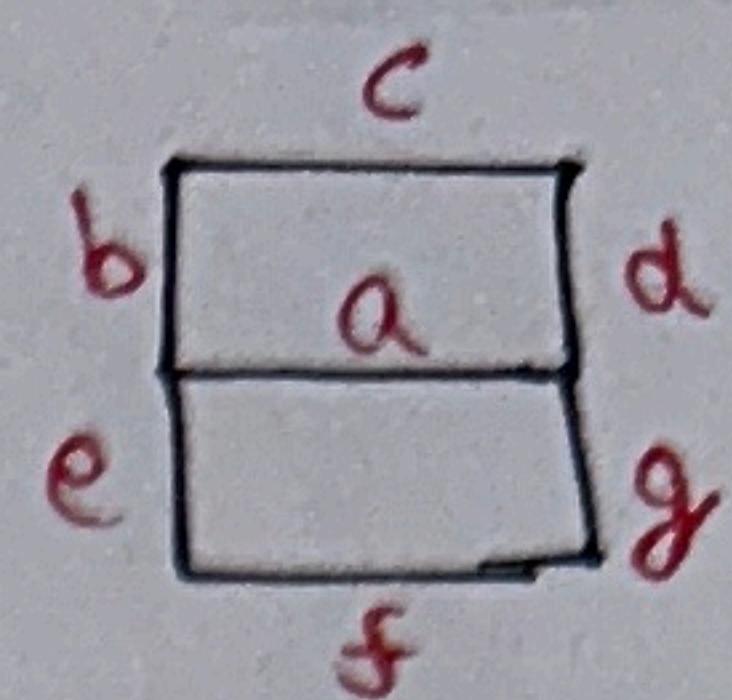


Assignment 1 : 7-segment display.  
DIVYANK SHARMA

A.) Steps for logic minimisation for segment C :



A B C D	C
0 0 0 0	1
1 0 0 0 1	0
2 0 0 1 0	1
3 0 0 1 1	1
4 0 1 0 0	0
5 0 1 0 1	1
6 0 1 1 0	1
7 0 1 1 1	1
8 1 0 0 0	1
9 1 0 0 1	1
10 1 0 1 0	-
11 1 0 1 1	-
12 1 1 0 0	-
13 1 1 0 1	-
14 1 1 1 0	-
15 1 1 1 1	-

Don't care.  
Can be 0 or 1.

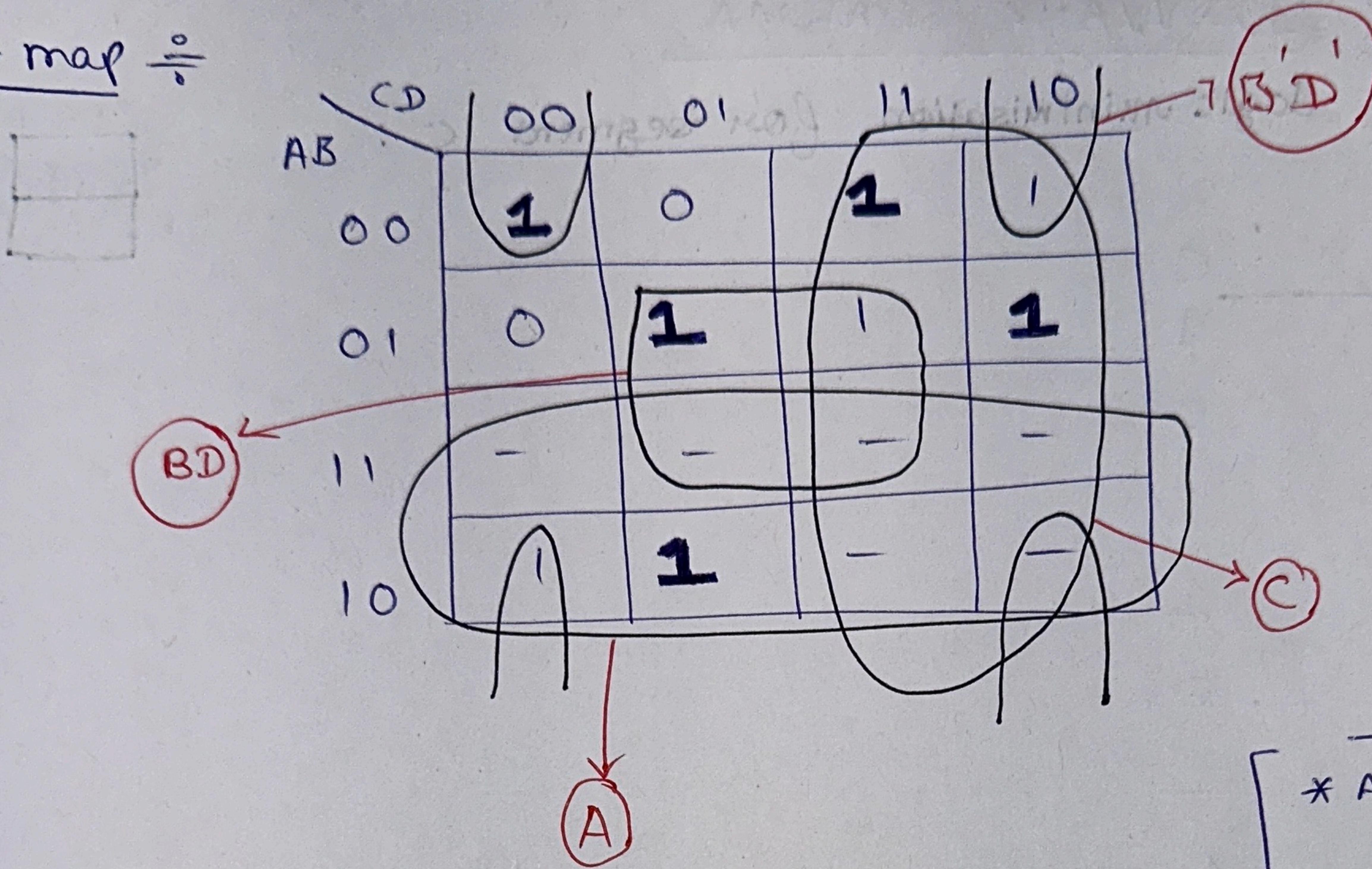
Steps for minimisation :-

- To find all prime implicants. (that cannot grow further without covering 0's). = 4
- To find all distinguished 1's ( 1 that is covered by only one prime implicant) = 5
- Essential Prime implicants ( those prime implicant which converts at least one distinguished - 1 ) . = 4

Then will see if all 1's are covered in essential implicant or any non-

essential implicant has to be added.

K-map  $\frac{1}{0}$



\* All bold 1's are distinguished 1.  
and circled literals are  
essential literals

$\frac{1}{0}$  To cover all 1's we need at least 4 primes.

