

COMPUTER SCIENCE & IT

DIGITAL LOGIC



Lecture No. 05

Combinational Circuit



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Recap of Previous Lecture





Topics to be Covered

K-Map cont.



[Question]

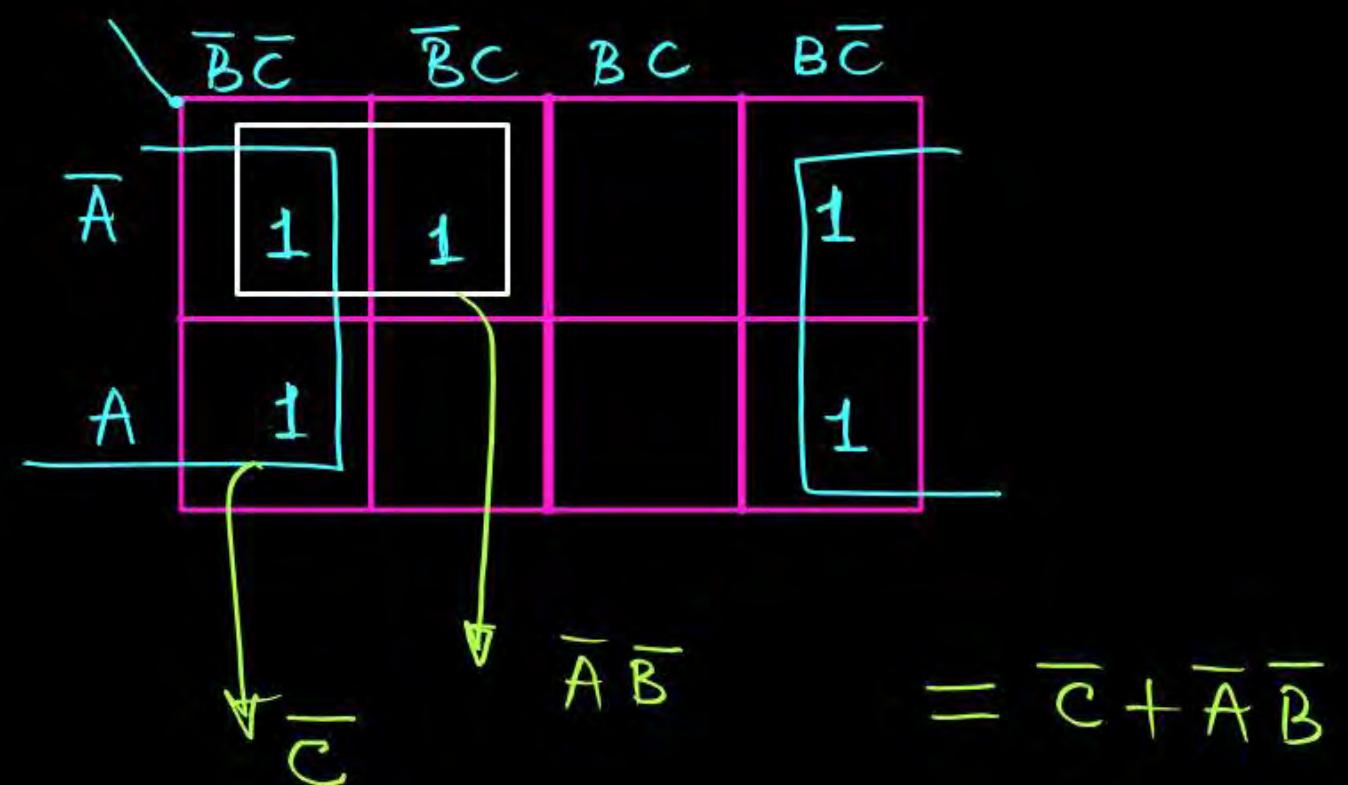
$$f(A, B, C) = \Sigma(0, 1, 3, 5, 7)$$

	$\bar{B}\bar{C}$	$\bar{B}C$	BC	$B\bar{C}$
\bar{A}	1	1	1	
A		1	1	
	$\bar{A}\bar{B}$		C	

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

[Question]

