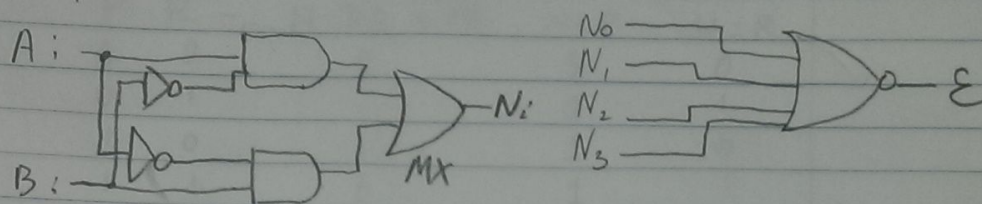


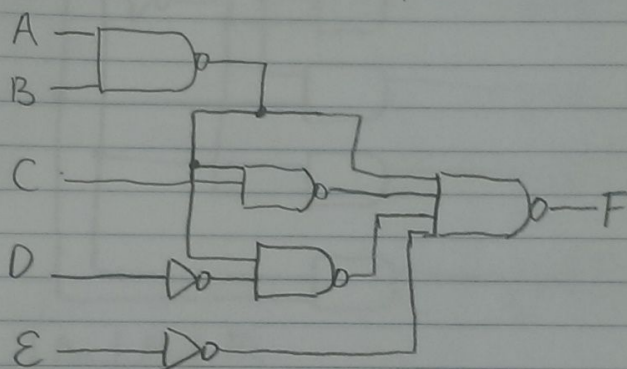
Chapter 3 Examples.

Example 3-1



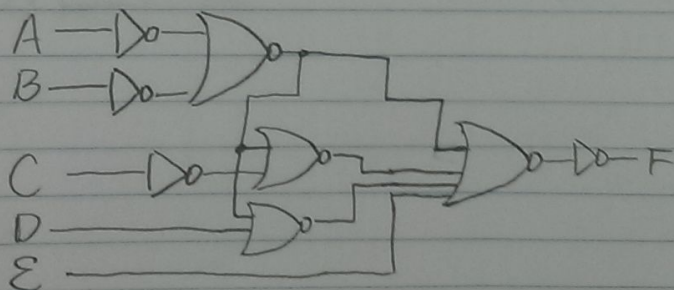
Example 3-2

Implementation with NAND Gate



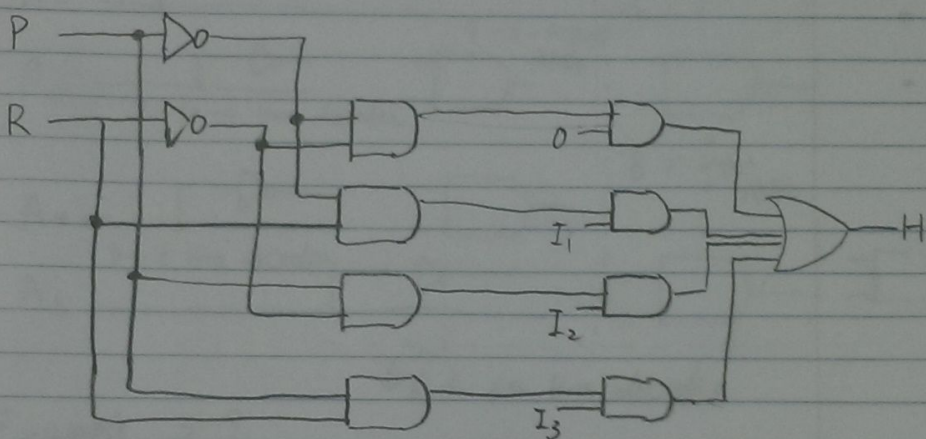
Example 3-3

Implementation with NOR Gates



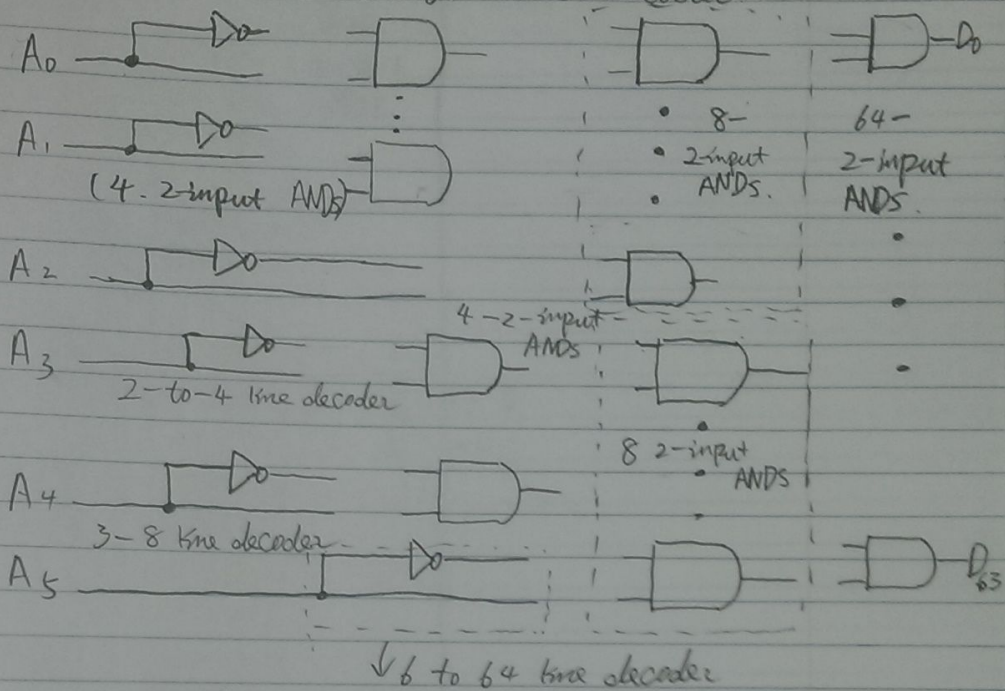
Example 3-4 Value Fixing

| Mode | | M_0 | M_1 | M_2 |
|------|---|---------------------------|---------|---------|
| P | R | $H = \bar{P}R + P\bar{R}$ | $H = P$ | $H = R$ |
| 0 | 0 | 0 | 0 | 0 |
| 0 | 1 | 1 | 0 | 1 |
| 1 | 0 | 1 | 1 | 0 |
| 1 | 1 | 0 | 1 | 1 |

