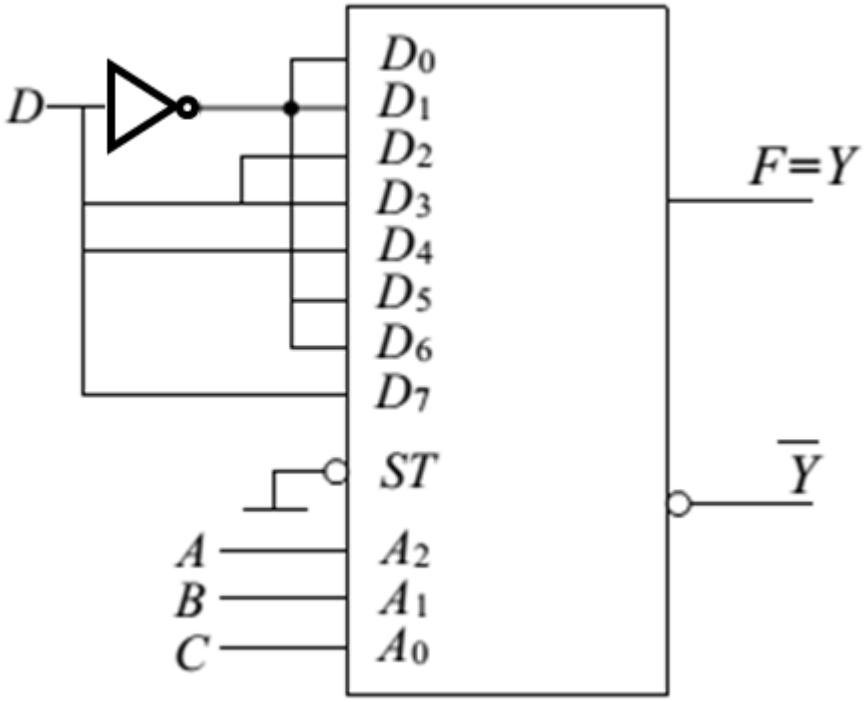
1. Quiz for Chapter 3&4&6

1) Give the canonical sum of product expression for the function which is implemented using the circuit on the right.



解：该电路是由 8 选 1 数据选择器 74LS151 构成的组合逻辑电路。

（1）分析图示电路，得到 8 选 1 数据选择器数据输入端数据

$$\begin{cases} D_0 = D_1 = D_5 = D_6 = \overline{D} \\ D_2 = D_3 = D_4 = D_7 = D \end{cases}$$

（2）写出 8 选 1 数据选择器输出逻辑表达式

$$Y = \overline{A_2}\,\overline{A_1}\,\overline{A_0}D_0 + \overline{A_2}\,\overline{A_1}A_0D_1 + \overline{A_2}A_1\overline{A_0}D_2 + \overline{A_2}A_1A_0D_3 + A_2\overline{A_1}\,\overline{A_0}D_4 + A_2\overline{A_1}A_0D_5 + A_2A_1\overline{A_0}D_6 + A_2A_1A_0D_7$$

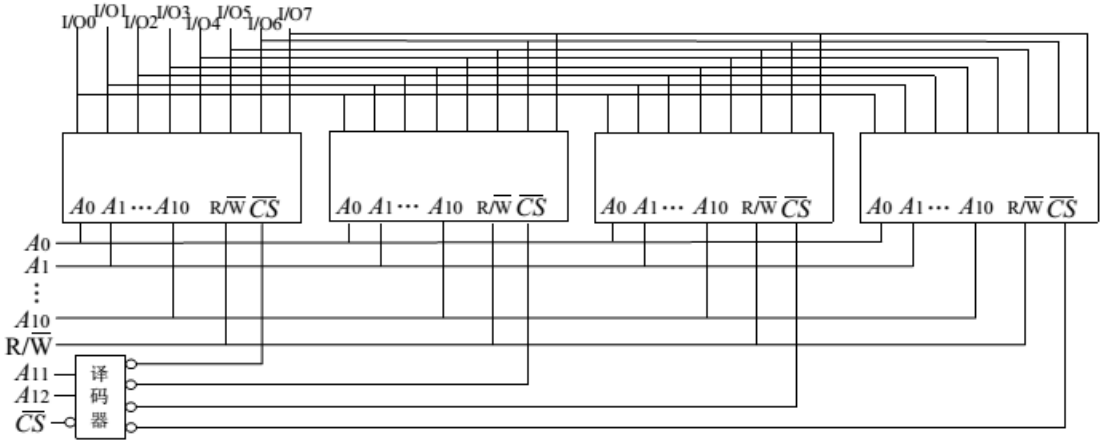
（3）令 $A = A_2$，$B = A_1$，$C = A_0$，将数据带入 8 选 1 数据选择器输出逻辑表达式可得：

$$F = Y = \overline{A}\overline{B}\overline{C}\overline{D} + \overline{A}\overline{B}C\overline{D} + \overline{A}B\overline{C}D + \overline{A}BCD + A\overline{B}\overline{C}D + A\overline{B}C\overline{D} + AB\overline{C}\overline{D} + ABCD$$

$$= m_0 + m_2 + m_5 + m_7 + m_9 + m_{10} + m_{12} + m_{15}$$

F(A, B, C, D) = $\sum_m$(0, 2, 5, 7, 9, 10, 12, 15)

2)Given a 2K x 8 ROM chip with Enable input, show the external connections necessary to construct a 8K x 8 ROM with four chips and a decoder.



3)Perform the arithmetic operations (+36) + (-24) and (-35) - (-24) in binary using signed 2s complement representation for negative numbers.

+36 = 0100100	36	0100100
- 24 = 1101000	+(–24)	+ 1101000
- 35 = 1011101		10001100
	= 12	= 0001100
	–35	1011101
	- (–24)	+ 0011000
	= –11	= 1110101