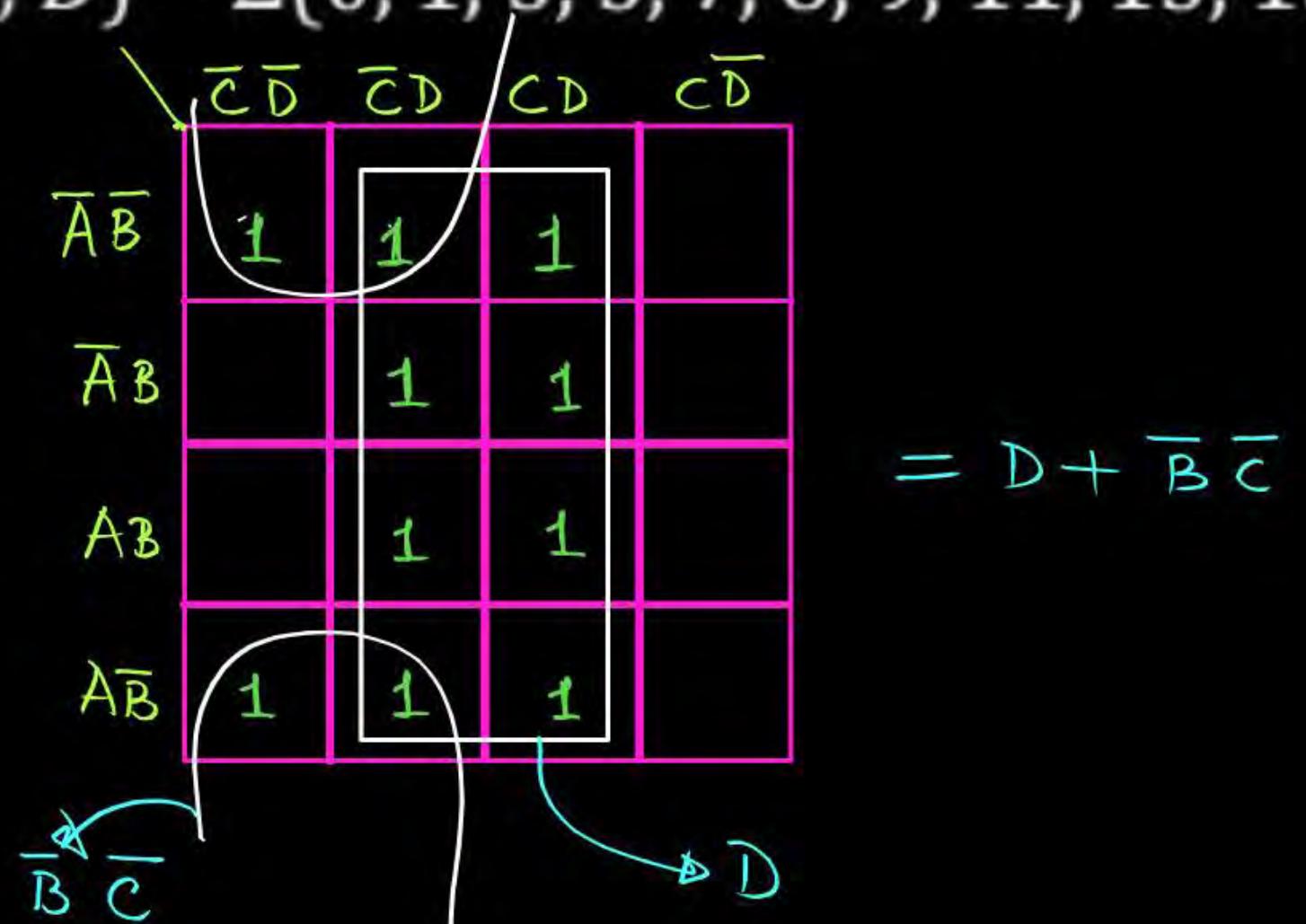
$$f(A, B, C) = \Sigma(0, 1, 2, 4, 6)$$



[Question]



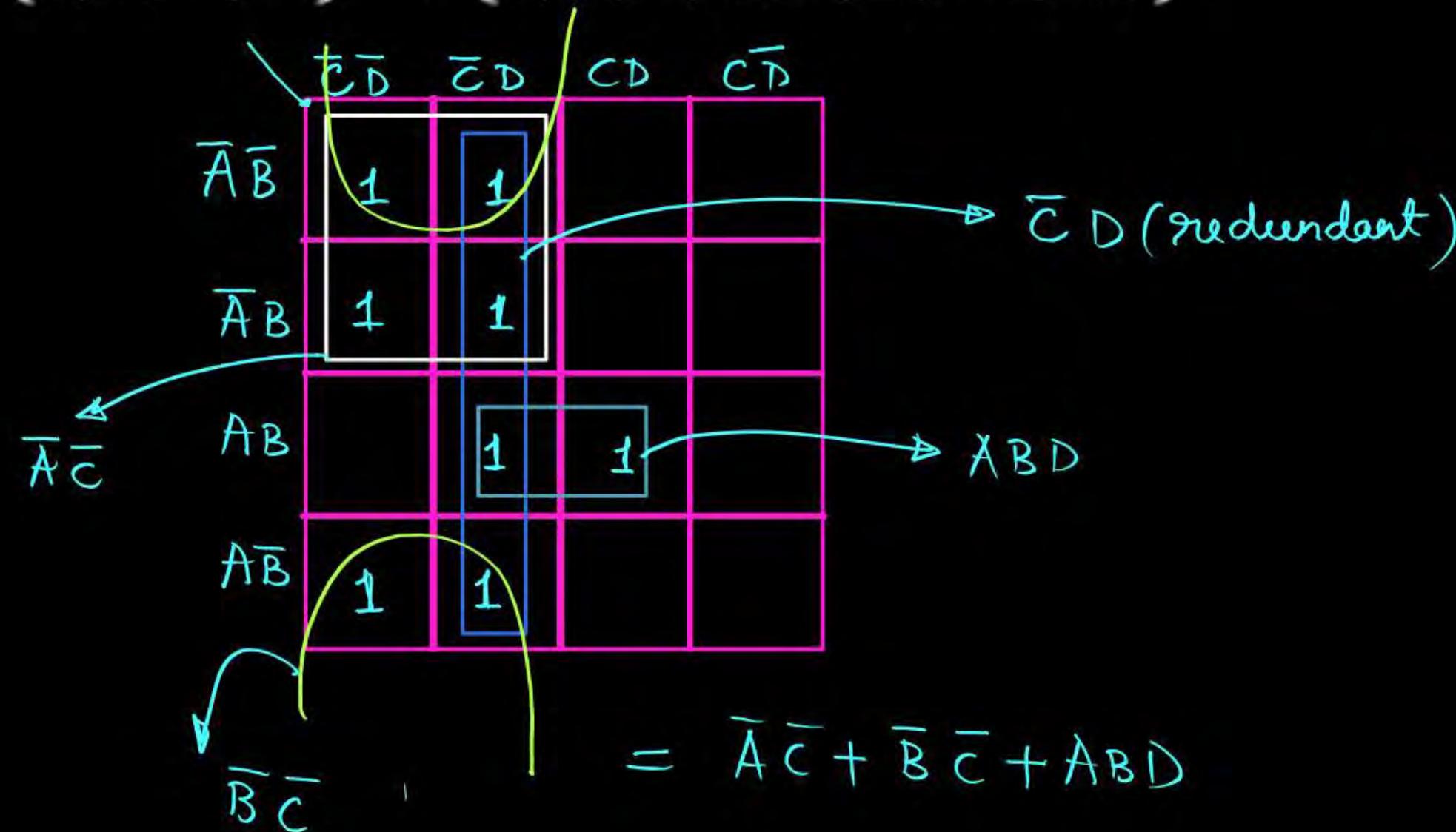
$$f(A, B, C, D) = \Sigma(0, 1, 3, 5, 7, 8, 9, 11, 13, 15)$$



