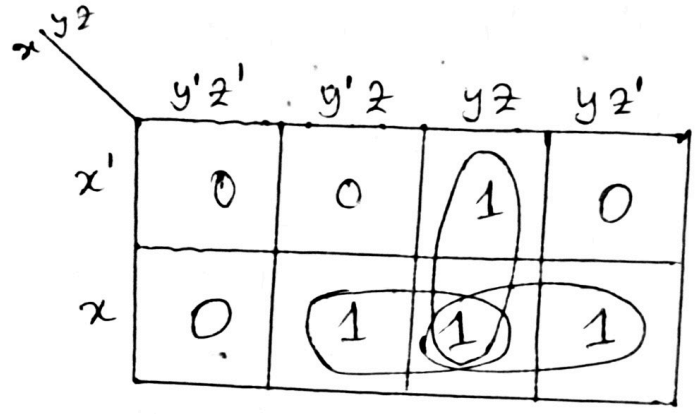
22. Simplify the following Boolean function using three Variable map.

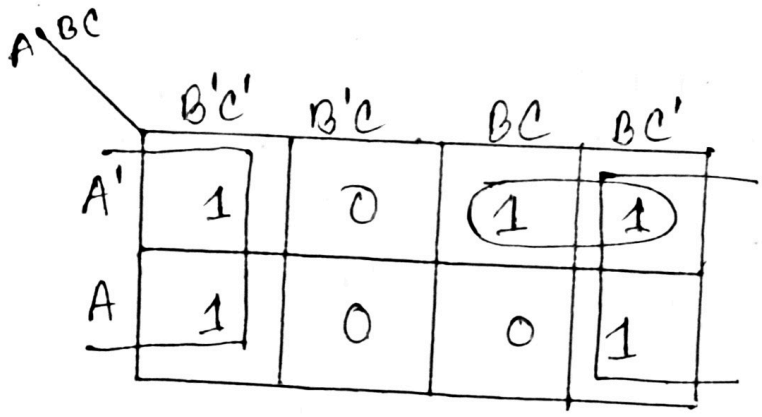
a). $f(x, y, z) = \sum (3, 5, 6, 7)$



∴ Simplified function $F = zx + xy + yz$

$= xy + yz + zx$

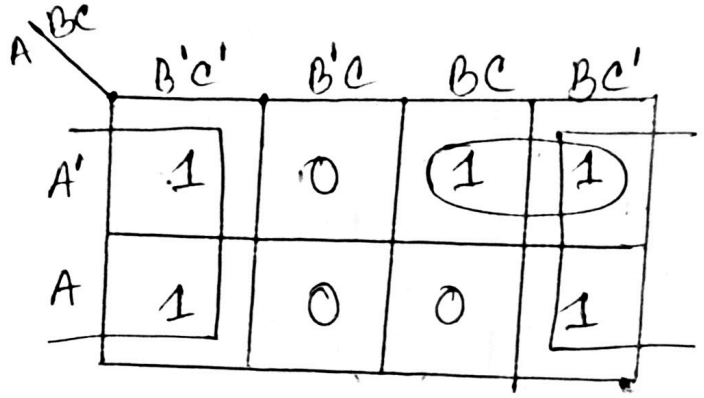
b) $F(A, B, C) = \sum (0, 2, 3, 4, 6)$



∴ Simplified function $F = C' + A'B$

3.2 Simplify the following boolean expression using three variable maps.

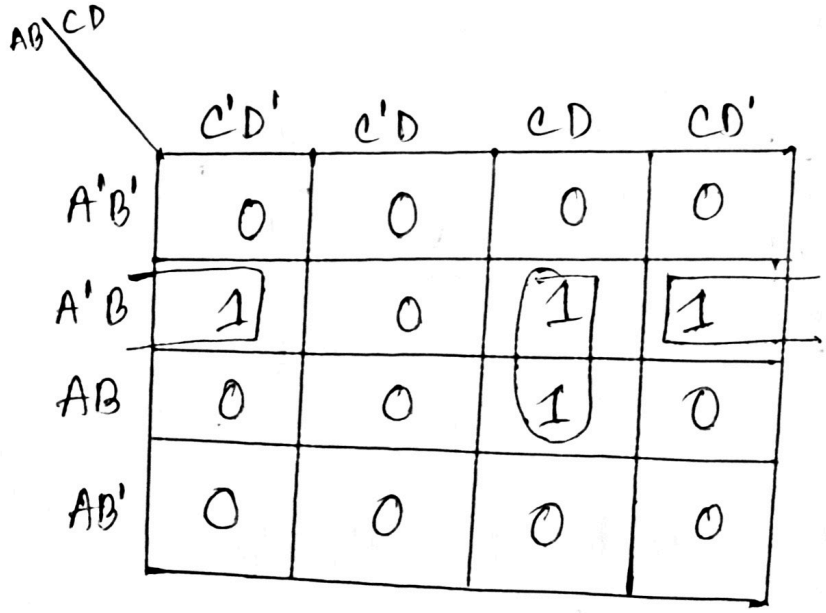
* $A'B + BC' + B'C'$



∴ Simplified function $F = C' + A'B$.

