

计算机组成作业 1

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第一大题

1.导通，截止

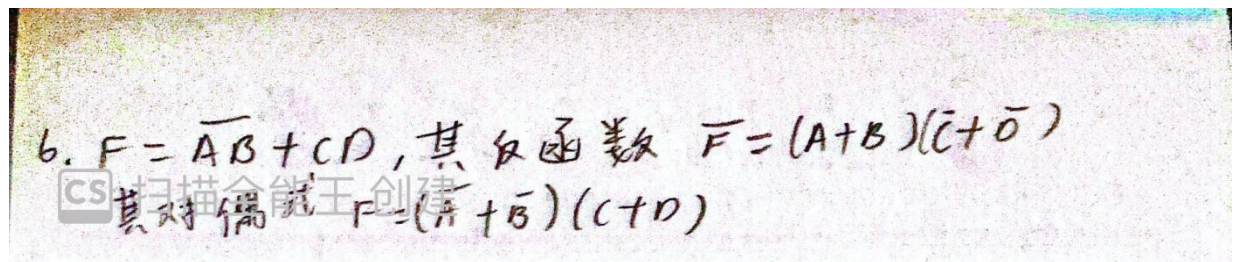
2.关态，低电平，开态，高电平

3.3.0v, 0.35v

4.ECL-TTL-CMOS（从快到慢），CMOS-TTL-ECL（抗干扰能力强弱），CMOS-TTL-ECL（静态功耗低和高）

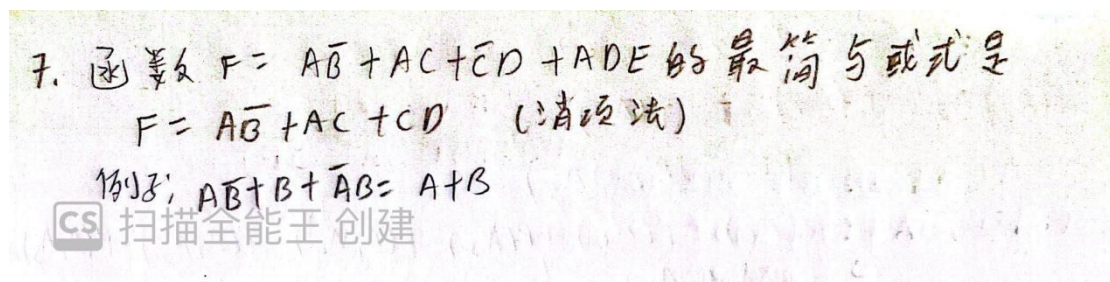
5.0 和 1

6.



6.  $F = \overline{A}B + CD$ , 其反函数  $\overline{F} = (A+B)(\overline{C}+\overline{D})$   
其对称偶  $F = (A+B)(C+D)$

7.



7. 函数  $F = A\overline{B} + AC + \overline{C}D + ADE$  的最简与或式是  
 $F = A\overline{B} + AC + CD$  (消项法)  
例子:  $AB + B + \overline{A}B = A + B$

8.存储电路，反馈电路，输入信号决定

9.编码

10.译码器，n 个输入，2n 输出

11.111011111

第二题

- 1.第 4 个, 大于 0.5v 小于 0.5v
- 2.第 3 个
- 3.第二个 答案是或逻辑
- 4.第 4 个
- 5.第 1 个 答案是 1
- 6.第 2 个 答案是 011
- 7.第 1 个 答案是互为反函数
- 8.第 3 个 答案是构成电路的逻辑元件存在传输延迟
- 9.第 3 个 答案是数据选择器
- 10.第 2 个 答案是半加
- 11.第 4 个 数值比较器

### 第三题

1.

三、  
1.  $F = ABC + \bar{A}BD$  标准与或表达式  
 $F = ABC(\bar{D} + D) + \bar{A}BD(\bar{C} + C)$   
 $F = \overset{1}{A}\overset{1}{B}\overset{1}{C}\overset{0}{D} + \overset{1}{A}\overset{1}{B}\overset{1}{C}\overset{1}{D} + \overset{0}{A}\overset{1}{B}\overset{0}{C}\overset{1}{D} + \overset{0}{A}\overset{1}{B}\overset{1}{C}\overset{0}{D}$   
 $F = m_5 + m_7 + m_{14} + m_{15}$  (从小到大)

2.