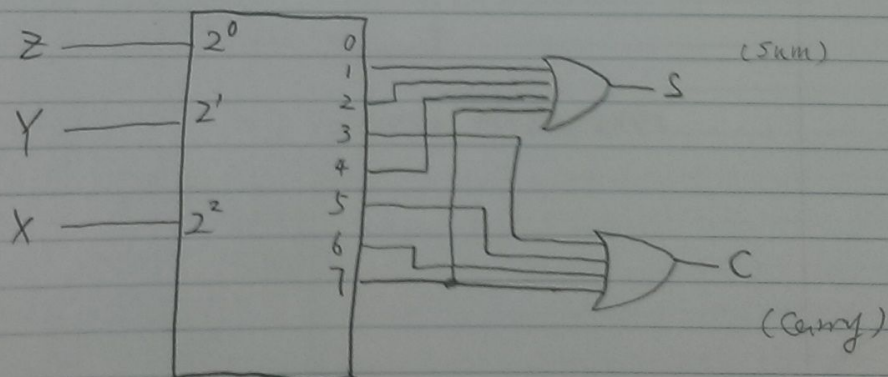


| | M_0 | M_1 | M_2 |
|-------|-------|-------|-------|
| I_1 | 1 | 0 | 1 |
| I_2 | 1 | 1 | 0 |
| I_3 | 0 | 1 | 1 |

Example 3-6 6-to-64-line Decoder



Example 3-9



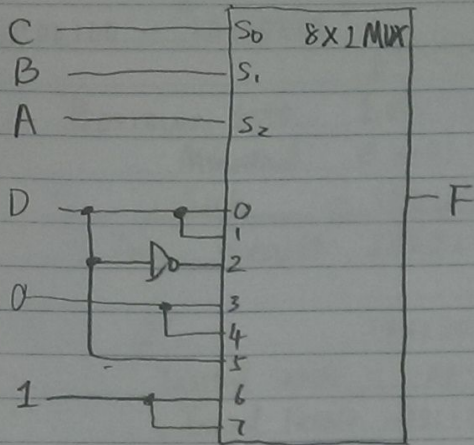
Example 3-15 multiplexer Implementation of binary adder Bit

| | | | |
|---|------------------|----------------|-----|
| X | S ₂ | Dual | |
| Y | S ₁ | 8-to-1 | |
| Z | S ₀ | MUX | |
| 0 | I _{0,0} | | |
| 0 | I _{0,1} | | |
| 1 | I _{1,0} | | |
| 0 | I _{1,1} | | |
| 1 | I _{2,0} | | |
| 0 | I _{2,1} | | |
| 0 | I _{3,0} | Y ₀ | — S |
| 1 | I _{3,1} | Y ₁ | — C |
| 1 | I _{4,0} | | |
| 0 | I _{4,1} | | |
| 0 | I _{5,0} | | |
| 1 | I _{5,1} | | |
| 0 | I _{6,0} | | |
| 1 | I _{6,1} | | |
| 1 | I _{7,0} | | |
| 1 | I _{7,1} | | |

Example 3-16 Alternative multiplexer

| | | | |
|---|------------------|----------------|-----|
| X | S ₁ | Dual | |
| Y | S ₀ | 4-to-1 MUX | |
| Z | I _{0,0} | | |
| 0 | I _{0,1} | | |
| Z | I _{1,0} | Y ₀ | — S |
| Z | I _{1,1} | Y ₁ | — C |
| Z | I _{2,0} | | |
| Z | I _{2,1} | | |
| Z | I _{3,0} | | |
| 1 | I _{3,1} | | |

Example 3-17 Multiplexer Implementation of 4-variable ^{Function}



Example 3-19 Unsigned Binary Subtraction
by 2's Complement subtract

$$01100100 - 10010110$$

$$\begin{array}{r} \text{Borrowed} \downarrow \\ \text{Borrow into } 100111100 \\ \text{Minuend } 01100100 \\ \text{Sub } -10010110 \\ \hline \text{Int Result } 11001110 \end{array}$$

$$\begin{array}{r} 2^8 \quad 100000000 \\ - \text{Initial result } -11001110 \\ \hline \text{Final Result } -00110010 \end{array}$$

Example 3-21

$$\begin{array}{rclcl} +6 & 00000110 & -6 & 11111010 & +6 & 00000110 & -6 \\ +13 & 00001101 & +13 & 00001101 & -13 & 11110011 & -13 \\ +19 & 00010011 & +7 & 00000111 & -7 & 11110011 & -19 \end{array}$$

$$\begin{array}{r} 11111010 \\ \rightarrow 11110011 \\ \hline 11101101 \end{array}$$

Example 3-22 signed binary sub using 2's Complement

$$\begin{array}{rclcl} -6 & 11111010 & 11111010 & +6 & 00000110 \\ -(-13) & -11110011 & +00001101 & -(-13) & -11110011 \\ +7 & & 00000111 & +19 & \end{array}$$

$$\begin{array}{r} 00000110 \\ + 00001101 \\ \hline 00010011 \end{array}$$