Modern Digital System Design

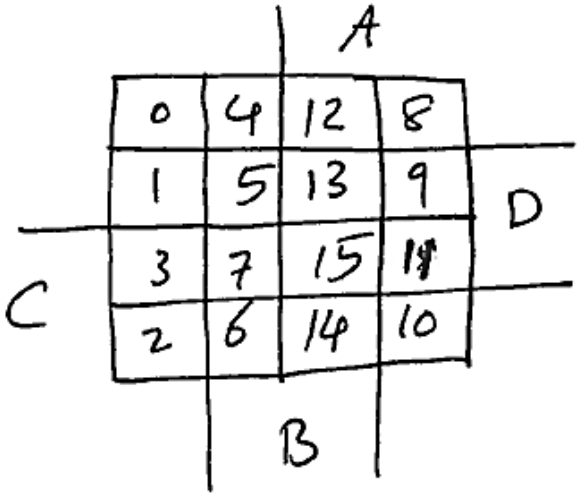
ECE 2372 / Fall 2018 / Lecture 6

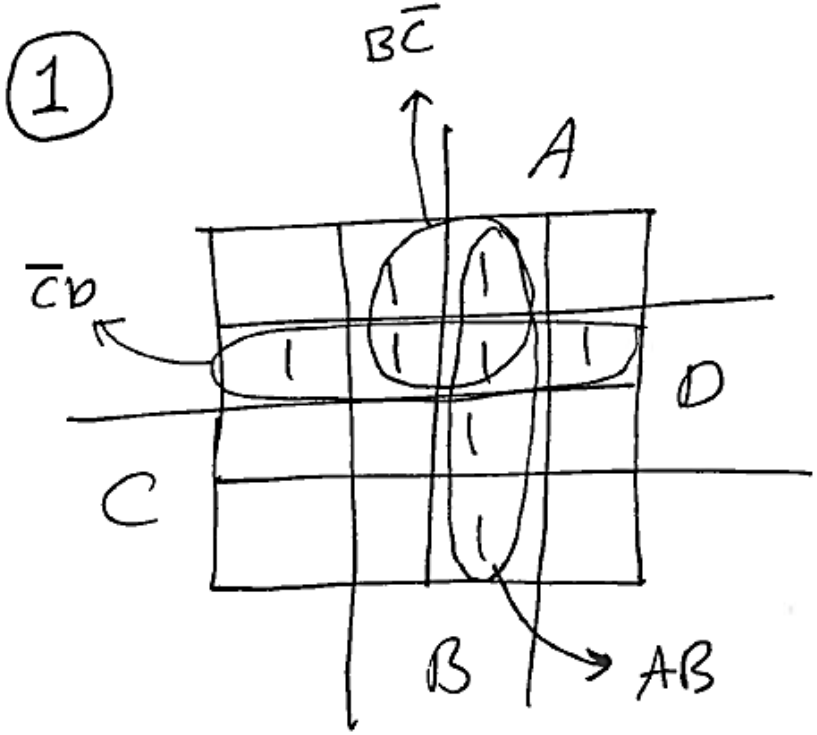
Texas Tech University
Dr. Tooraj Nikoubin

