1. Find the minterms for the following Boolean function by first plotting each function in the K-map
    a. $F\ (A,B,C,D)\ =\ A'C'\ +\ BC\ +\ AB'$
    b. $F\ (A,B,C)\ =\ B\ +\ C'$

2. Find all prime implicants and determine which are essential for:
    a. $F\quad B,C,D)\ =\ \Sigma(0,2,4,5,6,7,8,10,13,15)$
    b. $F\ W,X,Y,Z)\ =\ \Sigma(0,2,3,5\ 7,8,10,11,14,15)$

3. Simplify the following Boolean functions, and implement them with two-level **NANAD-NAND**:
    a. $F\ A\ B\ C\ D)\ =\ ABC\ +\ A'BC\ +\ AB'C\ +\ A'B'C$
    b. $F\ A\ B\ C\ D)\ =\ AB'D'\ +\ AB'D\ +\ A'D\ +\ A'D'$

4. Implement directly the following function with two-level **NOR–NOR** (without going first to plot the circuit using AND-OR)
    $$F(A,B,C,D)\ =\ \Sigma(0,1,2,3,6,7,9,14,15)$$

5. Given the following function:
    $$F(A,B,C,D)\ =\ \Sigma(0,1,2,4,5,7,8,9,10,11,15)$$

    Implement this function using two-level:
    -NAND-NAND
    -NOR-NOR
    -AND-NOR
    -NAND-AND

6. Implement the following function with **two-input NOR** gates only:
    $$w,x,y,z)\ =\ \Sigma(0,1,2,5\ 9,10,11,13)$$

7. Simplify using QM Tabulation method the following function
    $$F(A,B,C,D)\ =\ \Sigma(1,3,5,7,9,15)$$
    With don't –care conditions
    $$d(A,B,C,D)\ =\ \Sigma(4,6,12,13)$$