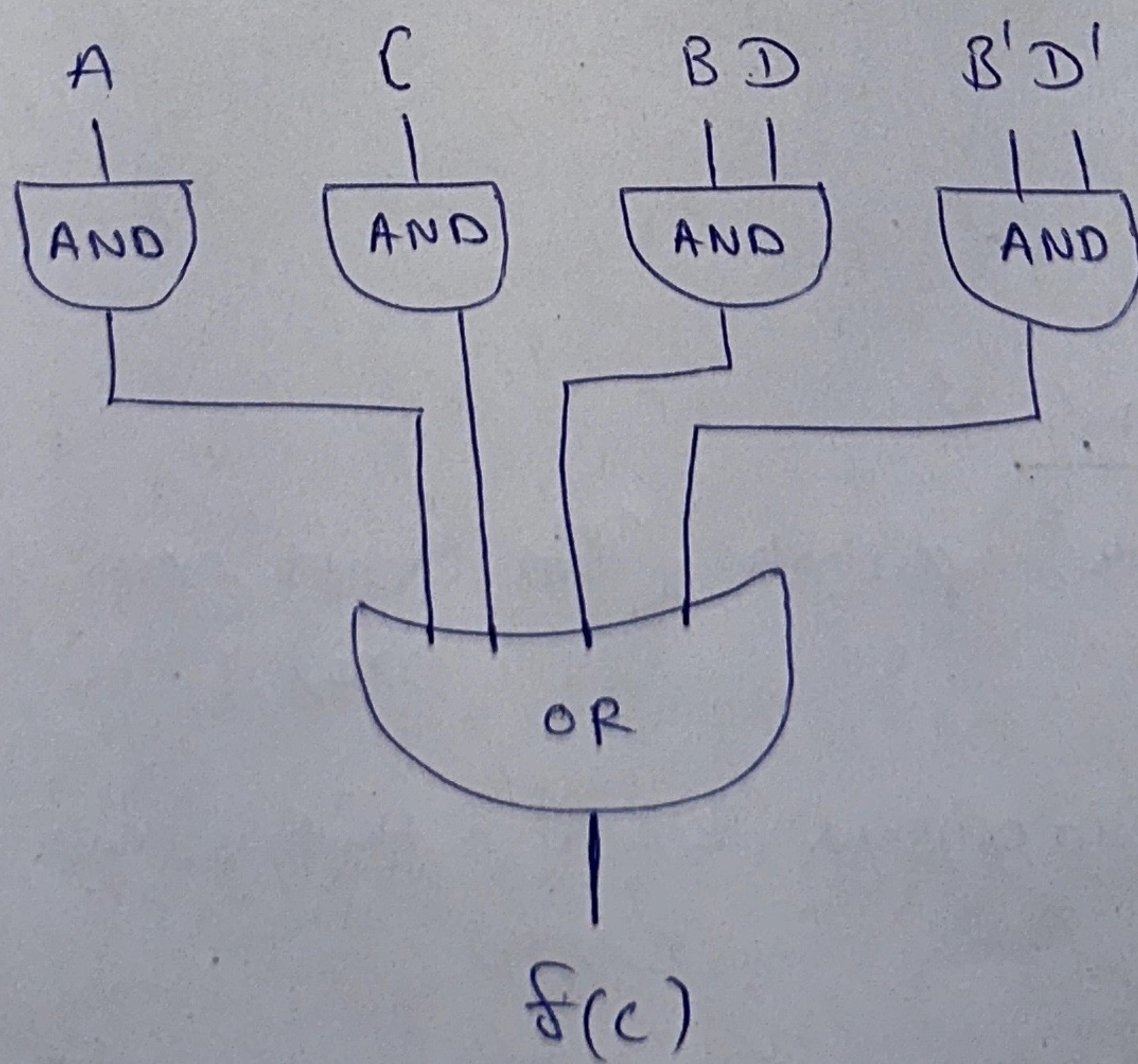
8 1's then one literal

4 1's then 2 literals

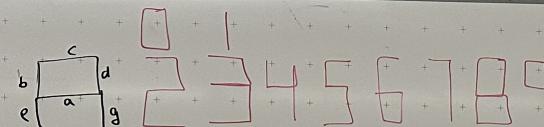
2 1's then 3 literals

4.) The minimal cover for segment 'C'  $\Rightarrow$

$$f(C) = A + C + BD + B'D'$$



	A	B	C	D	a	b	c	d	e	f	g
0	0	0	0	0	0	1	1	1	1	1	1
1	0	0	0	1	0	0	0	1	0	0	1
2	0	0	1	0	1	0	1	1	1	0	0
3	0	0	1	1	1	0	1	0	1	1	1
4	0	1	0	0	1	0	0	0	0	1	1
5	0	1	0	1	1	1	0	0	1	1	1
6	0	1	1	0	1	1	0	0	1	1	1
7	0	1	1	1	1	1	0	1	1	1	1
8	1	0	1	1	0	0	1	1	0	0	1
9	1	0	0	0	1	1	1	1	1	1	1
10	1	0	0	1	1	1	1	0	0	1	1
11	1	0	1	0	1	1	1	1	1	1	1
12	1	0	1	1	0	0	0	0	0	0	0
13	1	1	0	0	0	0	0	0	0	0	0
14	1	1	0	1	0	0	0	0	0	0	0
15	1	1	1	0	0	0	0	0	0	0	0



DIVYANK SHARMA (I was doing for practice so I did for segment b, d and e also)

For segment <u>b</u> :	
CD	00 01 11 10
AB	00 10 00 11
00	1 0 0 0
01	1 1 0 1
11	- - - -
10	1 1 - -

Prime Implicants  $\Rightarrow 4$

D 1's  $\Rightarrow 4$

Essential Prime Implicants  $\Rightarrow 4$

$$f(b) = A + BC' + C'D' + BCD'$$

For segment <u>d</u> :	
CD	00 01 11 10
AB	00 10 00 11
00	1 1 1 1
01	1 0 1 0
11	- - - -
10	1 1 - -

Prime Implicants  $\Rightarrow 3$

D 1's  $\Rightarrow 5$

Essential Prime Implicants  $\Rightarrow 3$

$$f(d) = B' + CD + C'D'$$

For segment <u>e</u> :	
CD	00 01 11 10
AB	00 10 00 11
00	1 0 0 1
01	0 0 0 1
11	- - - -
10	1 0 - -

Prime Implicants  $\Rightarrow 2$

D 1's  $\Rightarrow 3$

Essential Prime Implicants  $\Rightarrow 2$

$$f(e) \Rightarrow B'D + CD'$$