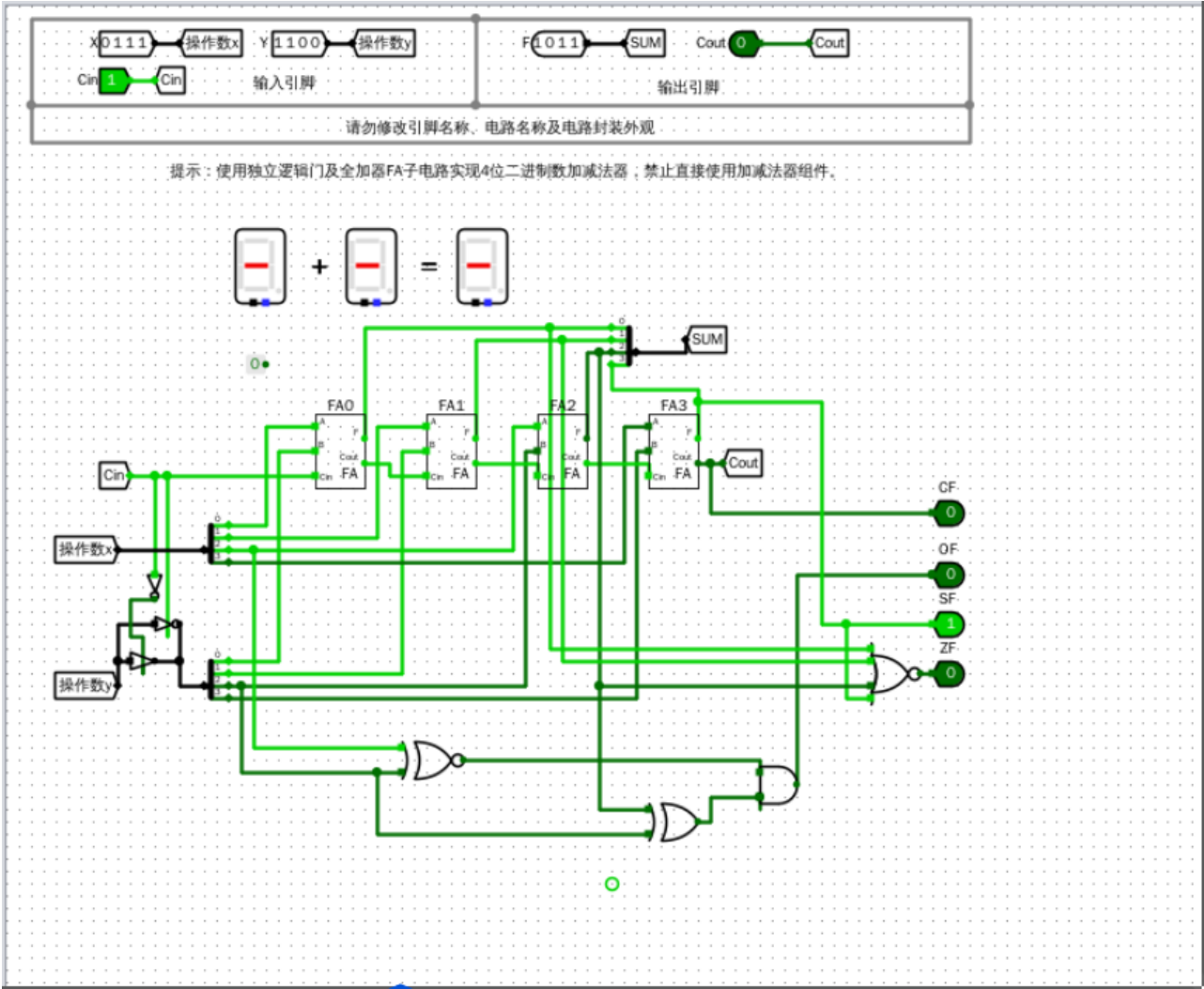


实验报告

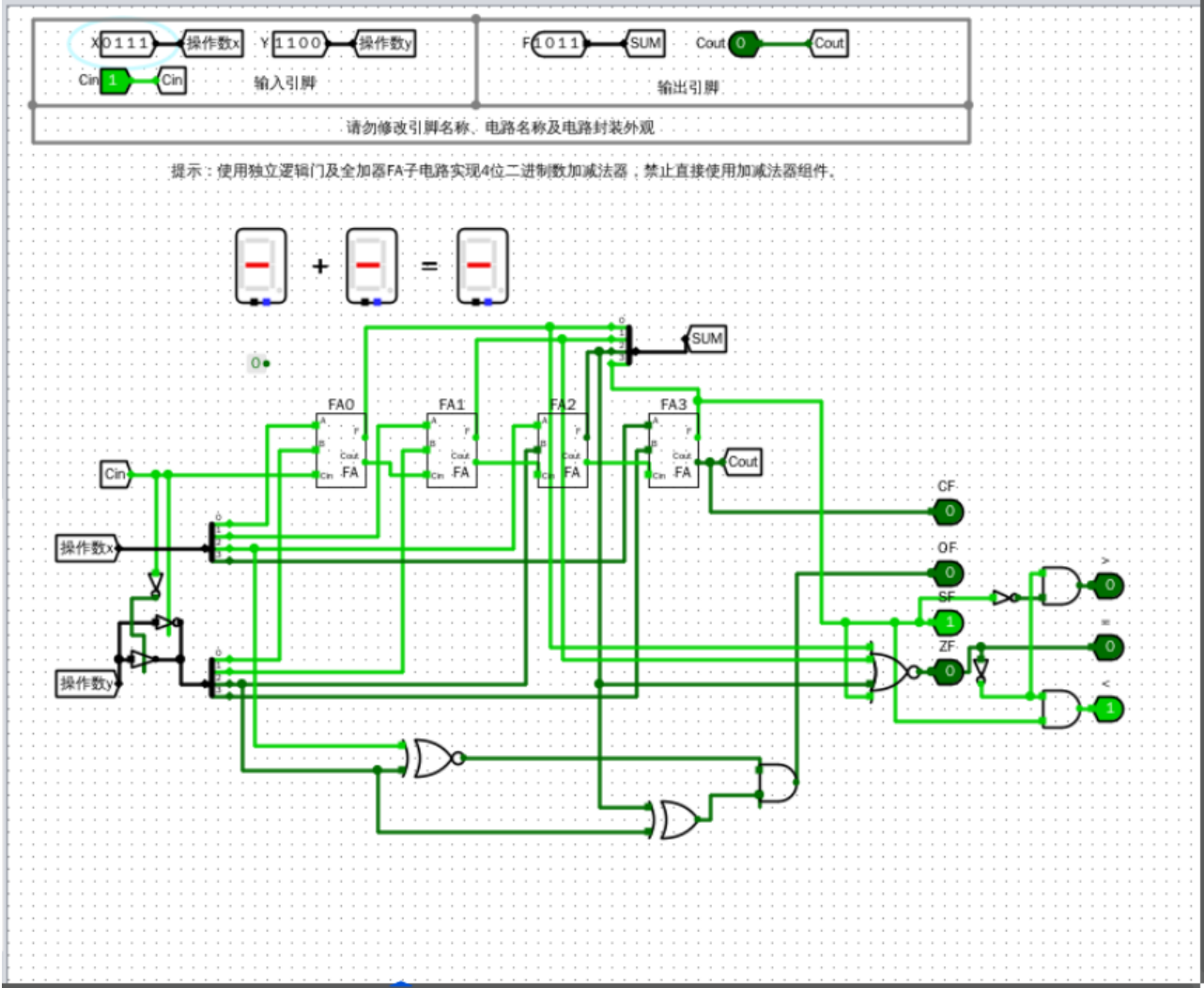
思考题

1. 修改实验中的加法器电路，生成进位标志 CF、溢出标志 OF、符号标志 SF 和结果为零标志位 ZF。



如此实现

2. 在执行比较指令时，通常使用减法运算后，判断标志位的方式来实现，试通过上述加法器实验举例说明判别的方法



如此实现两个无符号二进制的比较

3. 如何使用 8 位桶形移位器扩展到 32 位桶形移位器。8 位桶形移位器由三个模块组成，即移动1位置、移动2位、移动4位。要实现32位桶形移位器，还需要实现移动8位、移动16位的模块，原理一致。

基本信息

实验名称：基本逻辑部件设计 实验人：241220071葛家韬

实验目的

- 1. 学习组合逻辑电路的设计方法和步骤，掌握译码器、编码器等组合部件的设计方法。
- 2. 掌握串行加法器设计方法，理解减法和比较运算的实现方法。
- 3. 掌握汉明码校验电路的设计方法。
- 4. 掌握桶形移位器的设计方法。