$$= D + \bar{B} \bar{C}$$

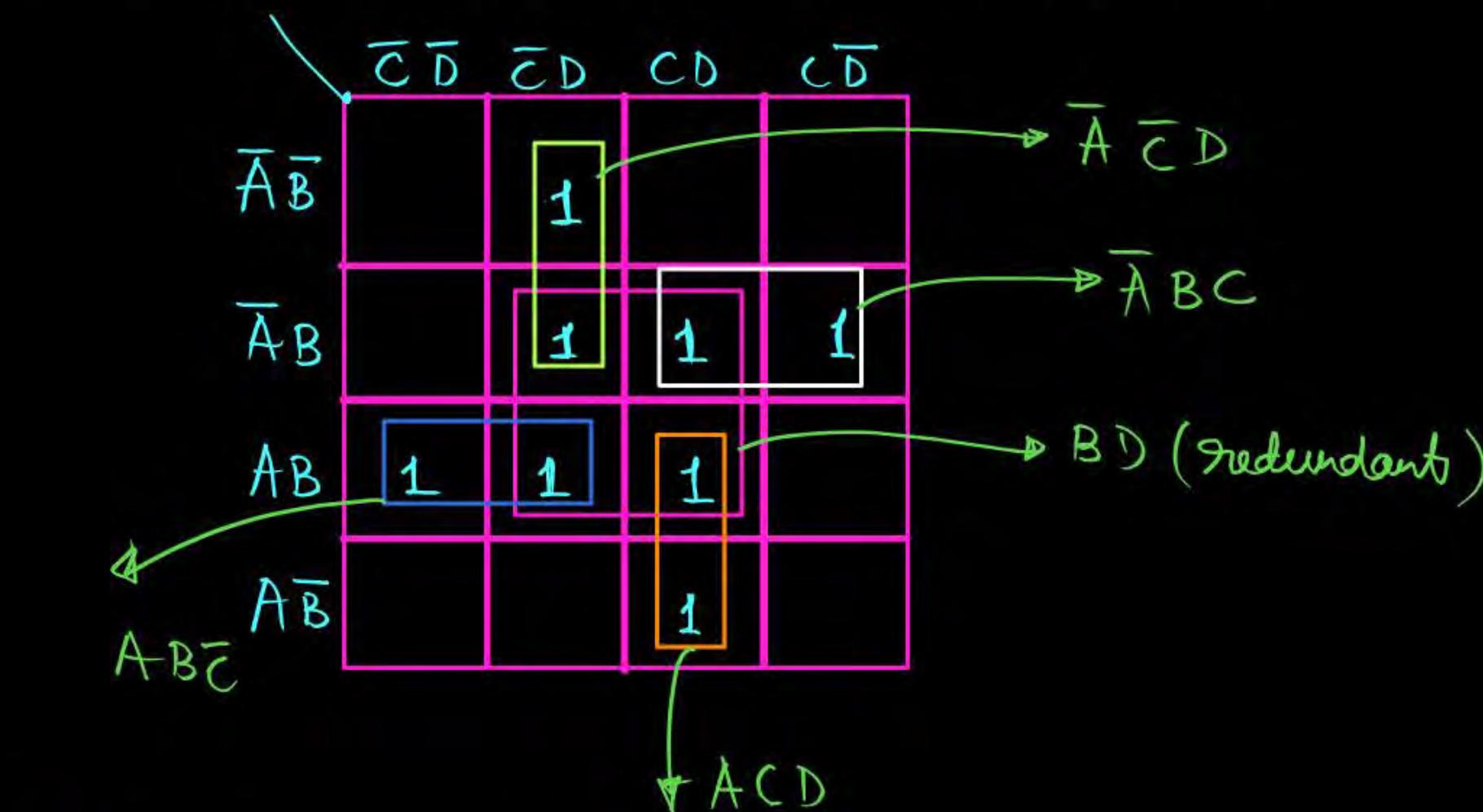
[Question]

$$f(A, B, C, D) = \Sigma(0, 1, 4, 5, 8, 9, 13, 15)$$



[Question]

