Binary Decision Diagrams

Assignments

1. For each the following functions, carry out the following for two different orderings of the input variables:
   - Use Shannon decomposition theorem to systematically reduce the given function into sub-functions, and hence create the binary decision diagram (BDD).
   - Apply the reduction rules and create the ROBDD from the BDD.
   - From the ROBDD, arrive at a circuit realization of the function using 2-to-1 multiplexers.

   (i) $F(x_1, x_2, x_3) = x_1'x_2 + x_2'x_3$

   (ii) $F(a,b,c,d) = (a + b.c)' + b'c'd'$

   (iii) $F(a,b,c,d) = a'b'c'd' + a'b'cd + abc'd'$

   (iv) $F(a,b,c) = 1$

2. State the reduction rules for converting a BDD to ROBDD with the help of illustrative examples.