实验环境

Logisim 2.16

实验内容

1.译码器实验

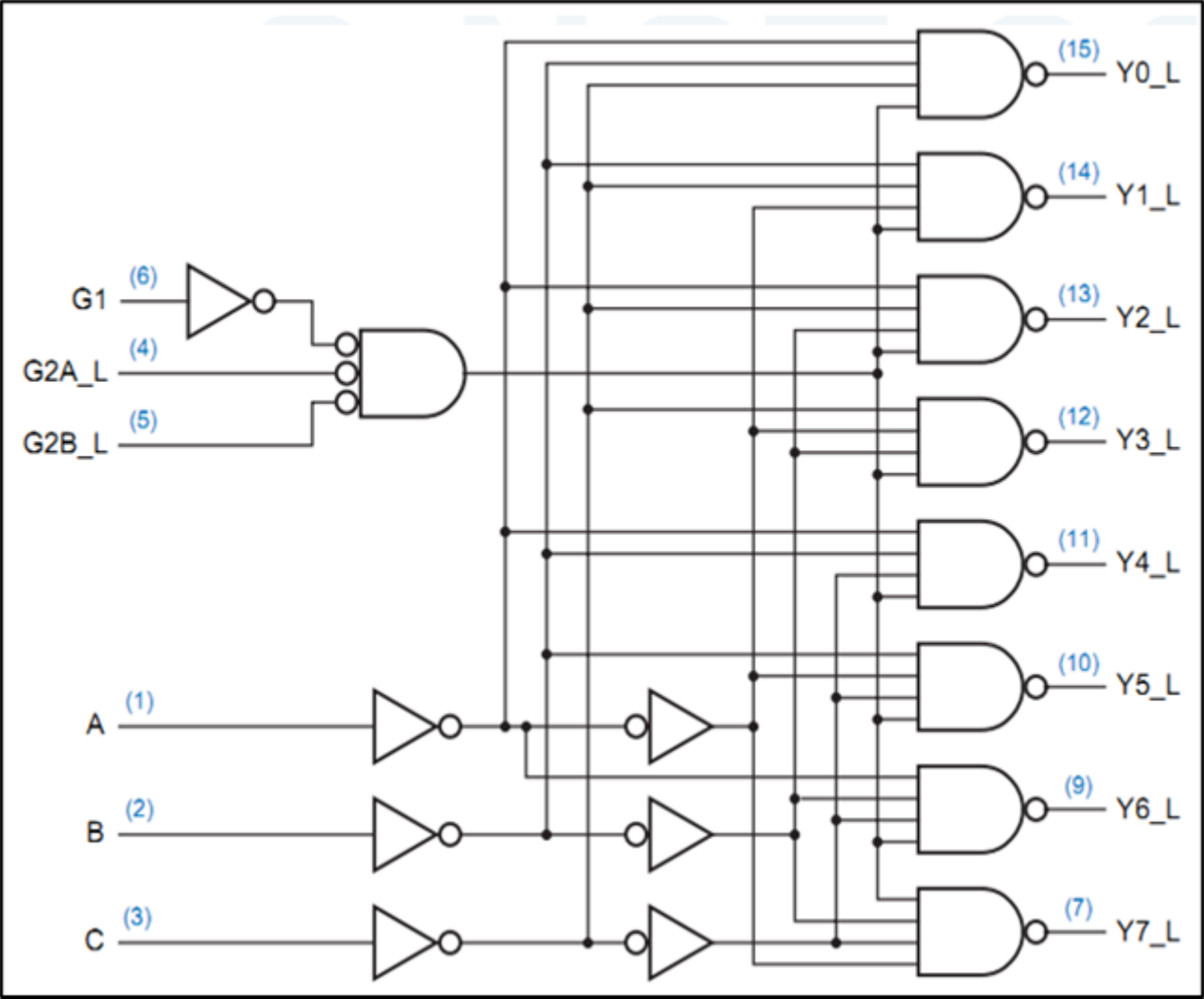
(1) 实验整体方案设计

要求：说明本次实验的顶层设计模块图，对每个子模块进行详细描述，定义输入输出引脚，数据及控制信号的传输通道等。

实验电路较为简单，不需要顶层模块设计图。

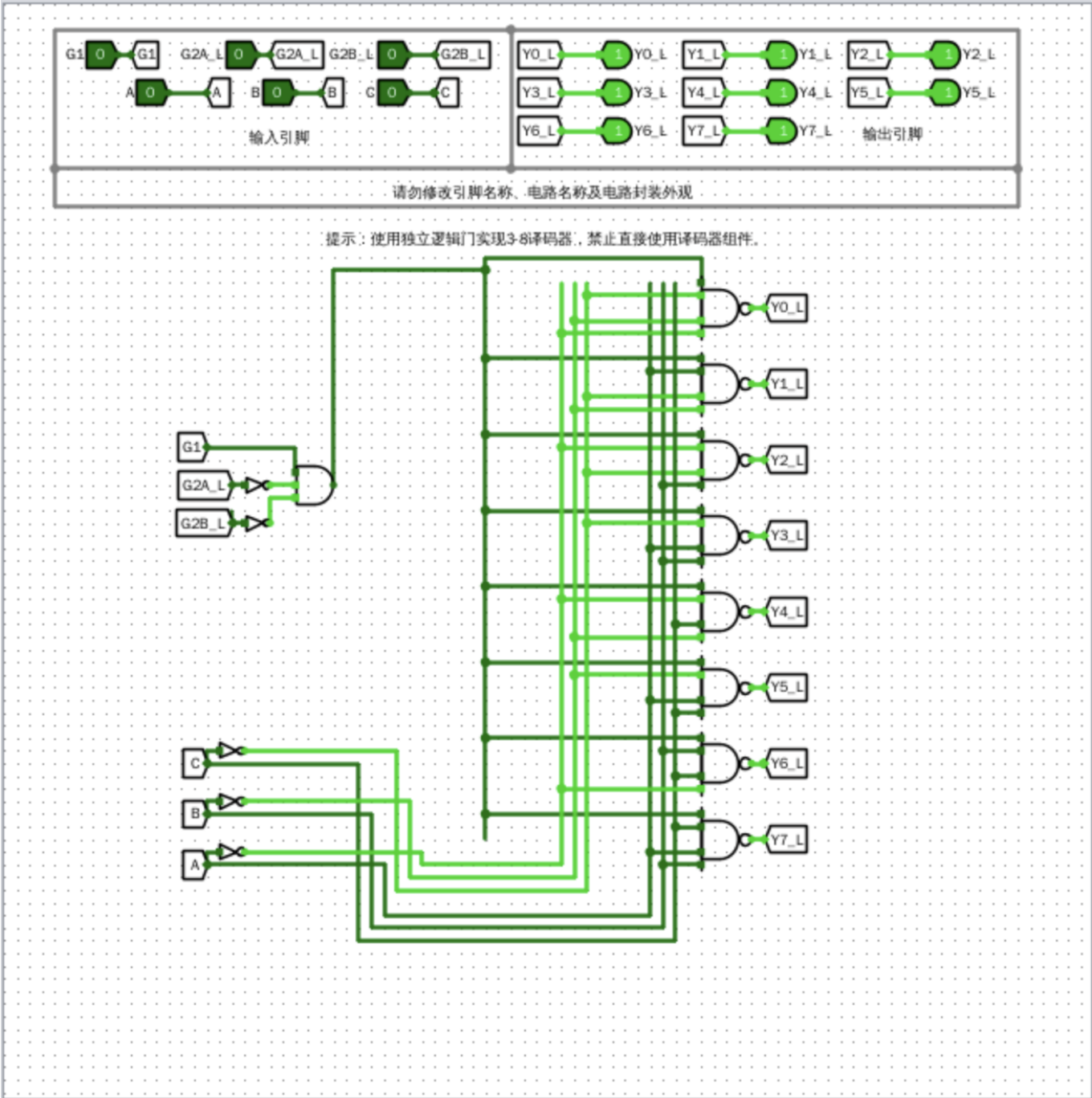
(2) 实验原理图和电路图

要求：给出每个子模块的原理图和 Logisim 中的电路图，定义子模块的外观图。如果对实验指导讲义中的内容提出优化或改进，需要此说明原因、方法和效果。



3-8

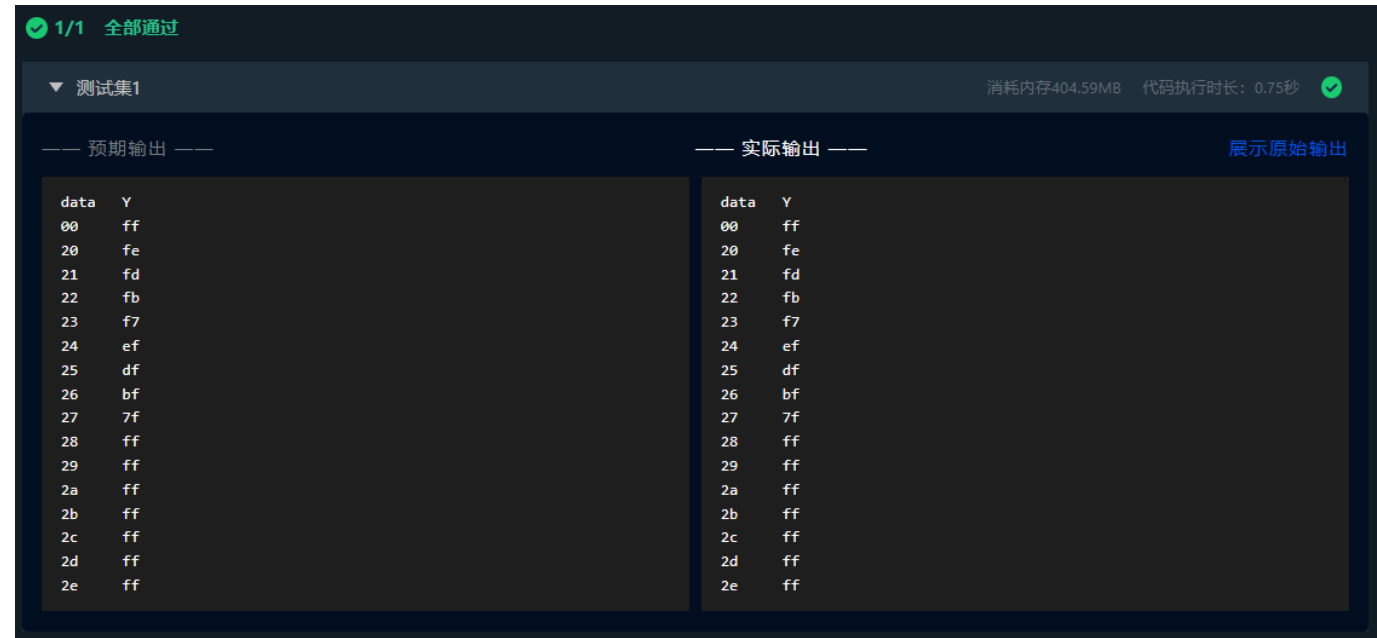
译码器原理图



3-8译码器电路图

(3) 实验数据仿真测试图

要求：根据实验要求，输入测试数据，选择单步时钟执行，截取仿真运行时的电路图，分析电路状态是否满足设计需求。说明子模块的功能，列出子模块的功能表。



仿真测试截图

真值表

附在实验报告末尾

(4) 错误现象及分析

要求：在电路设计、连接和仿真运行时，遇到的任何错误，都需要截屏放置到实验报告中，并分析错误原因和解决办法。

在完成实验的过程中，没有遇到任何错误。

2.编码器实验

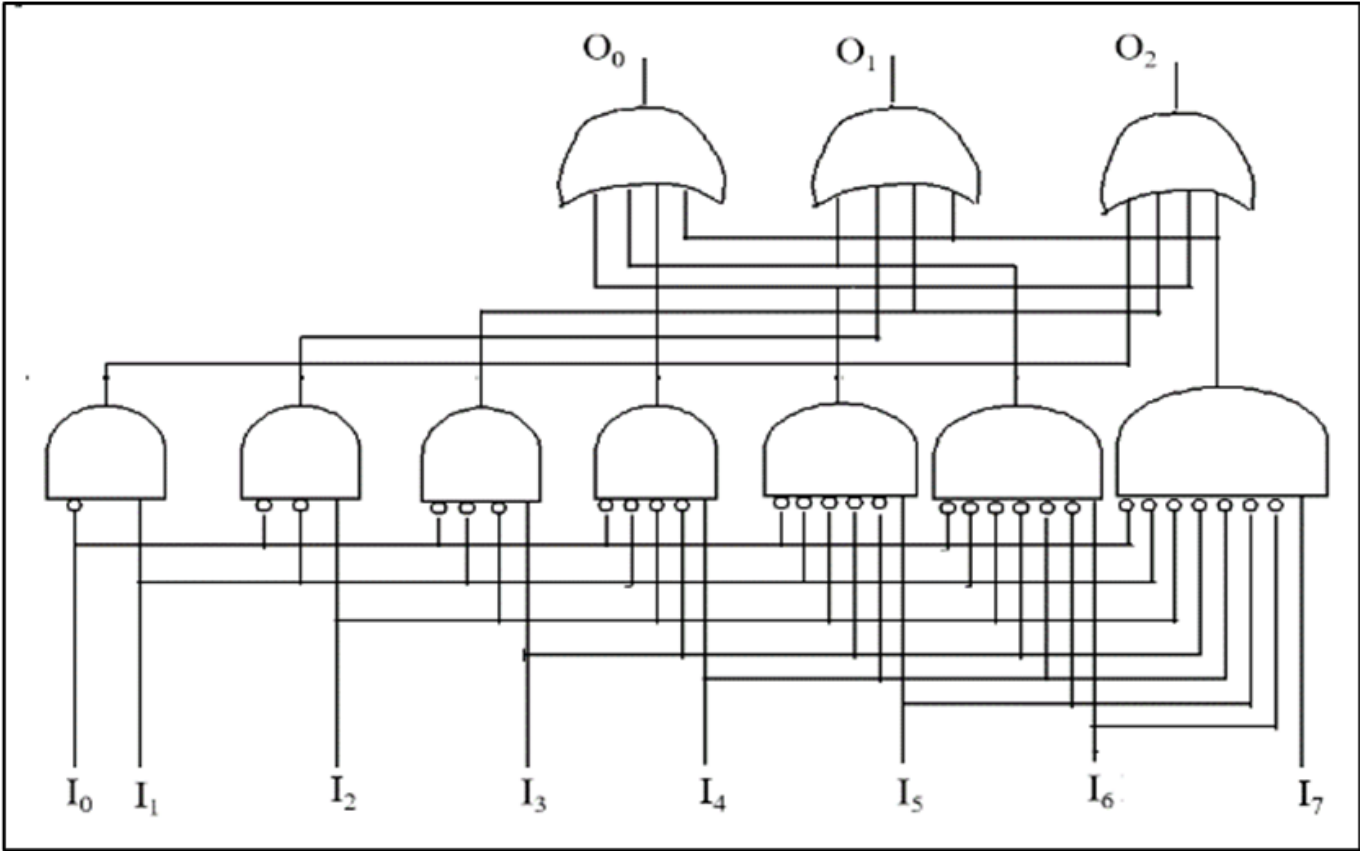
(1) 实验整体方案设计

要求：说明本次实验的顶层设计模块图，对每个子模块进行详细描述，定义输入输出引脚，数据及控制信号的传输通道等。

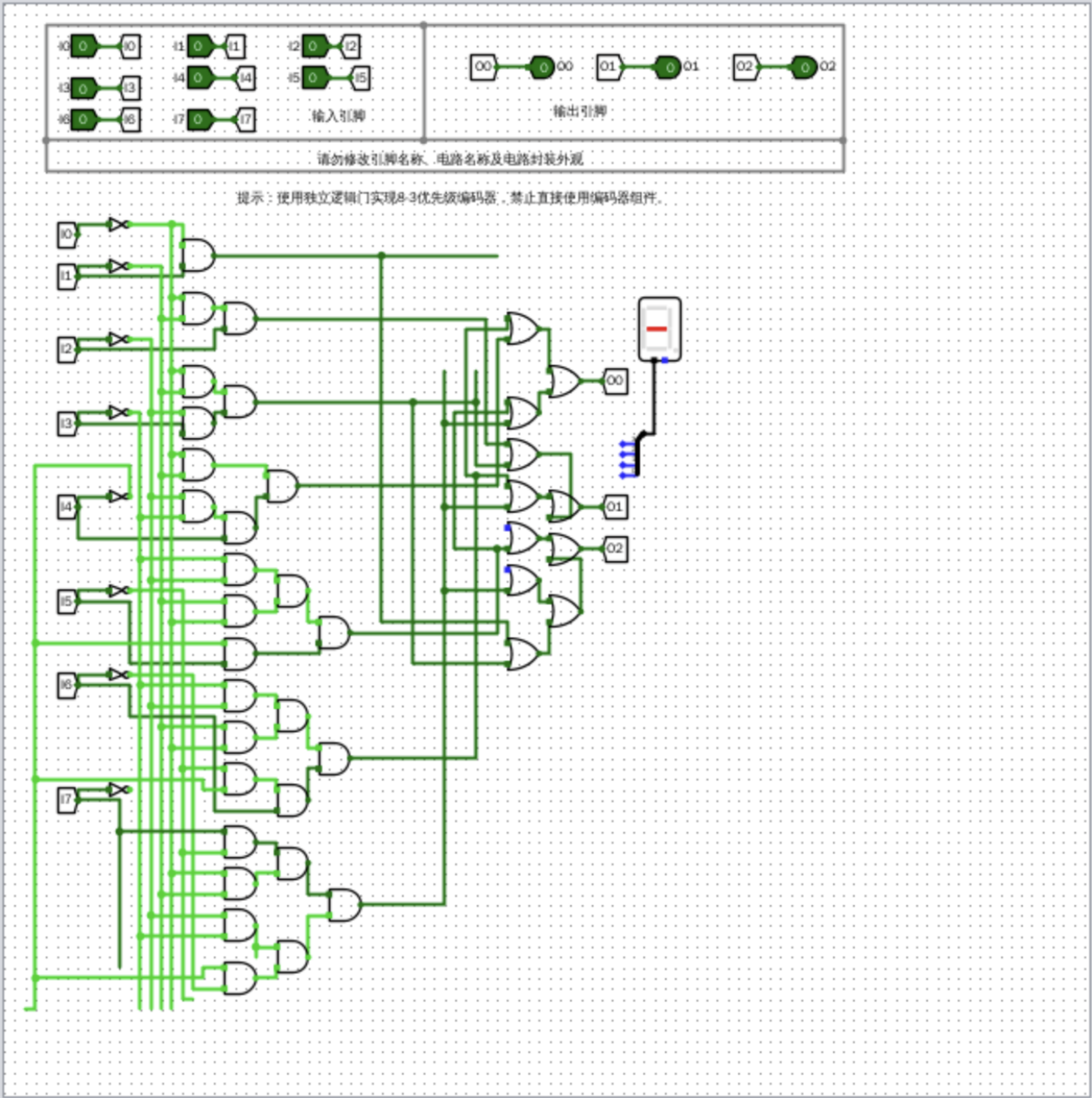
实验电路较为简单，不需要顶层模块设计图。

(2) 实验原理图和电路图