2.  $F = \overline{AB+B} + A\bar{C}$  的最简与或式  
 $F = \overline{B(A+C)} + A\bar{C}$   
 反演律  $F = \overline{B} + \overline{A+C} + A\bar{C}$   
 $F = \overline{B} + \bar{C}(\bar{A} + A)$   
 $F = \overline{B} + \bar{C}$

3.

A	B	C	F <sub>3</sub>
0	0	0	0
0	0	1	0
0	1	0	0
0	1	1	1
1	0	0	0
1	0	1	0
1	1	0	1
1	1	1	1

表达式  $F(A,B,C) = AB(C + \bar{C}) + BC(A + \bar{A})$   
 $= ABC + AB\bar{C} + \bar{A}BC$   
 $= \sum m(3, 6, 7)$

又  $\bar{A}BC + AB\bar{C} + \bar{A}BC$   
 $= BC(\bar{A} + A) + AC(\bar{B} + B) + AB(\bar{C} + C)$   
 $= BC + AC + AB$

```

module top_module(
    input A,B,C;
    output out
);
    assign out = B&C+A&C+A&B;
endmodule

```

4.

4. 用公式法证明下列等式

$AB + \bar{A}C + BCD = AB + A'C \Rightarrow B + C$

$\bar{B}C\bar{D} + B\bar{C}D + ACD + \bar{A}B\bar{C}\bar{D} + \bar{A}BCD + B\bar{C}\bar{D} + B\bar{C}D = B + C$

解： $\bar{B}C(\bar{D} + \bar{A}D) + BD + (A + \bar{A}B)(CD + B\bar{C}\bar{D})$   
 $= \bar{B}C\bar{D} + \bar{A}BC + BD + ACD + \bar{B}C\bar{D} + B\bar{C}\bar{D}$   
 $= \bar{B}C\bar{D} + \bar{B}CD + \bar{A}BC + BD + ACD + B\bar{C}\bar{D}$   
 $= \bar{B}C + \bar{A}BC + BD + ACD + B\bar{C}\bar{D} = \bar{B}C + BD + ACD + B\bar{C}\bar{D}$   
 $= \bar{B}C + B(D + \bar{C}\bar{D}) = \bar{B}C + BD + B\bar{C} = B + C$

$\bar{A}BCD$   
 $\downarrow$   
 $AB + \bar{A}C + BD$



5.

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5. 用8选1数据选择器(T74151)实现下列函数  
 $F(A, B, C, D, E) = \sum m(1, 2, 3, 4, 7, 8, 10, 13, 14, 17, 19, 20, 21, 23, 24, 26, 28, 30, 31)$

A	B	C	D	E	F
0	0	0	0	0	0
0	0	0	0	1	1
0	0	0	1	0	1
0	0	0	1	1	1
0	0	1	0	0	1
0	0	1	0	1	0
0	0	1	1	0	0
0	0	1	1	1	1
0	1	0	0	0	1
0	1	0	0	1	0
0	1	0	1	0	1
0	1	0	1	1	0
0	1	1	0	0	0
0	1	1	0	1	1
0	1	1	1	0	0
0	1	1	1	1	1
1	0	0	0	0	1
1	0	0	0	1	0
1	0	0	1	0	1
1	0	0	1	1	1
1	0	1	0	0	1
1	0	1	0	1	1
1	0	1	1	0	0
1	0	1	1	1	1

1	1	0	0	0	1
1	1	0	0	1	0
1	1	0	1	1	0
1	1	1	0	0	0
1	1	1	0	1	0
1	1	1	1	0	0
1	1	1	1	1	0