Examples for Karnough map simplification

(SOP) 1

$Y = \sum_m (1, 4, 5, 9, 12, 13, 14, 15)$





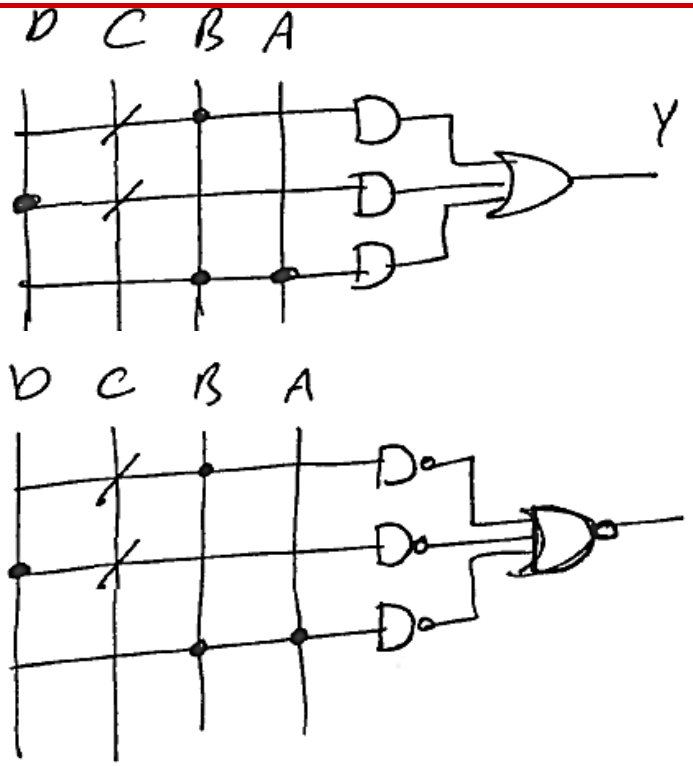
$$Y = B\bar{C} + \bar{C}D + AB$$

AND–OR

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

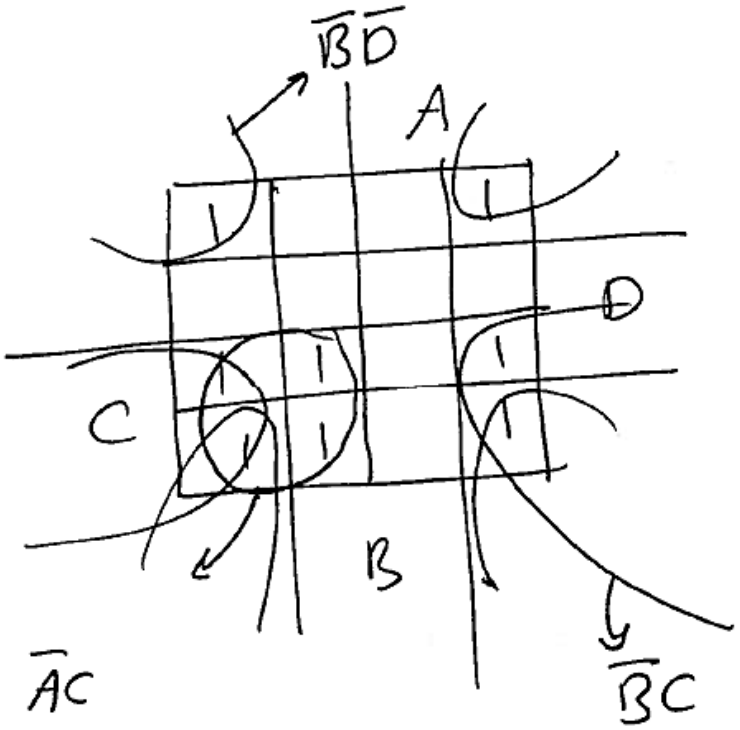
$$Y = \overline{B\bar{C} \cdot \bar{C}D \cdot AB}$$