要求：给出每个子模块的原理图和 Logisim 中的电路图，定义子模块的外观图。如果对实验指导讲义中的内容提出优化或改进，需要此说明原因、方法和效果。



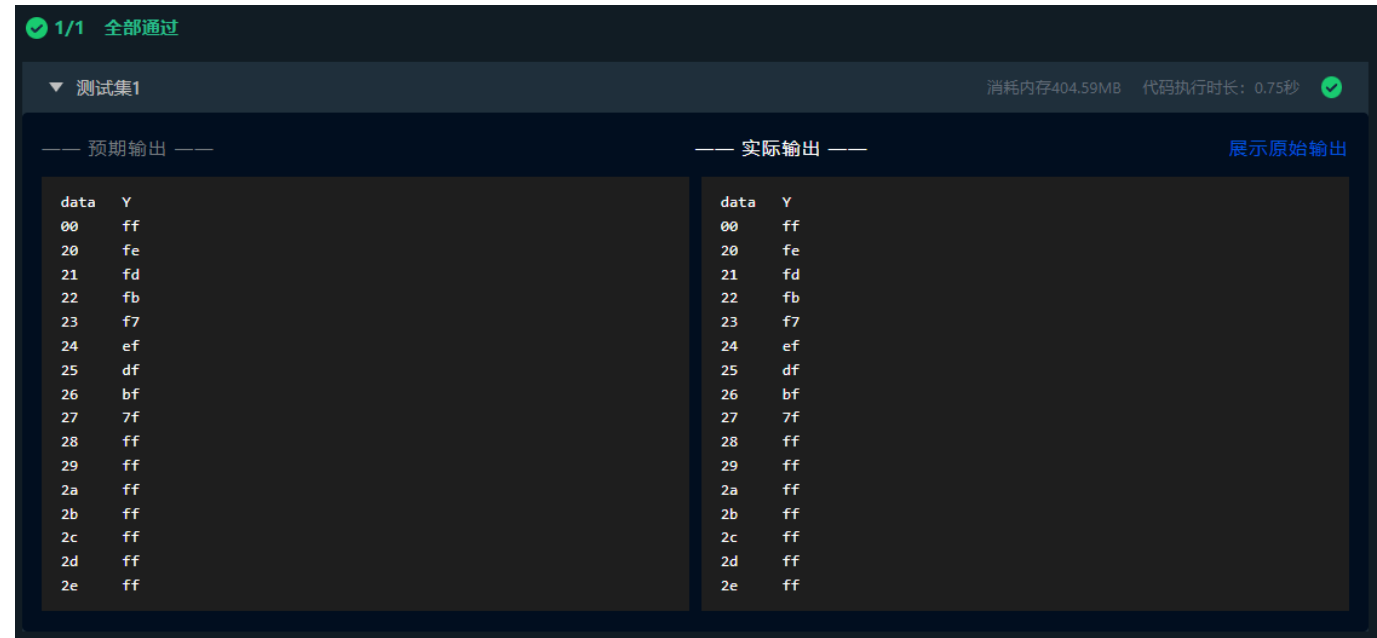
编码器原理图



编码器电路图

(3) 实验数据仿真测试图

要求：根据实验要求，输入测试数据，选择单步时钟执行，截取仿真运行时的电路图，分析电路状态是否满足设计需求。说明子模块的功能，列出子模块的功能表。



仿真测试截图

真值表

附在实验报告末尾

(4) 错误现象及分析

要求：在电路设计、连接和仿真运行时，遇到的任何错误，都需要截屏放置到实验报告中，并分析错误原因和解决办法。

在完成实验的过程中，没有遇到任何错误。

3.加减法器实验

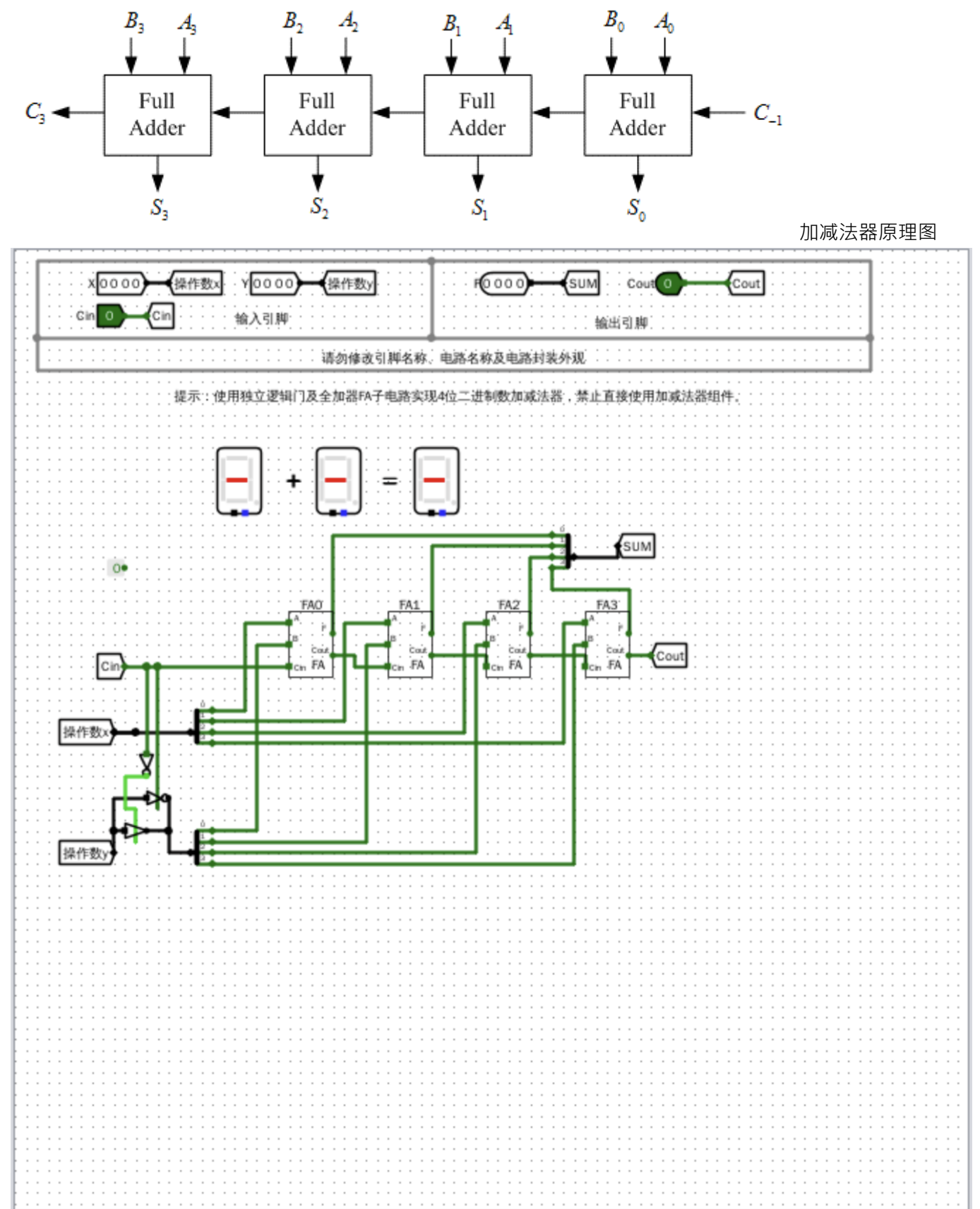
(1) 实验整体方案设计