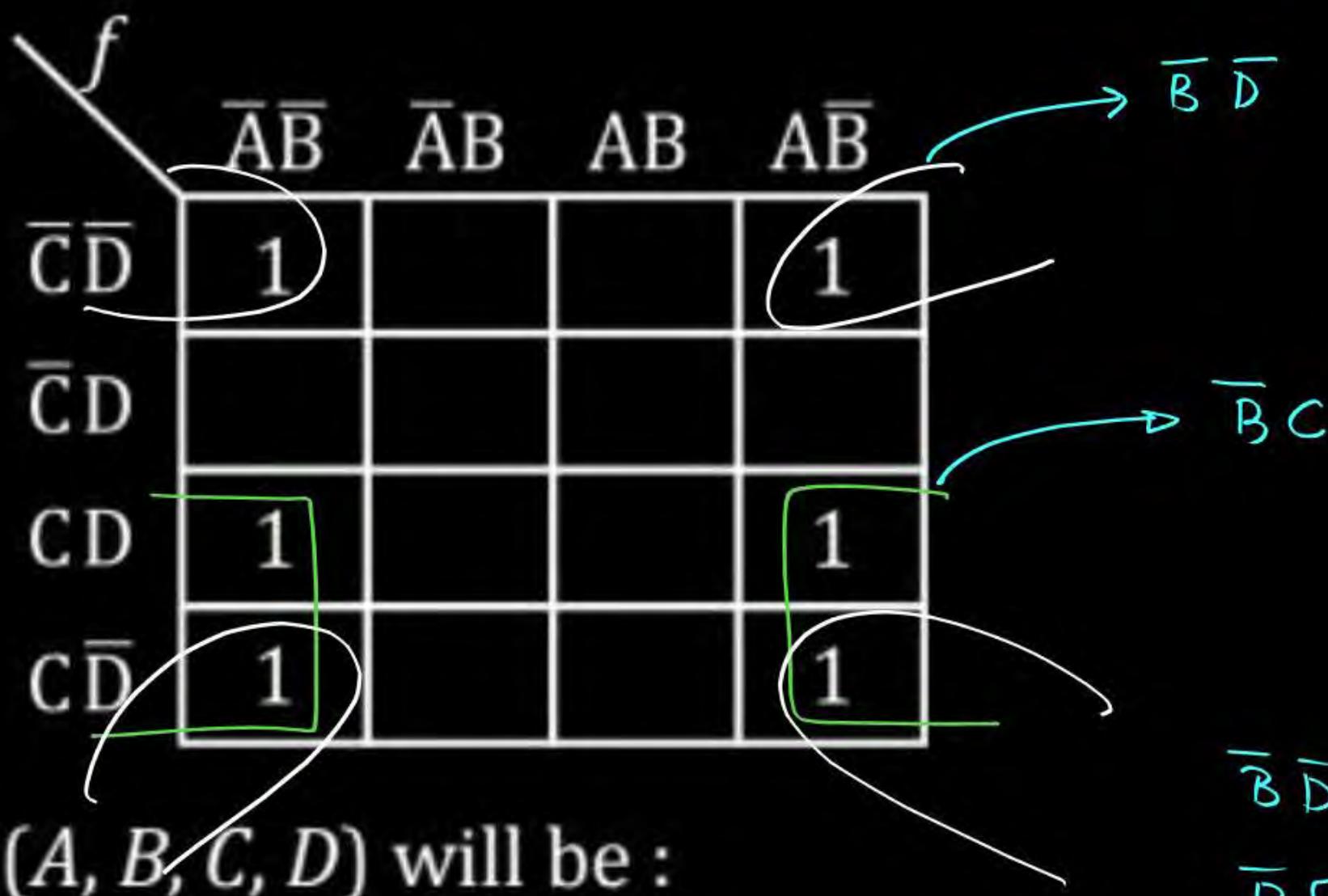
$$f(A, B, C, D) = \Sigma(1, 5, 6, 7, 11, 12, 13, 15)$$



$$= AB\bar{C} + \bar{A}BC + ACD + \bar{A}\bar{C}D$$

[Question]

A K-map is given as :