NAND–NAND



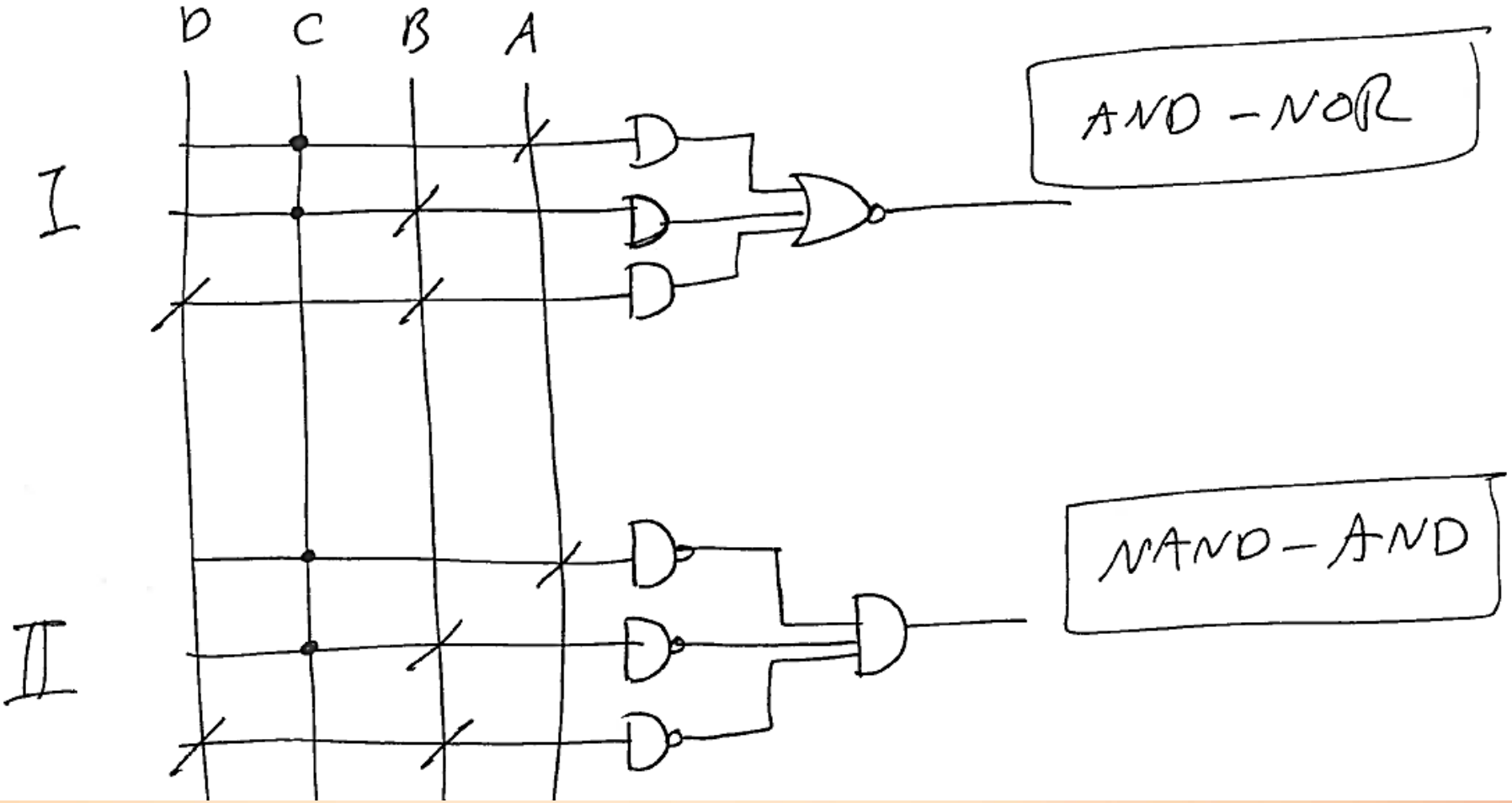
(SOP) 2

$Y = \sum_m (1, 4, 5, 9, 12, 13, 14, 15)$



$Y = \overline{\bar{A}C + \bar{B}C + \bar{B}\bar{D}}$ I

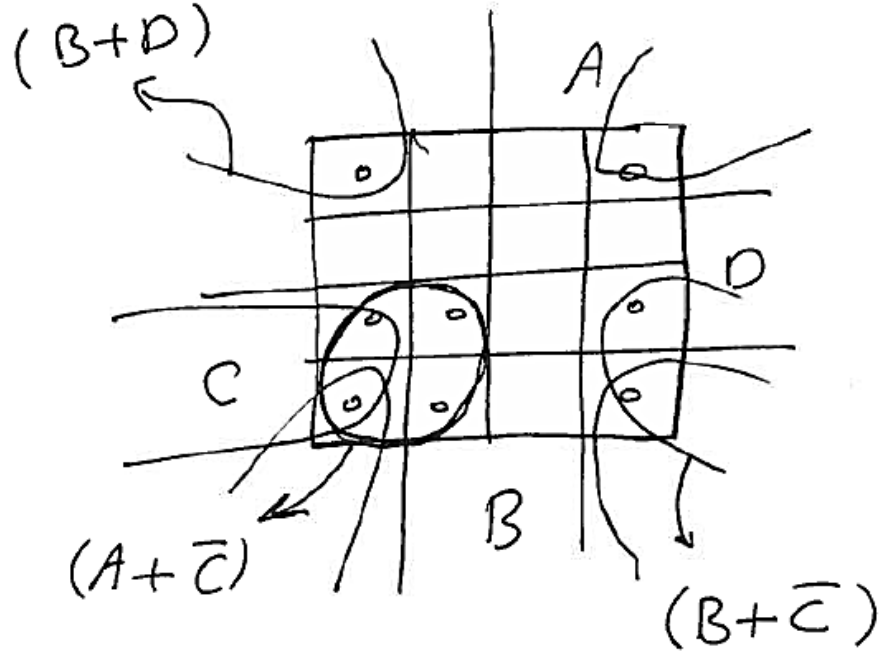
$Y = \overline{\bar{A}C} \cdot \overline{\bar{B}C} \cdot \overline{\bar{B}\bar{D}}$ II