要求：说明本次实验的顶层设计模块图，对每个子模块进行详细描述，定义输入输出引脚，数据及控制信号的传输通道等。

实验电路较为简单，不需要顶层模块设计图。

(2) 实验原理图和电路图

要求：给出每个子模块的原理图和 Logisim 中的电路图，定义子模块的外观图。如果对实验指导讲义中的内容提出优化或改进，需要此说明原因、方法和效果。



加减法器原理图

加减法器电路图

(3) 实验数据仿真测试图

要求：根据实验要求，输入测试数据，选择单步时钟执行，截取仿真运行时的电路图，分析电路状态是否满足设计需求。说明子模块的功能，列出子模块的功能表。

1/1 全部通过

测试集1

消耗内存381.96MB 代码执行时长: 1.11秒

预期输出

Cnt	X	Y	Cin	Sum	Cout
000	0	0	0	0	0
001	1	0	0	1	0
002	2	0	0	2	0
003	3	0	0	3	0
004	4	0	0	4	0
005	5	0	0	5	0
006	6	0	0	6	0
007	7	0	0	7	0
008	8	0	0	8	0
009	9	0	0	9	0
00a	a	0	0	a	0
00b	b	0	0	b	0
00c	c	0	0	c	0
00d	d	0	0	d	0
00e	e	0	0	e	0
00f	f	0	0	f	0
010	0	1	0	1	0
011	1	1	0	2	0
012	2	1	0	3	0
013	3	1	0	4	0
014	4	1	0	5	0
015	5	1	0	6	0
016	6	1	0	7	0
017	7	1	0	8	0
018	8	1	0	9	0
019	9	1	0	a	0
01a	a	1	0	b	0
01b	b	1	0	c	0
01c	c	1	0	d	0
01d	d	1	0	e	0
01e	e	1	0	f	0
01f	f	1	0	0	1

