Homework #4

3.13 Simplify the following expressions to (1) sum-of-products and (2) products-of-sums:

(a)* $xz' + y'z' + yz' + xy'$

3.15 Simplify the following Boolean function F, together with the don't-care conditions d, and then express the simplified function in sum-of-minterms form:

(a) $F(x, y, z) = \Sigma(0, 1, 3, 5, 7)$
$d(x, y, z) = \Sigma(2, 4, 6)$

(b)* $F(A, B, C, D) = \Sigma(0, 4, 8, 10, 14)$
$d(A, B, C, D) = \Sigma(2, 6, 12)$

3.20 Draw the multiple-level NOR circuit for the following expression:

$$F = BC(D + C)A + (BC' + DE') + BD'$$

3.24 Implement the following Boolean function F, using the two-level forms of logic (c) NOR-OR (g) NAND-AND:

$$F(A, B, C, D) = \Sigma(1, 5, 8, 9, 10, 11, 12, 13, 15)$$

3.26 With the use of maps, find the simplest sum-of-products form of the function $F = fg$, where

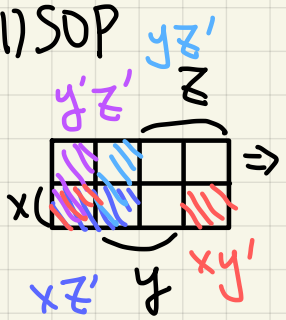
$$f = abc' + b'd' + a'd' + b'cd'$$

and

$$g = (a + b + c' + d')(a' + b' + d)(a' + d')$$

$g' = a'b'cd + ab'd + ad$ (不要忘記)

3.13 (1) SOP



$\Rightarrow F = xz' + y'z' + yz' + xy'$

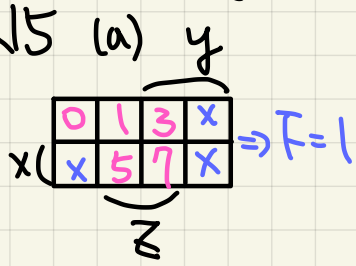
$= z' + xy'$ #

(2) POS

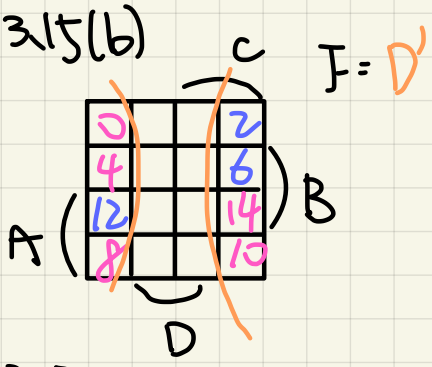
$F' = (xz' + y'z' + yz' + xy')' = yz + x'z$

$\Rightarrow F = (y' + z')(x + z')$

3.15 (a)

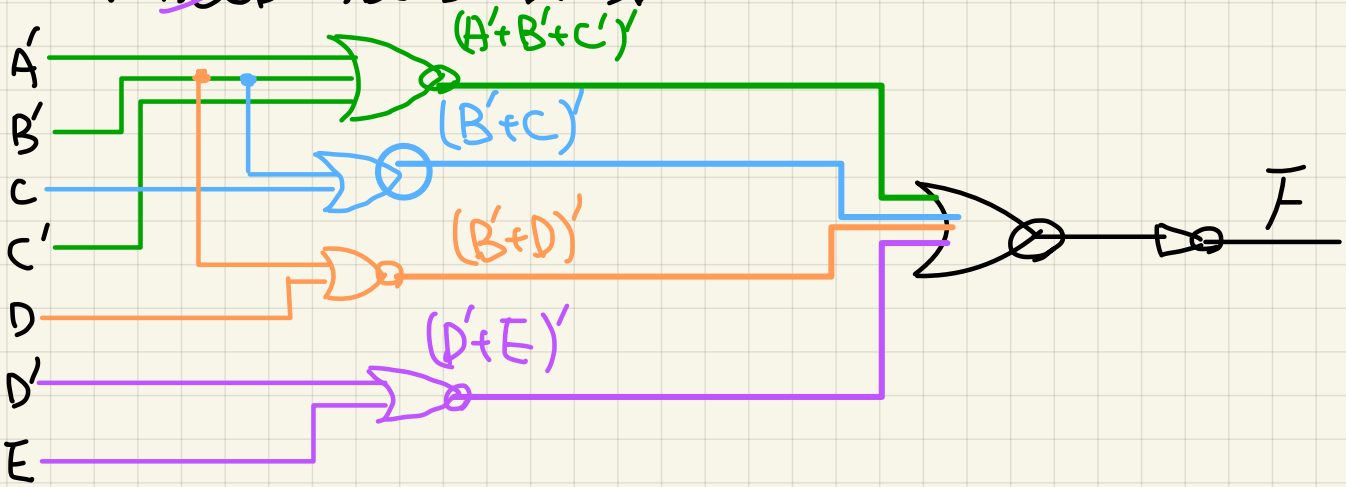


3.15 (b)

