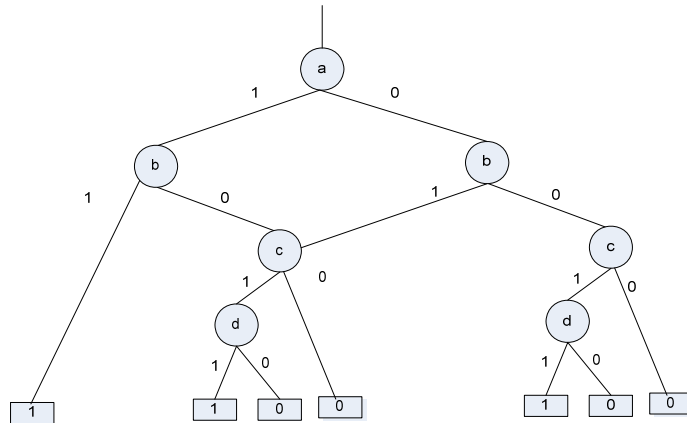


COE 561, Term 091
Digital System Design and Synthesis

HW# 1

Due date: Sunday, Nov. 1

Q.1. Consider the following OBDD with the variable ordering {a, b, c, d}. Reduce it based on **Reduce** function to obtain the ROBDD. Show the details of your work.



Q.2. Consider the function $f=(a+bc)(d+b'c')$:

- (i) Draw the **ROBDD** for the function using the variable order {a, b, c, d}.
- (ii) Draw the **ROBDD** for the function using the variable order {a, d, b, c}.

Q.3. Consider the two functions $f=(a+bc)(d+b'c')$ and $g=(a+d)(b+c)$:

- (i) Compute the function $f \oplus g$ based on orthonormal basis expansion.
- (ii) Draw the **ITE DAG** for the function $f.g$. Show the details of the ITE algorithm step by step. Use the variable order {a, b, c, d}

Q.4. Consider the following given matrix representing a covering problem:

$$A = \begin{bmatrix} 0 & 0 & 1 & 0 & 1 & 0 & 1 & 1 \\ 0 & 1 & 0 & 1 & 0 & 1 & 0 & 1 \\ 1 & 1 & 1 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 1 & 1 & 0 & 0 & 0 \\ 1 & 0 & 0 & 0 & 0 & 1 & 1 & 0 \\ 1 & 0 & 0 & 0 & 0 & 0 & 0 & 1 \end{bmatrix}$$

Find a **minimum cover** using **EXACT_COVER** procedure. Show all the details of the algorithm. Assume the following order in branching selection when needed: $C_1, C_2, C_3, C_4, C_5, C_6, C_7, C_8$.