Minimized expression of $f(A, B, C, D)$ will be :

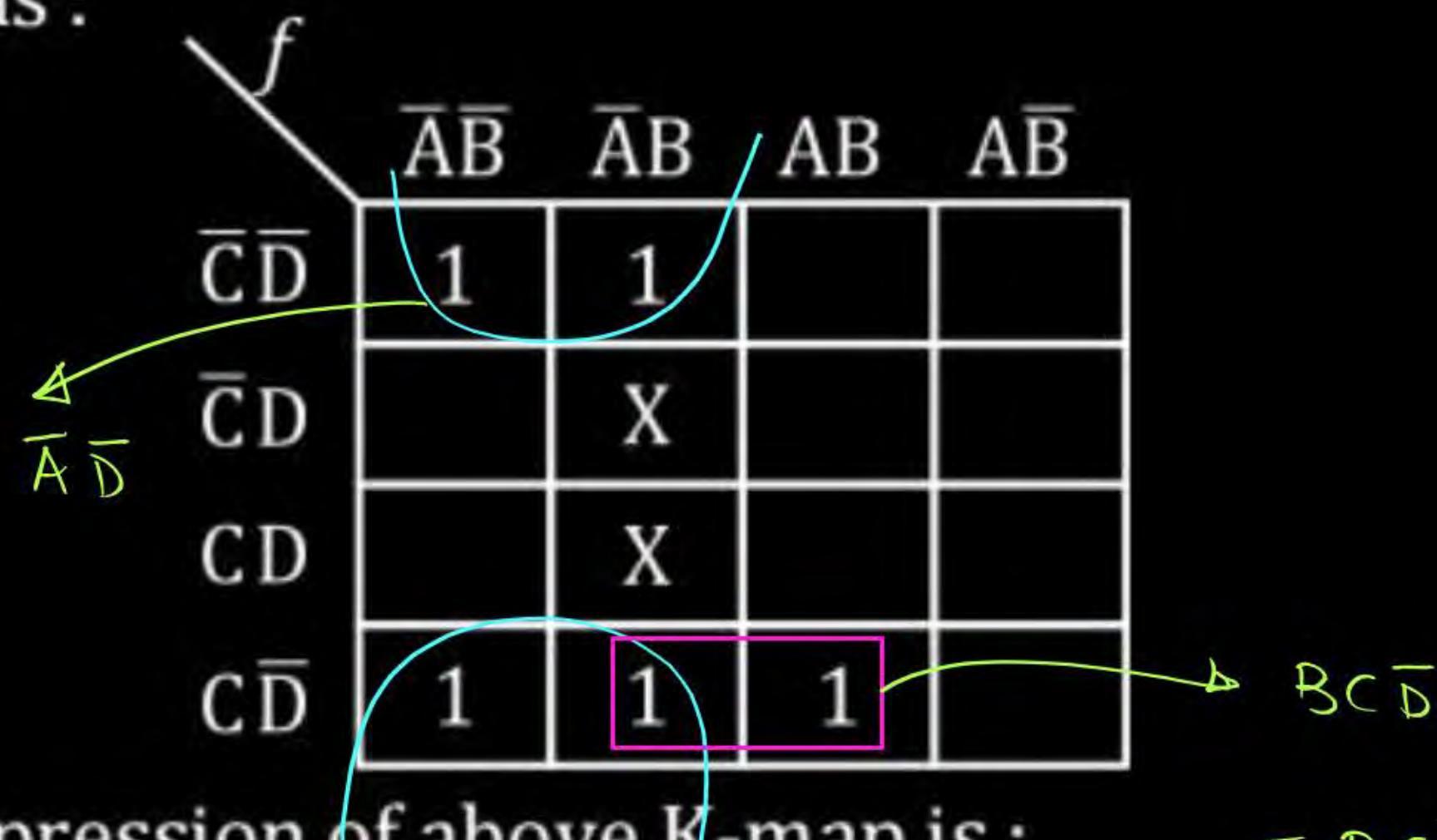
- (a) $\bar{B}(C + \bar{D})$
- (b) $\bar{A}\bar{B}C + A\bar{B}C + \bar{B}\bar{C}D$
- (c) $\bar{A}\bar{B} + \bar{C}\bar{D}$
- (d) None of these

$$\begin{aligned} & \bar{B}\bar{D} + \bar{B}C \\ & \bar{B}(C + \bar{D}) \end{aligned}$$



[Question]

A K-map is given as :



- The minimized expression of above K-map is : $= \bar{B}C\bar{D} + \bar{A}\bar{D}$
- (a) $\bar{A}B + \bar{A}\bar{D} + BCD$
 - (b) $\bar{A}\bar{D} + BCD$
 - (c) $\bar{A}\bar{B}\bar{D} + \bar{A}B + BCD$
 - (d) None of these

[Question]

$$\begin{array}{c} 100 \rightarrow 4 \\ 110 \rightarrow 6 \\ 111 \rightarrow 7 \end{array} = \Sigma (3, 4, 5, 6, 7)$$

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

$$\begin{array}{c} 101 \quad 011 \rightarrow 3 \\ 111 \rightarrow 7 \end{array}$$

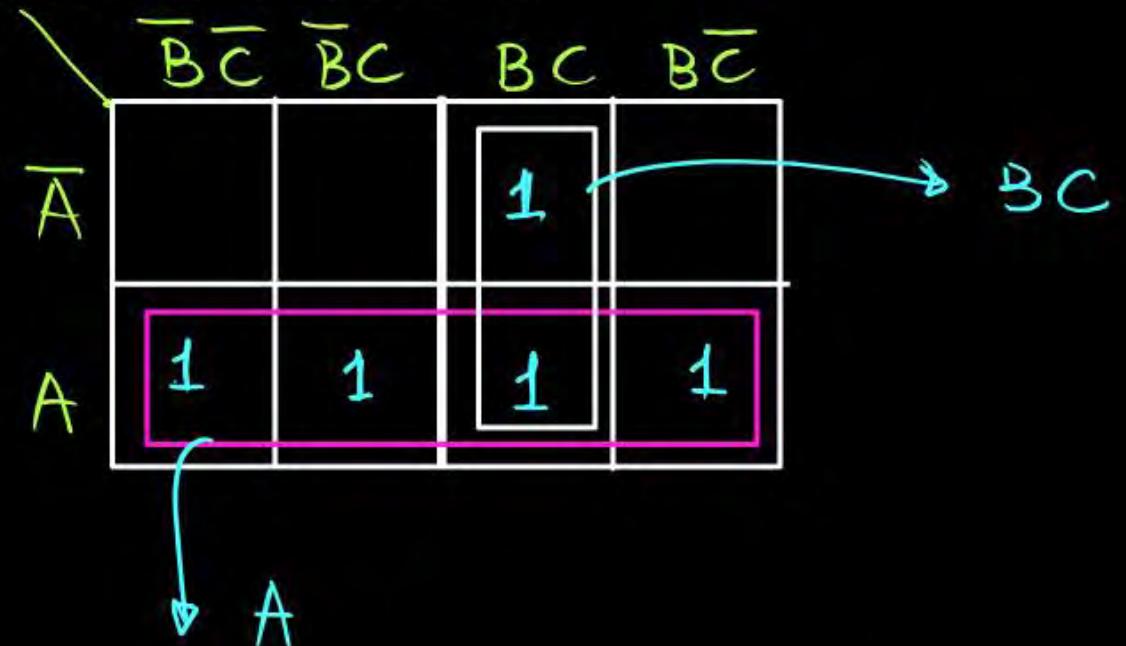
Then its minimized expression will be

(a) ~~$(A + B)(A + C) = (A + BC)$~~

(b) $A \odot C + BC$

(c) $\bar{A} + BC$

(d) None of these



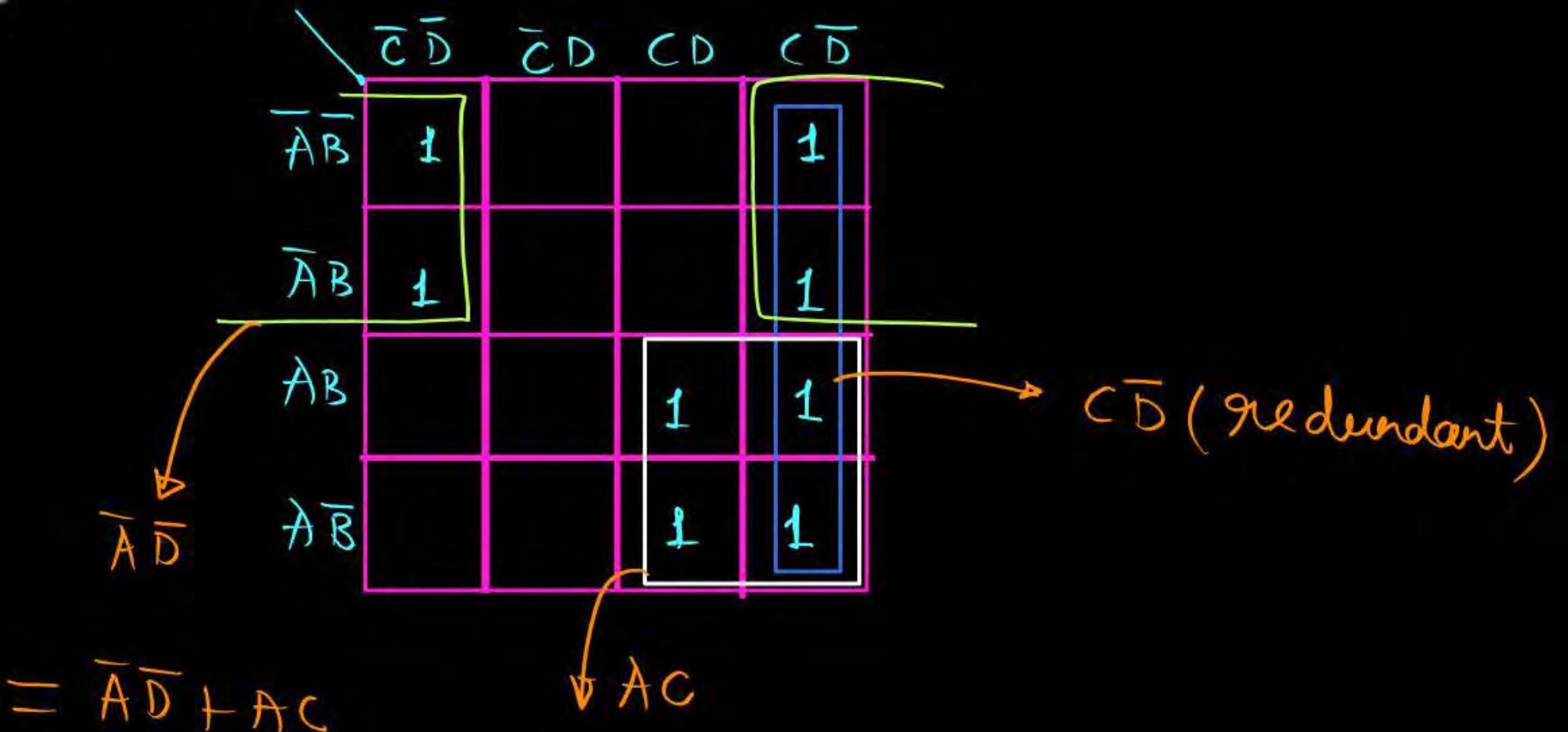
$$= A + BC = (A + B)(A + C)$$

[Question]

$$f(A, B, C, D) = \bar{A}\bar{D} + BCD + AC$$

Then its minimized expression will be

- (a) ~~$\bar{A}\bar{D} + AC$~~
- (b) $\bar{A}\bar{D} + BC$
- (c) $BC + AC$
- (d) $\bar{A}\bar{D} + C\bar{D}$



Question

$$f_1(A, B, C) = \overline{A}C + B\overline{C}$$



$$f(A, B, C) = \overline{\bar{A}C + B\bar{C}} + AB\bar{C} = \overline{f_1(A, B, C)} + AB\bar{C}$$