$$\frac{1}{2} A_2 A_1 A_0 = ABC$$

$$D_0 = D\bar{E}$$

$$D_1 = D \oplus E$$

$$D_2 = \bar{E}$$

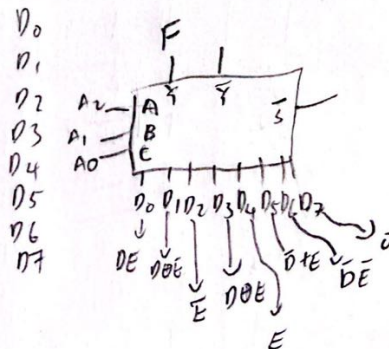
$$D_3 = D \oplus E$$

$$D_4 = E$$

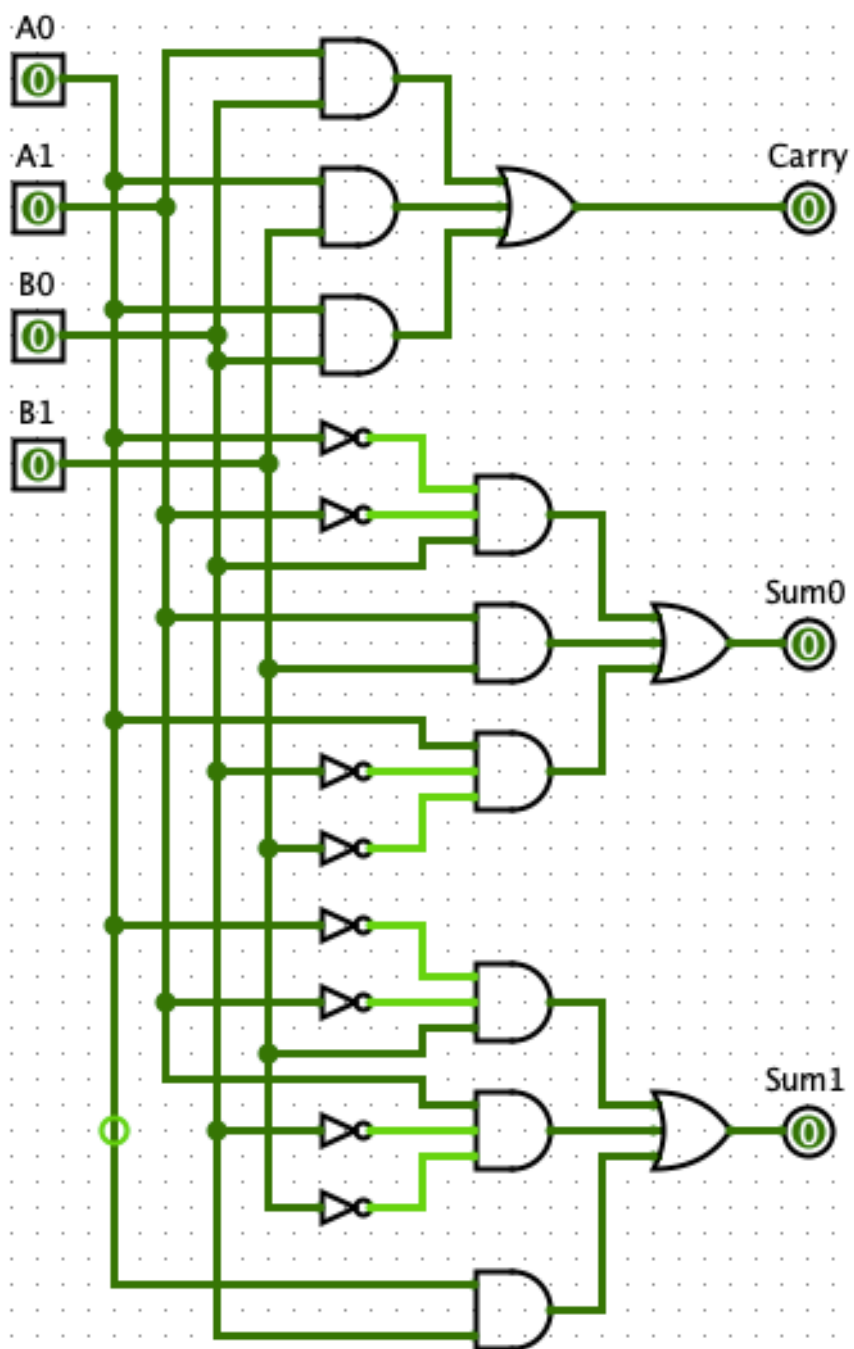
$$D_5 = \bar{D} + E$$

$$D_6 = \bar{D}\bar{E}$$

$$D_7 = 0$$



6.(1)





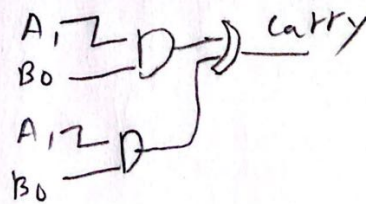
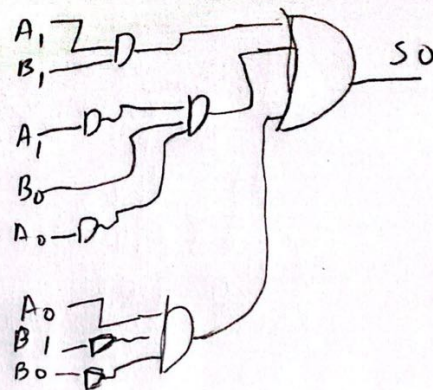
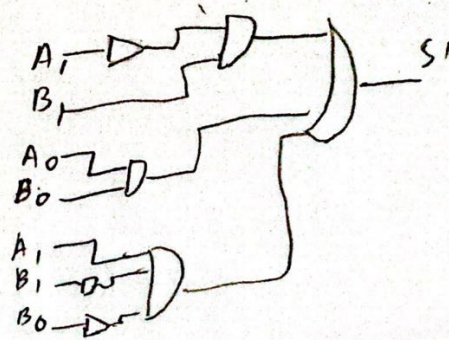
(下面这张图是 2)