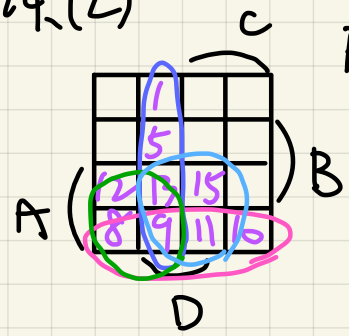


3.20

$F = \cancel{ABCD} + ABC + BC' + DE' + BD'$

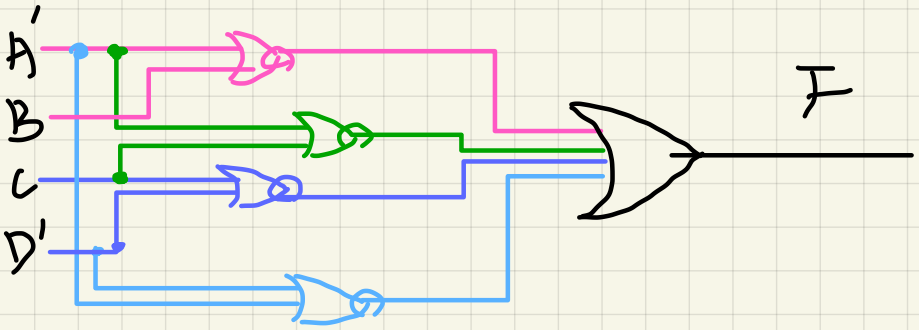


3.24 (c)

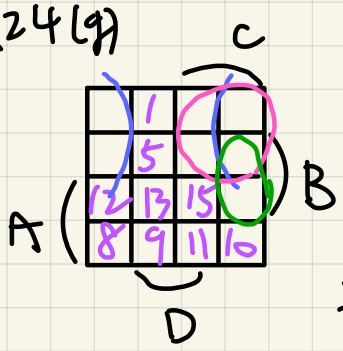


$F = AB' + C'D + AC' + AD$

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

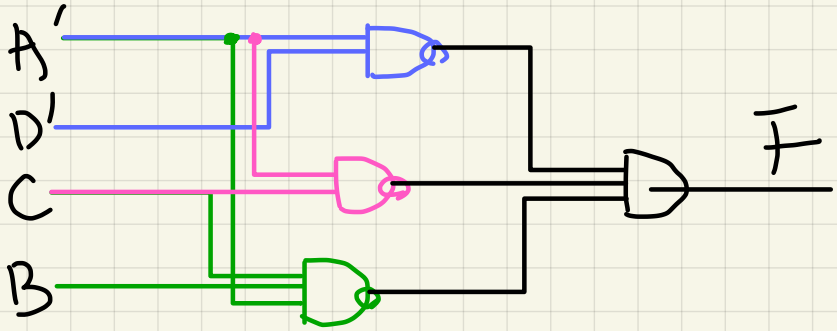


3.24 (g)

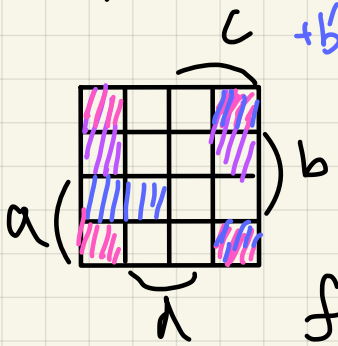


$F' = A'D' + A'C + BCD'$

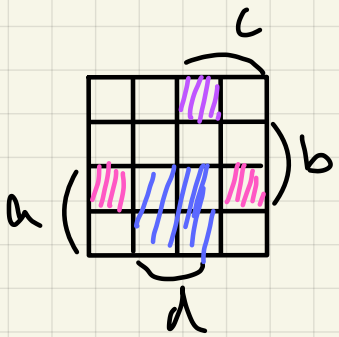
$\Rightarrow F = (A'D')'(A'C)'(BCD')'$



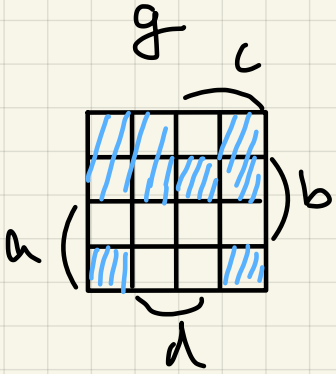
3.26 f $abc' + b'd' + a'd' + b'cd'$



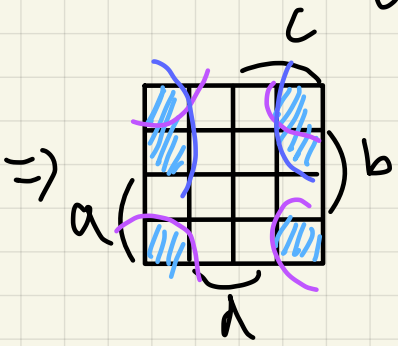
g' = $a'b'cd + abd' + acd$



$\Rightarrow$



fg



$\Rightarrow$ $F = b'd' + a'd'$