

GIRLS' HIGH SCHOOL AND COLLEGE

2020-2021

CLASS 12 B

COMPUTER SCIENCE

WORKSHEET -03

CHAPTER- BOOLEAN ALGEBRA

TOPIC-MINIMIZATION OF BOOLEAN EXPRESSION

Note: Parents please ensure that your ward refers to a computer science book/internet for two days to read the topic Boolean Algebra.

Reference Book: Computer Science with Java for class 12 by Sumita Arora

Website: geeksforgeeks.org

Introduction: Karnaugh Map or K-Map is a graphical display of the fundamental products in a truth table. For a function of n variables there would be a map of 2^n squares each representing a minterm for SOP expression and maxterm for POS expression.

Answer the following questions:

1. Simplify the following using Algebraic Method:

a) $AB'CD' + AB'CD + ABCD' + ABCD$

b) $X'Y'Z' + X'YZ' + XY'Z' + XYZ'$

2. Reduce the following using K-Map:

a) $F(a, b, c) = \Sigma (1, 3, 5, 7)$

b) $F(w, x, y, z) = \Sigma (0, 4, 8, 12)$

c) $F(w, x, y, z) = \Sigma (1, 3, 5, 6, 7, 14, 15)$

d) $F(P, Q, R, S) = \pi(0, 1, 3, 5, 7, 8, 9, 10, 11, 14, 15)$

3. Reduce the following expression: $F(A, B, C) = \Sigma (0, 1, 2, 3, 4, 5, 6, 7)$. Also find the complement of the reduced expression.

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