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三进制全加器真值表

6. <span>二進制加減法</span>				
A	B	C	sum	carry
00	0000		00	00
00	0001		01	00
00	0010		10	00
000	100		01	00
0001	01		10	00
00	1000		10	00
001001			00	01
001010			01	01
010000			01	00
010001			10	00
010010			00	01
010100			10	00
010101			00	01
010110			01	01
011000			00	01
011001			01	01
011000			10	01
100000			10	00
100001			00	01
100010			01	01
100010			00	01
100101			01	01
100110			10	01
101000			01	01
101001			10	01
101010			00	10



扫描全能王创建

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7. 请给出7段数码管控制电路的输入输出  
信号真值表

11) 输入 输出 字形

D	C	B	A	F <sub>a</sub>	F <sub>b</sub>	F <sub>c</sub>	F <sub>d</sub>	F <sub>e</sub>	F <sub>f</sub>	F <sub>g</sub>	字形
0	0	0	0	1	1	1	1	1	1	0	0
0	0	0	1	0	0	0	0	0	0	0	1
0	0	1	0	1	0	1	1	0	0	1	2
0	0	1	1	1	0	0	1	0	0	1	3
0	1	0	0	0	1	0	0	0	1	1	4
0	1	0	1	1	1	0	1	0	0	1	5
0	1	1	0	1	1	1	1	1	0	1	6
0	1	1	1	1	0	0	0	0	0	0	7
1	0	0	0	1	1	1	1	1	1	1	8
1	0	0	1	1	1	0	0	0	1	1	9
1	0	1	0	1	1	1	0	1	1	1	A
1	0	1	1	0	1	1	1	1	0	1	B
1	1	0	0	1	1	1	1	0	0	0	C
1	1	0	1	0	0	1	1	1	1	1	D
1	1	1	0	1	1	1	1	0	0	1	E
1	1	1	1	1	1	1	0	0	0	1	F



7(2) 真值表 A 输出 1 的进制 f

$$a = \sum m(0, 2, 3, 5, 6, 7, 8, 9, 10, 12, 14, 15)$$

$$b = \sum m(0, 4, 5, 6, 8, 9, 10, 11, 12, 14, 15)$$

$$c = \sum m(0, 2, 6, 8, 10, 11, 12, 13, 14, 15)$$

$$d = \sum m(0, 2, 3, 5, 6, 8, 11, 12, 13, 14)$$

$$e = \sum m(0, 1, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12)$$

$$f = \sum m(0, 1, 2, 3, 4, 7, 8, 9, 10, 13)$$

$$g = \sum m(2, 3, 4, 5, 6, 8, 9, 10, 11, 13, 14, 15)$$

CS 扫描全能王 创建

```
module seg_dec(num,a_g); //71066001-陈伟杰的第七题 (3)
input[3:0] num;
output[6:0] a_g; //a_g 代表着abcdefg
reg[6:0] a_g;
always@(num)
begin
    case(num)
        4'd0:begin a_g<=7'b1111110; //这些都是我根据真值表所输出的数 比如这个是0
        4'd1:begin a_g<=7'b0000110; //1
        4'd2:begin a_g<=7'b1011011; //2
        4'd3:begin a_g<=7'b1001111; //3
        4'd4:begin a_g<=7'b0100111; //4
        4'd5:begin a_g<=7'b1101101; //5
        4'd6:begin a_g<=7'b1111101; //6
        4'd7:begin a_g<=7'b1000110; //7
        4'd8:begin a_g<=7'b1111111; //8
        4'd9:begin a_g<=7'b1100111; //9
        4'da:begin a_g<=7'b1110111; //A
        4'db:begin a_g<=7'b0111101; //B
        4'dc:begin a_g<=7'b1111000; //C
        4'dd:begin a_g<=7'b0011111; //D
        4'de:begin a_g<=7'b1111001; //E
        4'df:begin a_g<=7'b1110001; //F
    endcase
end
endmodule
```