Then its minimized expression will be

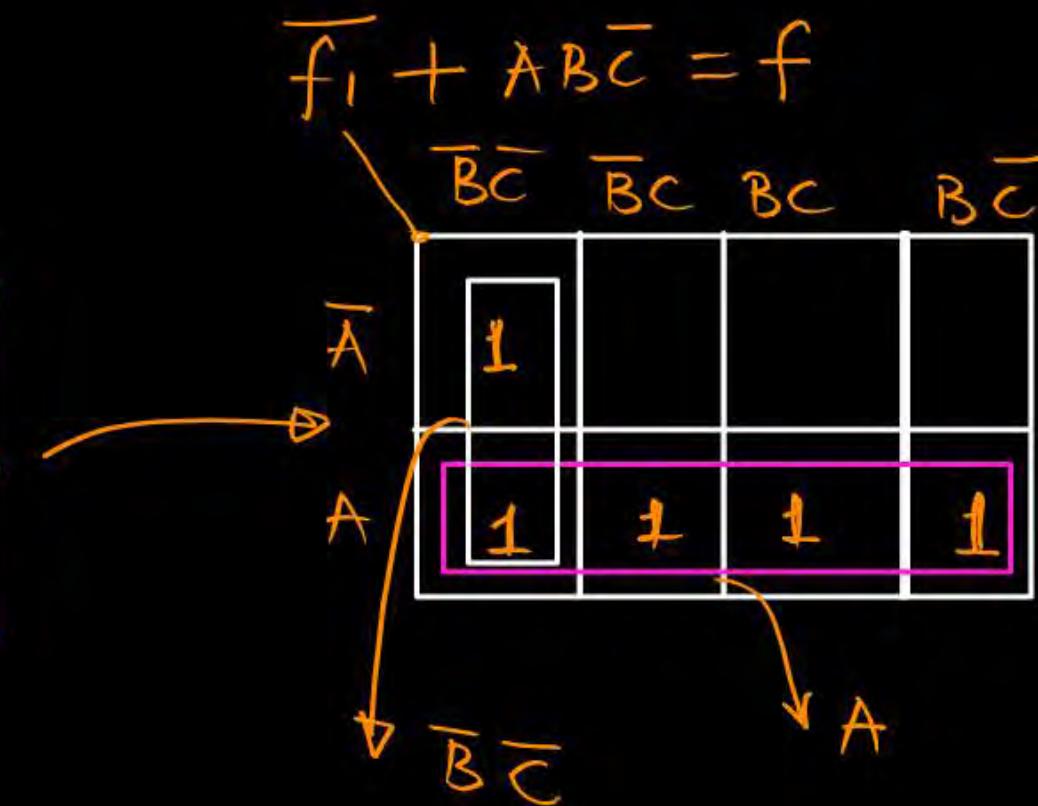
- (a) $(A + \bar{B})(A + \bar{C})$

(b) $A\bar{C} + \bar{B}C$

(c) $\bar{A}\bar{B} + A\bar{C}$

(d) None of these

f_1	$\bar{B}\bar{C}$	$\bar{B}C$	BC	$B\bar{C}$
\bar{A}		1	1	1
A				1



$$= A + \bar{B} \bar{C}$$

	$\overline{B}\overline{C}$	$\overline{B}C$	BC	$B\overline{C}$
\overline{A}	1	.	.	.
A	1	1	1	1

$$A + \overline{B} \overline{C}$$

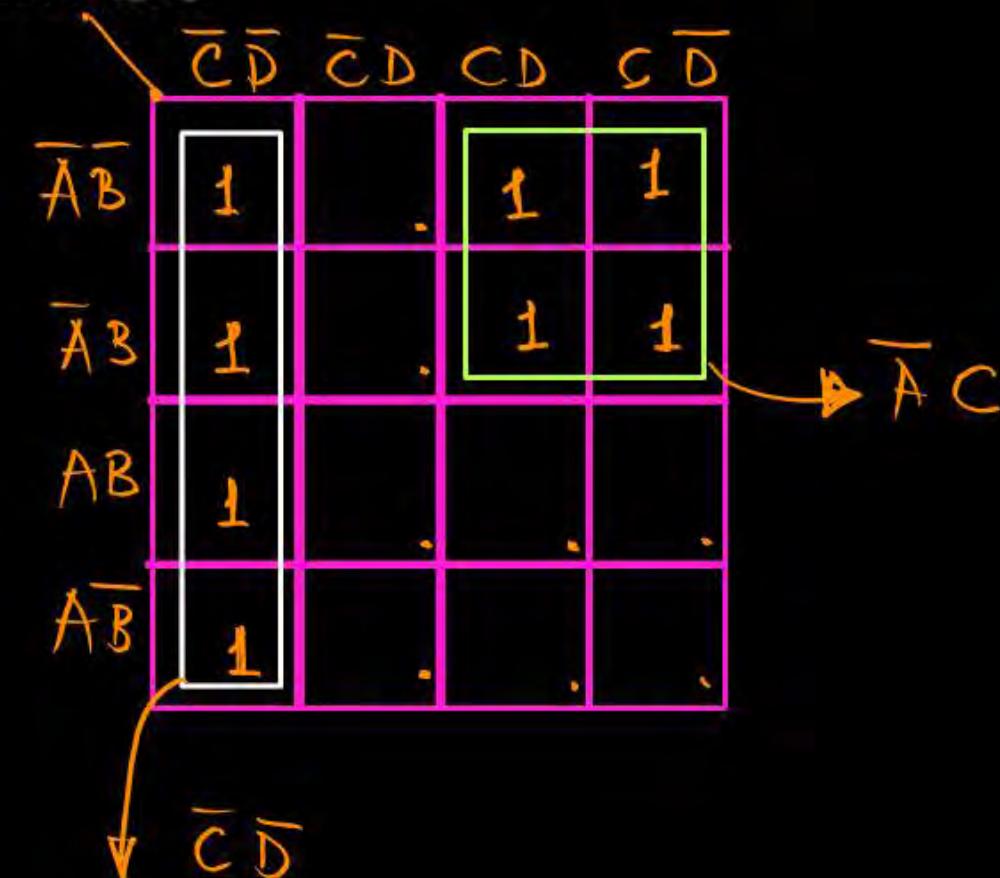
[Question]



$$f(A, B, C, D) = \overline{\bar{C}D + A\bar{B}D + AC} + \bar{A}\bar{B}C$$

Then its minimized solution will be

- (a) $\bar{A}\bar{C}D + \bar{B}\bar{D}$
- (b) ~~$\bar{C}\bar{D} + \bar{A}C$~~
- (c) $\bar{A}\bar{B} + \bar{A}\bar{D} + \bar{C}D$
- (d) None of these