实际输出

Cnt	X	Y	Cin	Sum	Cout
000	0	0	0	0	0
001	1	0	0	1	0
002	2	0	0	2	0
003	3	0	0	3	0
004	4	0	0	4	0
005	5	0	0	5	0
006	6	0	0	6	0
007	7	0	0	7	0
008	8	0	0	8	0
009	9	0	0	9	0
00a	a	0	0	a	0
00b	b	0	0	b	0
00c	c	0	0	c	0
00d	d	0	0	d	0
00e	e	0	0	e	0
00f	f	0	0	f	0
010	0	1	0	1	0
011	1	1	0	2	0
012	2	1	0	3	0
013	3	1	0	4	0
014	4	1	0	5	0
015	5	1	0	6	0
016	6	1	0	7	0
017	7	1	0	8	0
018	8	1	0	9	0
019	9	1	0	a	0
01a	a	1	0	b	0
01b	b	1	0	c	0
01c	c	1	0	d	0
01d	d	1	0	e	0
01e	e	1	0	f	0
01f	f	1	0	0	1

展示原始输出

仿真测试截图

真值表

附在实验报告末尾

4.汉明码校验电路

(1) 实验整体方案设计

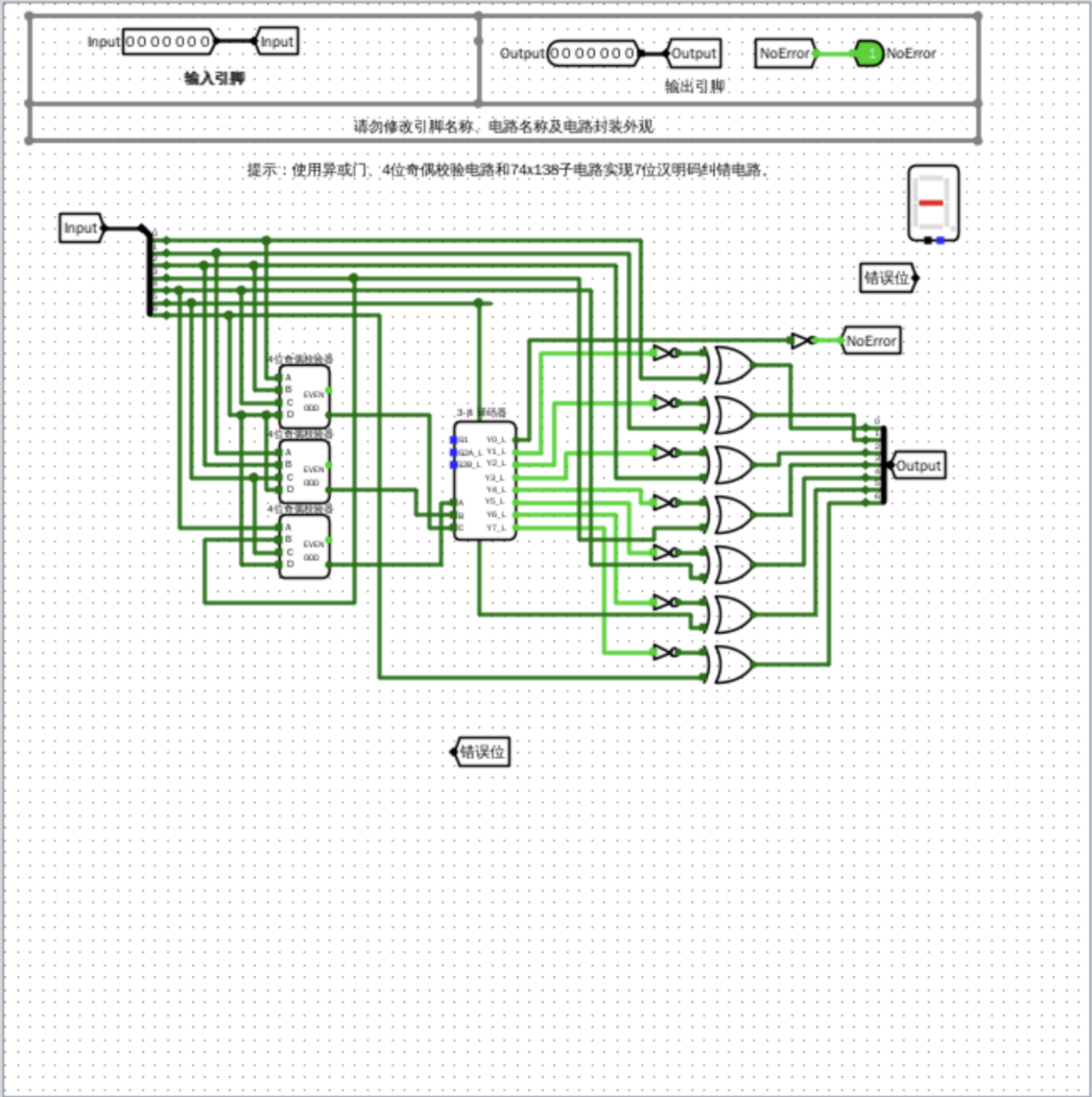
要求：说明本次实验的顶层设计模块图，对每个子模块进行详细描述，定义输入输出引脚，数据及控制信号的传输通道等。