D
C
B
A
I
AND - NOR
II
NAND - AND

(POS) 1

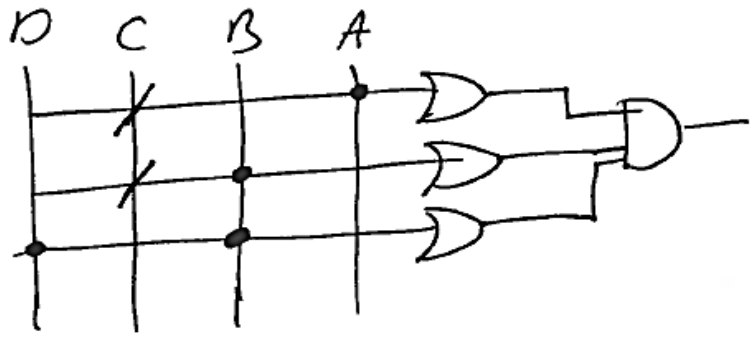
$Y = \prod_M (1, 4, 5, 9, 12, 13, 14, 15)$

C \ AB	00	01	11	10
0	0	4	12	8
1	1	5	13	9
3	3	7	15	11
2	2	6	14	10



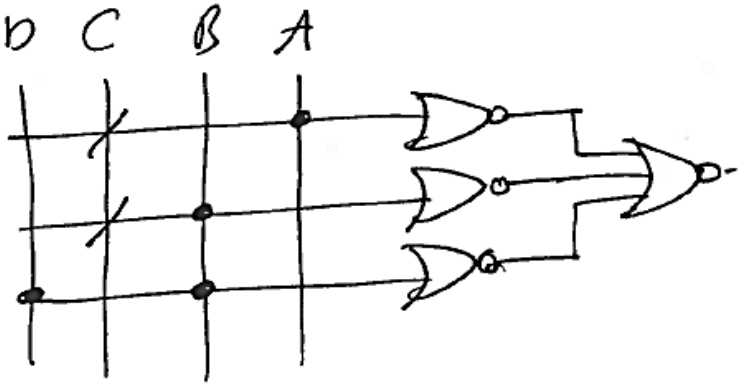
$$Y = (A + \bar{C})(B + \bar{C})(B + D)$$

OR – AND



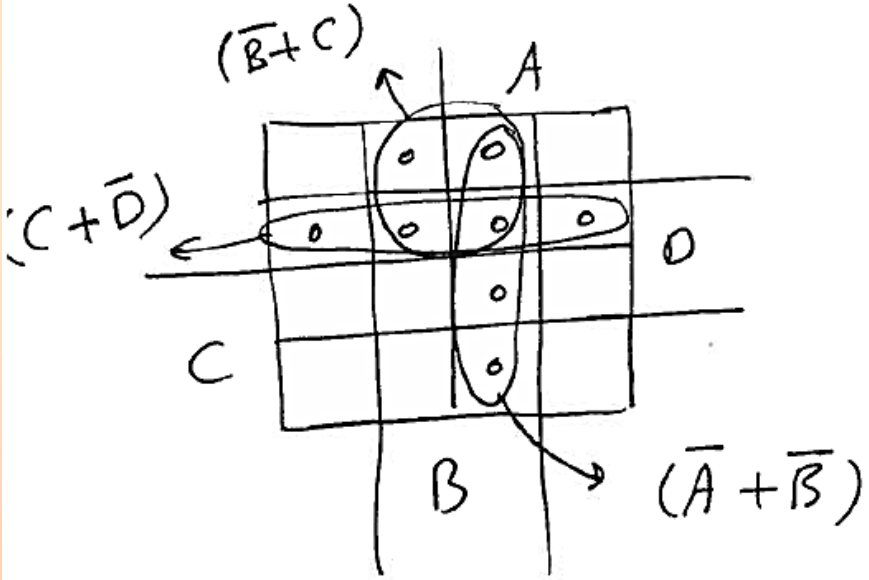
$$Y = \overline{\overline{(A + \bar{C})(B + \bar{C})(B + D)}}$$

