**HW Solution**

**Problem 6.11 (b)**

6.11 (b) Show a tree of multiplexers implementing the expressions:

\[ E(a, b, c, d, e, f) = a \oplus b \oplus c \oplus d \oplus e \oplus f \]

Since XOR gate can be expressed as \( a \oplus b = ab' + a'b \), XOR expression can be implemented as following using multiplexers.

\[
\text{XOR}(a, b) = a \oplus b = ab' + a'b \\
\text{XOR}(a, b) = \text{MUX(}\text{XOR}(a, 1), \text{XOR}(a, 0), b) \\
\text{XOR}(a, 1) = a' \\
\text{XOR}(a, 0) = a
\]

Since the expression \( E(a, b, c, d, e, f) = a \oplus b \oplus c \oplus d \oplus e \oplus f \) consists of five XOR operations, the expression can be implemented using five above XOR gates.