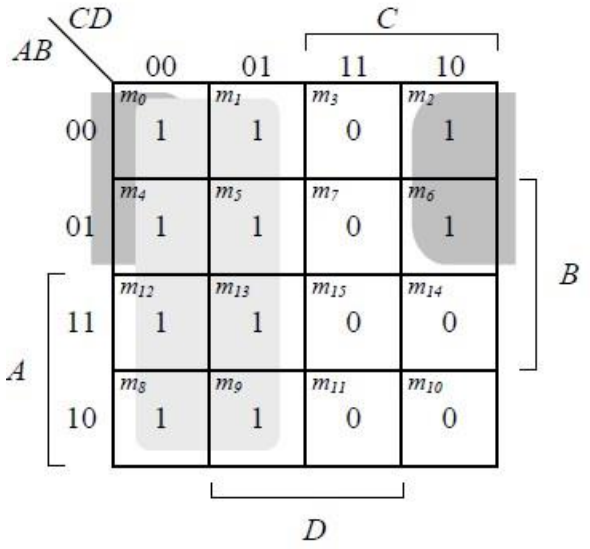
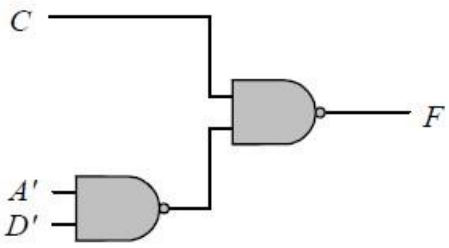
1. **Simplify the following function, and implement it with a two-level NAND gate circuit.**
   $\mathbf{F} = (\boldsymbol{A'} + \boldsymbol{C'} + \boldsymbol{D'})(\boldsymbol{A'} + \boldsymbol{C'})(\boldsymbol{C'} + \boldsymbol{D'})$

$$F = (A' + C' + D')(A' + C')(C' + D')$$
$$F' = (A' + C' + D')' + (A' + C')' + (C' + D')'$$
$$F' = ACD + AC + CD$$

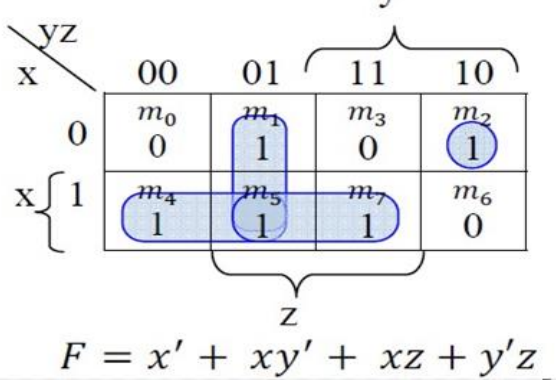


$$F = C' + A'D'$$
$$F = (C(A + D))'$$
$$F = (C(A'D')')'$$



2. **Design a combinational circuit with three inputs and one output. The output is 1 when the binary value of the inputs is not divisible by 3.**

x	y	z	F
0	0	0	0
0	0	1	1
0	1	0	1
0	1	1	0
1	0	0	1
1	0	1	1
1	1	0	0
1	1	1	1



$$F = x' + xy' + xz + y'z$$