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



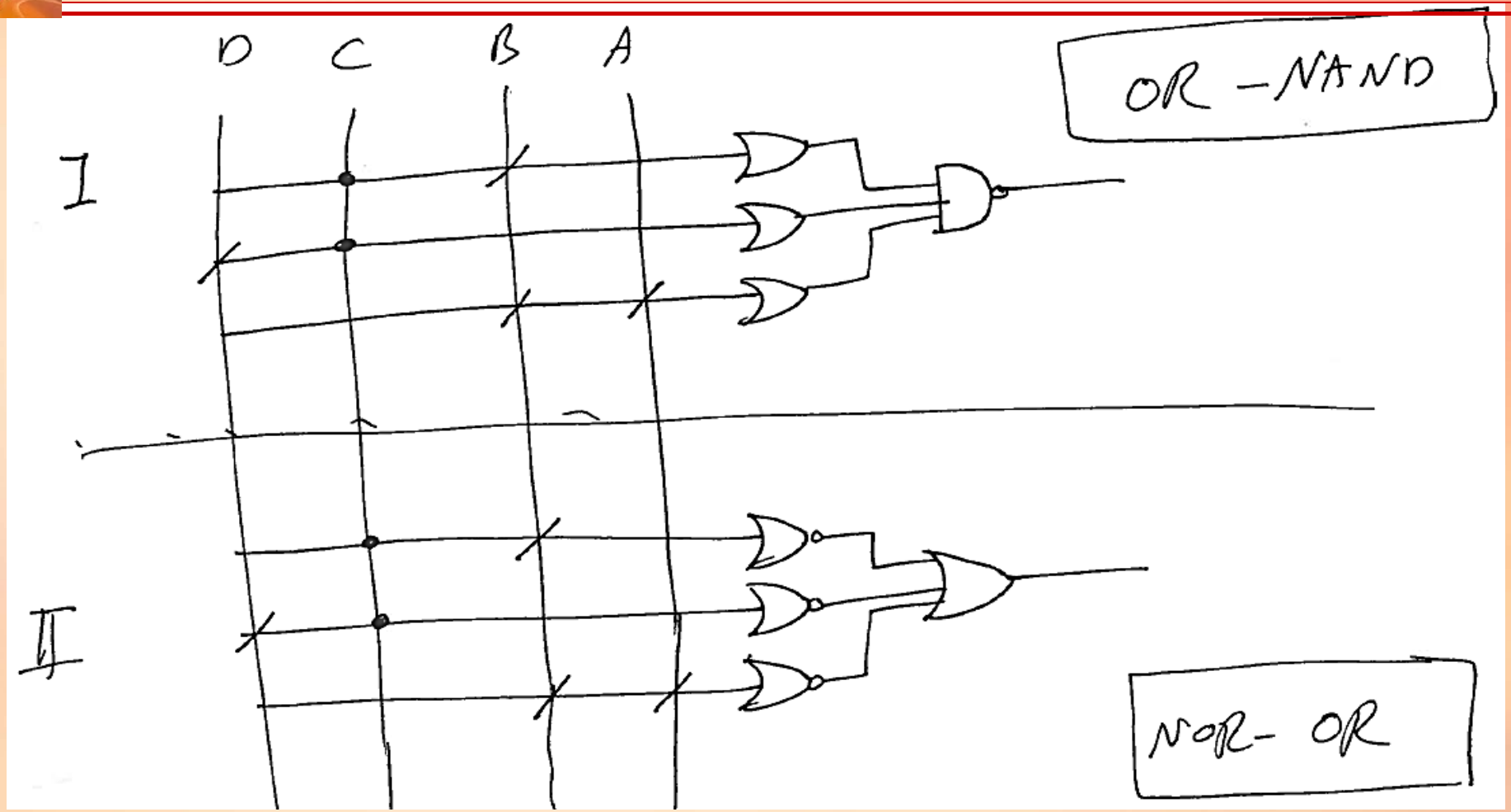
(POS) 2

$$Y = \sum_m (1, 4, 5, 9, 12, 13, 14, 15)$$



$$Y = \overline{(\bar{B}+C)(C+\bar{D})(\bar{A}+\bar{B})} \quad \text{I}$$

$$Y = \overline{(\bar{B}+C)} + \overline{(C+\bar{D})} + \overline{(\bar{A}+\bar{B})} \quad \text{II}$$


D
C
B
A
I
II
OR – NAND
NOR – OR

Thank You