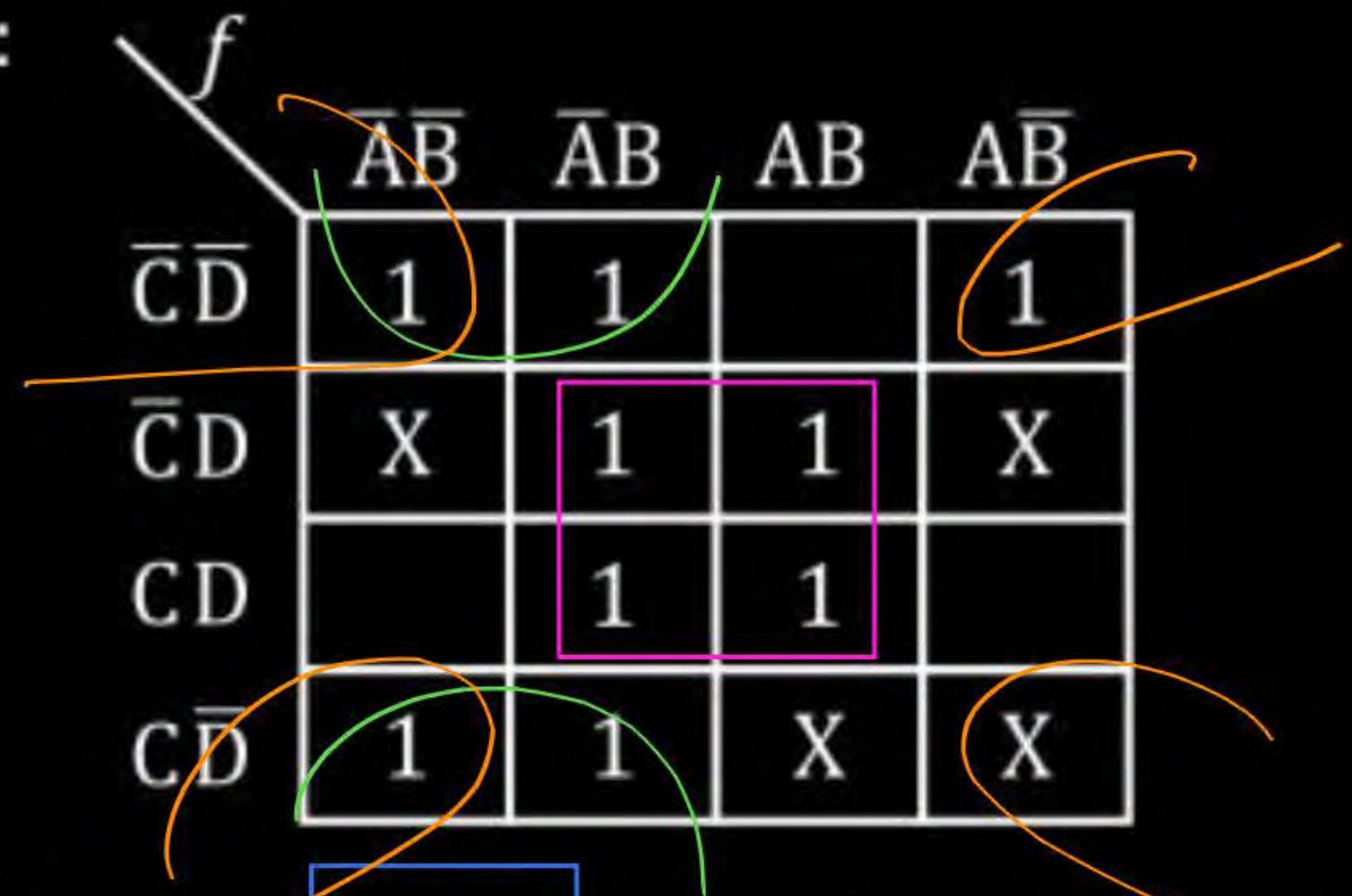


Question

MSQ



A K-map is given as :



Then which of the following is/are minimized form of above K-map ?

- (a) ~~$\bar{A}B + C\bar{D} + BD + \bar{B}\bar{D}$~~ (b) ~~$BD + \bar{A}\bar{D} + \bar{B}\bar{D}$~~
(c) ~~$\bar{A}\bar{D} + BD + \bar{B}\bar{C}$~~ (d) $\bar{B}\bar{C} + \bar{A}B + C\bar{D}$

	$\bar{A}\bar{B}$	$\bar{A}B$	AB	$A\bar{B}$
$\bar{C}\bar{D}$	1	1		1
$\bar{C}D$	X	1	1	X
$C\bar{D}$		1	1	
CD	1	1	X	X

(c)

$$\bar{A}\bar{B} + \bar{B}\bar{D} + BD$$

	$\bar{A}\bar{B}$	$\bar{A}B$	AB	$A\bar{B}$
$\bar{C}\bar{D}$	1	1		1
$\bar{C}D$	X	1	1	X
$C\bar{D}$		1	1	
CD	1	1	X	X

(d) X

	$\bar{A}\bar{B}$	$\bar{A}B$	AB	$A\bar{B}$
$\bar{C}\bar{D}$	1	1		1
$\bar{C}D$	X	1	1	X
$C\bar{D}$		1	1	
CD	1	1	X	X

(a) X



H.W.

Q

	$\bar{C}\bar{D}$	$\bar{C}D$	CD	$C\bar{D}$
$\bar{A}\bar{B}$	1	1		
$\bar{A}B$	1	1	1	1
$A\bar{B}$	X	X		1
AB	X	1	1	X



H.W.

Q

	$\bar{C}\bar{D}$	$\bar{C}D$	CD	$C\bar{D}$
$\bar{A}\bar{B}$			X	
$\bar{A}B$		1	X	
$A\bar{B}$	1	1	X	1
AB		1	1	

H.W.

Q

	$\bar{C}\bar{D}$	$\bar{C}D$	CD	$C\bar{D}$
$\bar{A}\bar{B}$			1	
$\bar{A}B$	1		1	1
$A\bar{B}$	1	X	X	1
AB		X	1	





H.W.

Q

	$\bar{C}\bar{D}$	$\bar{C}D$	CD	$C\bar{D}$
$\bar{A}\bar{B}$	1	1		1
$\bar{A}B$		1	X	X
$A\bar{B}$	1	1	X	1
AB	1	1		1



H.W.

Q

	$\bar{C}\bar{D}$	$\bar{C}D$	CD	$C\bar{D}$
$\bar{A}\bar{B}$		1	1	
$\bar{A}B$			X	
$A\bar{B}$	X		X	
AB				
$A\bar{B}$	1	1	1	1



2 Minute Summary

→ K-Map

Thank you
GW
Soldiers!

