Faculty of Computer & Information Sciences
Ain Shams University
CHW 261: Logic Design
Tutorial Sheets 2020-2021
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Tutorial 3

1) Simplify the following Boolean expressions to a minimum number of literals:
   a. (A + B)' (A' + B')' b. A'BC + ABC' + ABC + A'BC'

2) Simplify the following Boolean expressions to a minimum number of literals and Draw logic diagrams of the circuits that implement the original and simplified expressions
   a. (A+B') (A+ B) b. A' B (D' + C' D) + B (A + A' C D)

3) Obtain the truth table of the following functions, and express each function in sum-of-minterms and product-of-maxterms form:
   a. (B + CD)(C + BD) b. (CD + B'C + BD')(B+D)

4) Express the following functions in sum-of-product and product-of-sum forms
   a. F(X, Y, Z)= $\sum(1, 3, 7)$ b. F(A, B, C) = π (0, 1, 2, 3, 4, 6)

5) Given that **F(A, B, C) = B'C + AC' + ABC** then
   a. Express F in terms of Sum of its minterms as **F(A, B, C) =** $\sum(\dots)$
   b. Express F in terms of product of its maxterms as **F(A, B, C) =** $\pi(\dots)$
   c. Express F' in terms of Sum of its minterms as **F'(A, B, C) =** $\sum(\dots)$
   d. Express F' in terms of product of its maxterms as **F'(A, B, C) =** $\pi(\dots)$

6) Repeat question 5 Given that **F (A, B, C) = (A+B+C)(A+B')(B+C')** .

7) Express the **complement** of the following functions in sum of minterms and product of maxterm
   a. F(A, B,C, D) =$\sum(0, 2, 6, 11, 13, 14)$
   b. F(A,B ,C, D) =$\sum(2, 4, 7, 10, 12, 14)$
   c. F(X, Y, Z) = π (0, 3, 6, 7)
   d. F(X,Y, Z) = π (3, 5, 7)

8) Convert each of the following functions to its canonical form:
   a. F(x, y, z) = $\sum(1, 3, 5)$
   b. F(A, B, C, D) = $\pi(3, 5, 8, 11)$