COMPUTER ENGINEERING DEPARTMENT
COE-202 – Fundamentals of Computer Engineering (section 02)
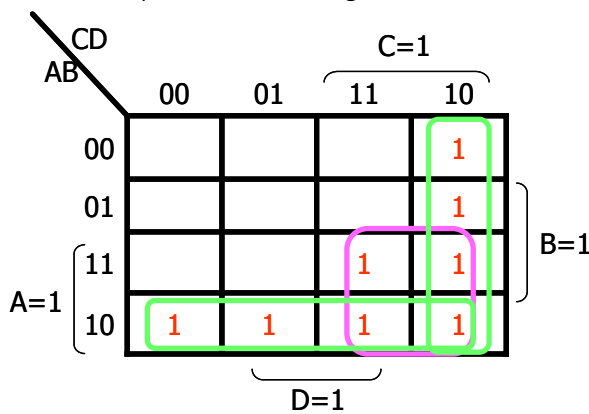
Student Name:
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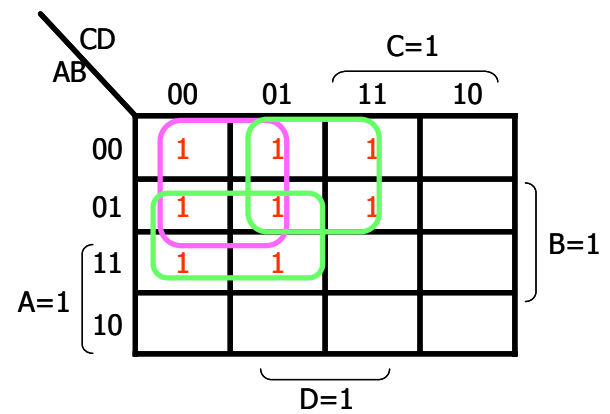**Q1. (20 points)** Given the function F(A,B,C,D)= AB'C' + AC + A'CD'
a) Plot the K-Map for F(A,B,C,D)
b) Determine the Prime Implicants and the Essential Prime Implicants for function F(A,B,C,D).
c) Simplify the function F(A,B,C,D) in the form of sum of products
d) Simplify the function F(A,B,C,D)in the form of product of sums
e) Implement the circuit in part (d) with NOR gates.

Solution:

a) The K-Map is as shown in figure:

K-map for F(A,B,C,D)   K-map for F'(A,B,C,D) {NOT REQUIRED}

b) The Prime Implicants are: AB', CD', AC

   The Essential Prime Implicants are: AB', CD', AC

c) F(A,B,C,D) = AB'+AC+CD','

d) F'(A,B,C,D) = BC' + A'C' + A'D, ➜

   therefore, F(A,B,C,D) = (B'+C) (A+C) (A+D')

e) The implementation for part (d) is as shown: