GIRLS' HIGH SCHOOL AND COLLEGE

2020-2021

CLASS 12 B

COMPUTER SCIENCE

WORKSHEET -02

CHAPTER- BOOLEAN ALGEBRA

TOPIC-DERIVATION 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:

- Minterm is the product of all the literals (with or without the bar) within the logic system.
- Maxterm is the sum of all the literals (with or without the bar) within the logic system.
- Boolean expression composed of entirely either of minterms or maxterms is referred to as Canonical expression.
- Principal of Duality states that starting with a Boolean relation another Boolean relation can be derived :
    1. Changing each OR (+) sign to AND (.) sign.
    2. Changing each AND (.) sign to OR (+) sign.
    3. Replacing each 0 by 1 and each 1 by 0.

Answer the following questions:

1. Convert X + Y to minterms .
2. Convert the following expression into its canonical POS form:

   F(X, Y, Z)=(X + Y').(Y' + Z)
3. Convert the given shorthand notation to canonical Sum of Products expression:

   $F(X, Y, Z) = \Sigma (0, 1, 4, 5, 7)$
4. State the principal of Duality and find the dual of:

   (A' + B).(1 + B')
5. If A=1, B=0, C=1and D=1 find its: (i) Maxterm (ii) Minterm
6. Verify using a truth table if: $(A \odot B \odot C)' = A \oplus B \oplus C$

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