3.3 Simplify the following boolean functions using four variable maps.

* $F(A,B,C,D) = \sum(4, 6, 7, 15)$



∴ Simplified function $F = A'BD' + BCD$

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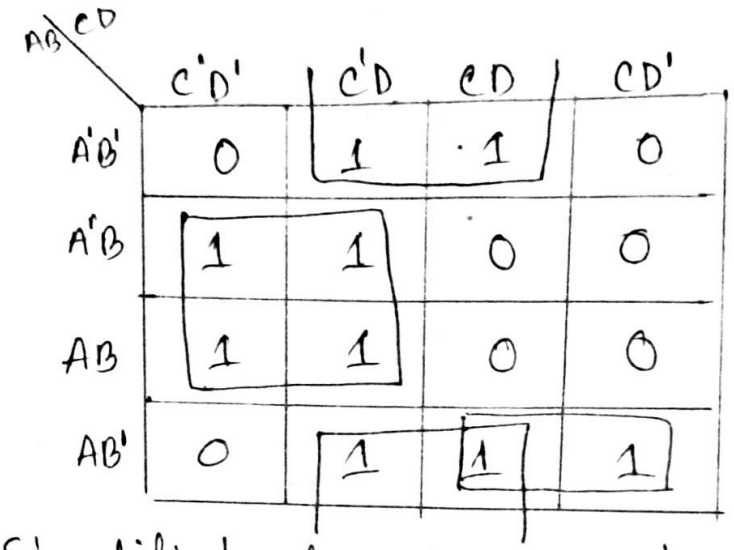
b) $F(A,B,C,D) = \Sigma\ (3,7,11,13,14,15)$

AB \ CD	C'D'	C'D	CD	CD'
A'B'	0	0	1	0
A'B	0	0	1	0
AB	0	1	1	1
AB'	0	0	1	0

∴ Simplified function $F = CD + ABD + ABC$

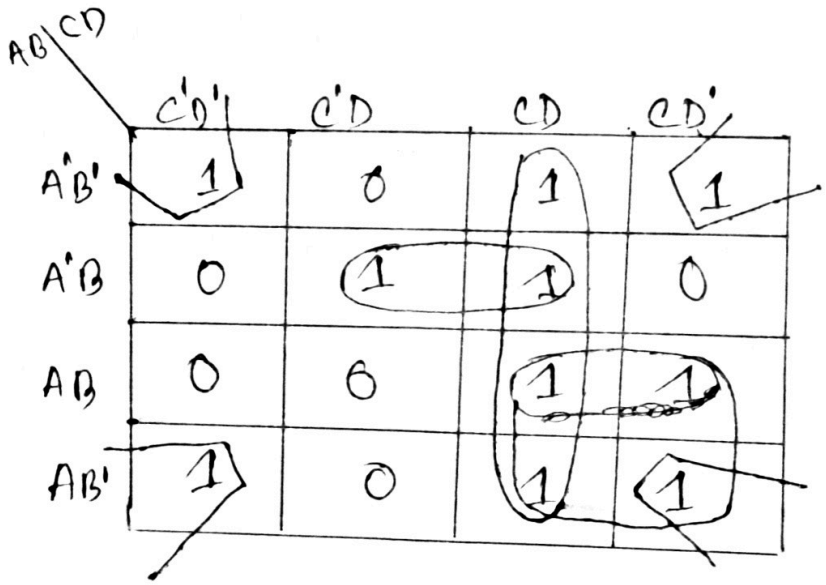
3.5 Simplify the following boolean expression using four variable maps.

a) $B'D + A'BC' + AB'C + ABC'$



∴ Simplified function $F = B'D + BC' + AB'C$

b) $AB'C + B'C'D' + BCD + ACD' + A'B'C + A'BC'D$



∴ Simplified function $F = \cancel{CD + A'BD + ABC + B'D'}$

$B'D' + CD + AC + A'BD$

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38 Simplify the following boolean functions using five variable maps.

a) $f(A,B,C,D,E) = \sum(0,2,3,4,5,6,7,11,15,16,18,19,23,27,31)$

$A = 0$

BC \ DE	D'E'	D'E	DE	DE'
B'C'	1	0	1	1
B'C	1	1	1	1
BC	0	0	1	0
BC'	0	0	1	0

$A = 1$

BC \ DE	D'E'	D'E	DE	DE'
B'C'	1	0	1	1
B'C	0	0	1	0
BC	0	0	1	0
BC'	0	0	1	0

∴ Simplified function $F = A'(DE + B'C + B'C'E') + A(DE + B'C'E')$

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b) $F = A'B'CE' + A'B'C'D' + B'D'E' + B'CD' + CDE' + BDE'$

$A = 0$ $\qquad\qquad$ $A = 1$

BC \ DE	D'E'	D'E	DE	DE'
B'C'	1	1	0	0
B'C	1	1	0	1
BC	0	0	0	1
BC'	0	0	0	1

BC \ DE	D'E'	D'E	DE	D'E'
B'C'	1	0	0	0
B'C	1	1	0	1
BC	0	0	0	1
BC'	0	0	0	1

∴ Simplified function $F = A'(B'D' + CDE' + BDE') + A(B'D'E' + B'CD' + CDE' + BDE')$

$= A'B'D' + A'CDE' + A'BDE' + AB'D'E' + AB'CD' + ACDE' + ABDE'$

$= A'B'D' + A'CDE' + ACDE' + A'BDE' + ABDE' + AB'D'E' + AB'CD'$

$= A'B'D' + CDE'(A' + A) + BDE'(A' + A) + AB'D'E' + AB'CD'$

$= A'B'D' + CDE' + BDE' + AB'D'E' + AB'CD'$