

For $f(x_1, x_2) = x_1$

$$d_{11} + d_{21} < d_{12} + d_{22}$$

$$d_{14} + d_{21} > d_{13} + d_{22}$$

$$d_{12} + d_{24} < d_{11} + d_{23}$$

$$d_{13} + d_{24} > d_{14} + d_{23}$$

$$-\Delta_{11-12} < \Delta_{13-14} < -\Delta_{11-12}$$

Hence, $f(x_1, x_2) = x_1$ can NOT be induced by a single arbiter PUF!