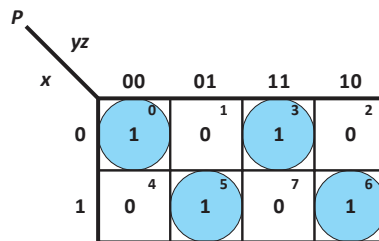


| $m_i$ | $x$ | $y$ | $z$ | Parity<br>$P$ |
|-------|-----|-----|-----|---------------|
| $m_0$ | 0   | 0   | 0   | 1             |
| $m_0$ | 0   | 0   | 1   | 0             |
| $m_0$ | 0   | 1   | 0   | 0             |
| $m_0$ | 0   | 1   | 1   | 1             |
| $m_0$ | 1   | 0   | 0   | 0             |
| $m_0$ | 1   | 0   | 1   | 1             |
| $m_0$ | 1   | 1   | 0   | 1             |
| $m_0$ | 1   | 1   | 1   | 0             |

**TABLE 3.10**  
Odd Parity Generator



$$P(x, y, z) = x'y'z' + x'yz + xy'z + xyz'$$

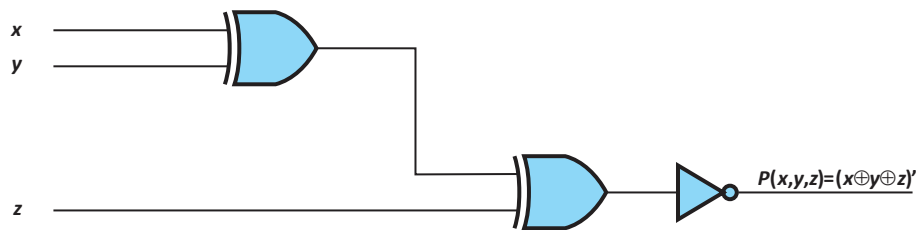
$$P(x, y, z) = x'(y'z' + yz) + x(y'z + yz')$$

$$P(x, y, z) = x'(y \oplus z)' + x(y \oplus z)$$

$$\text{Let } w = y \oplus z$$

$$P(x, y, z) = x'w' + xw$$

$$P(x, y, z) = (x \oplus w)' = (x \oplus y \oplus z)'$$



| $m_i$    | $x$ | $y$ | $z$ | $P$ | $E$ |
|----------|-----|-----|-----|-----|-----|
| $m_0$    | 0   | 0   | 0   | 0   | 1   |
| $m_1$    | 0   | 0   | 0   | 1   | 0   |
| $m_2$    | 0   | 0   | 1   | 0   | 0   |
| $m_3$    | 0   | 0   | 1   | 1   | 1   |
| $m_4$    | 0   | 1   | 0   | 0   | 0   |
| $m_5$    | 0   | 1   | 0   | 1   | 1   |
| $m_6$    | 0   | 1   | 1   | 0   | 1   |
| $m_7$    | 0   | 1   | 1   | 1   | 0   |
| $m_8$    | 1   | 0   | 0   | 0   | 0   |
| $m_9$    | 1   | 0   | 0   | 1   | 1   |
| $m_{10}$ | 1   | 0   | 1   | 0   | 1   |
| $m_{11}$ | 1   | 0   | 1   | 1   | 0   |
| $m_{12}$ | 1   | 1   | 0   | 0   | 1   |
| $m_{13}$ | 1   | 1   | 0   | 1   | 0   |
| $m_{14}$ | 1   | 1   | 1   | 0   | 0   |
| $m_{15}$ | 1   | 1   | 1   | 1   | 1   |

**TABLE 3.11**  
Odd Parity Checker

|    |      |      |    |    |    |
|----|------|------|----|----|----|
|    |      | $zP$ |    |    |    |
|    | $xy$ | 00   | 01 | 11 | 10 |
| 00 |      | 1    | 0  | 1  | 0  |
| 01 |      | 0    | 1  | 0  | 1  |
| 11 |      | 1    | 0  | 1  | 0  |
| 10 |      | 0    | 1  | 0  | 1  |

$$\begin{aligned}
 E(x, y, z, P) = & x'y'z'P' + x'y'zP \\
 & + x'yz'P + x'yzP' \\
 & + xyz'P' + xyzP \\
 & + xy'z'P + xy'zP'
 \end{aligned}$$

$$\begin{aligned}
 E(x, y, z, P) = & x'y'(z \oplus P)' \\
 & + x'y(z \oplus P) \\
 & + xy(z \oplus P)' \\
 & + xy'(z \oplus P)
 \end{aligned}$$

$$\text{Let } a = (z \oplus P)$$

$$E(x, y, z, P) = x'y'a' + x'ya + xya' + xy'a$$

$$E(x, y, z, P) = x'(y'a' + ya) + x(ya' + y'a) = x'(y \oplus a)' + x(y \oplus a)$$

$$\text{Let } b = (y \oplus a)$$

$$E(x, y, z, P) = x'b' + xb = (x \oplus b)' = (x \oplus y \oplus a)' = (x \oplus y \oplus z \oplus P)'$$