实验电路较为简单，不需要顶层模块设计图。

(2) 实验原理图和电路图

要求：给出每个子模块的原理图和 Logisim 中的电路图，定义子模块的外观图。如果对实验指导讲义中的内容提出优化或改进，需要此说明原因、方法和效果。

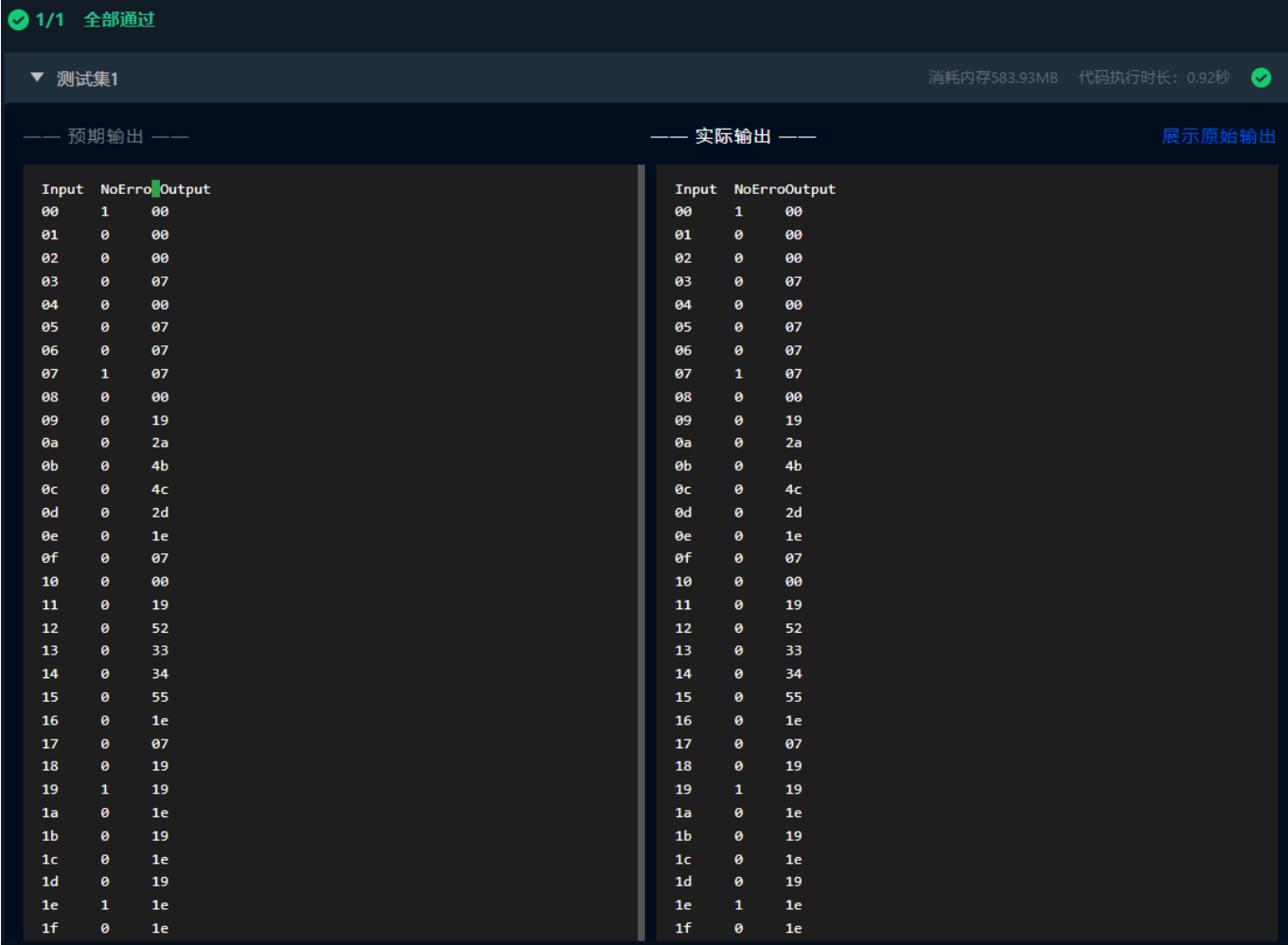
汉明码校验电路原理图



汉明码校验电路电路图

(3) 实验数据仿真测试图

要求：根据实验要求，输入测试数据，选择单步时钟执行，截取仿真运行时的电路图，分析电路状态是否满足设计需求。说明子模块的功能，列出子模块的功能表。



仿真测试截图

真值表

附在实验报告末尾

(4) 错误现象及分析

要求：在电路设计、连接和仿真运行时，遇到的任何错误，都需要截屏放置到实验报告中，并分析错误原因和解决办法。

在完成实验的过程中，没有遇到任何错误。

附件 真值表

5.桶形移位器

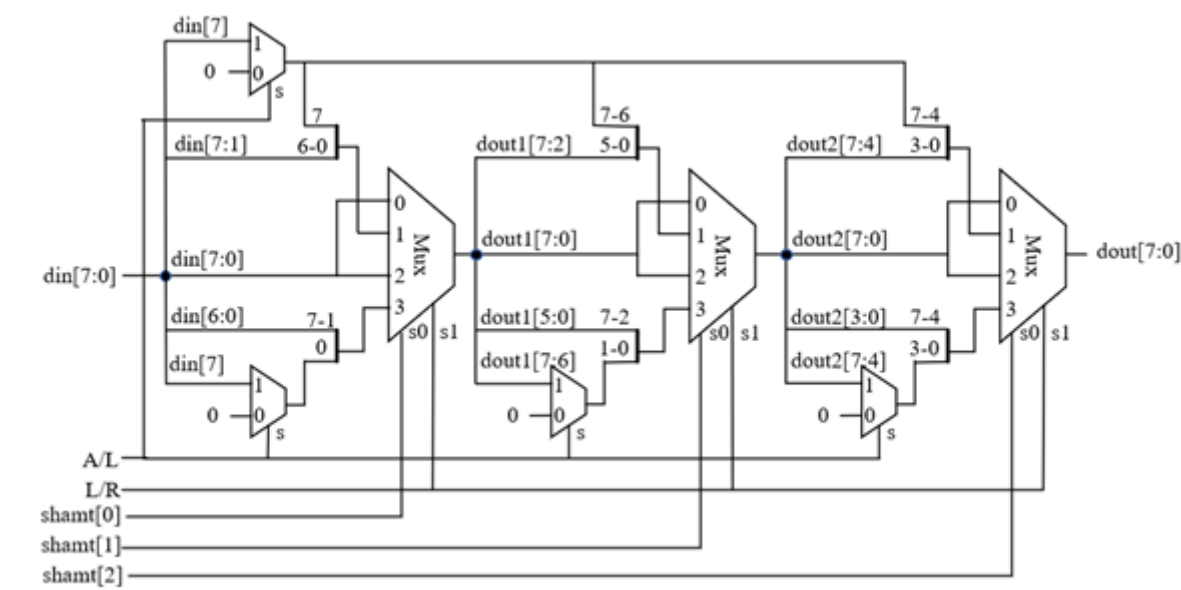
(1) 实验整体方案设计

要求：说明本次实验的顶层设计模块图，对每个子模块进行详细描述，定义输入输出引脚，数据及控制信号的传输通道等。

实验电路较为简单，不需要顶层模块设计图。

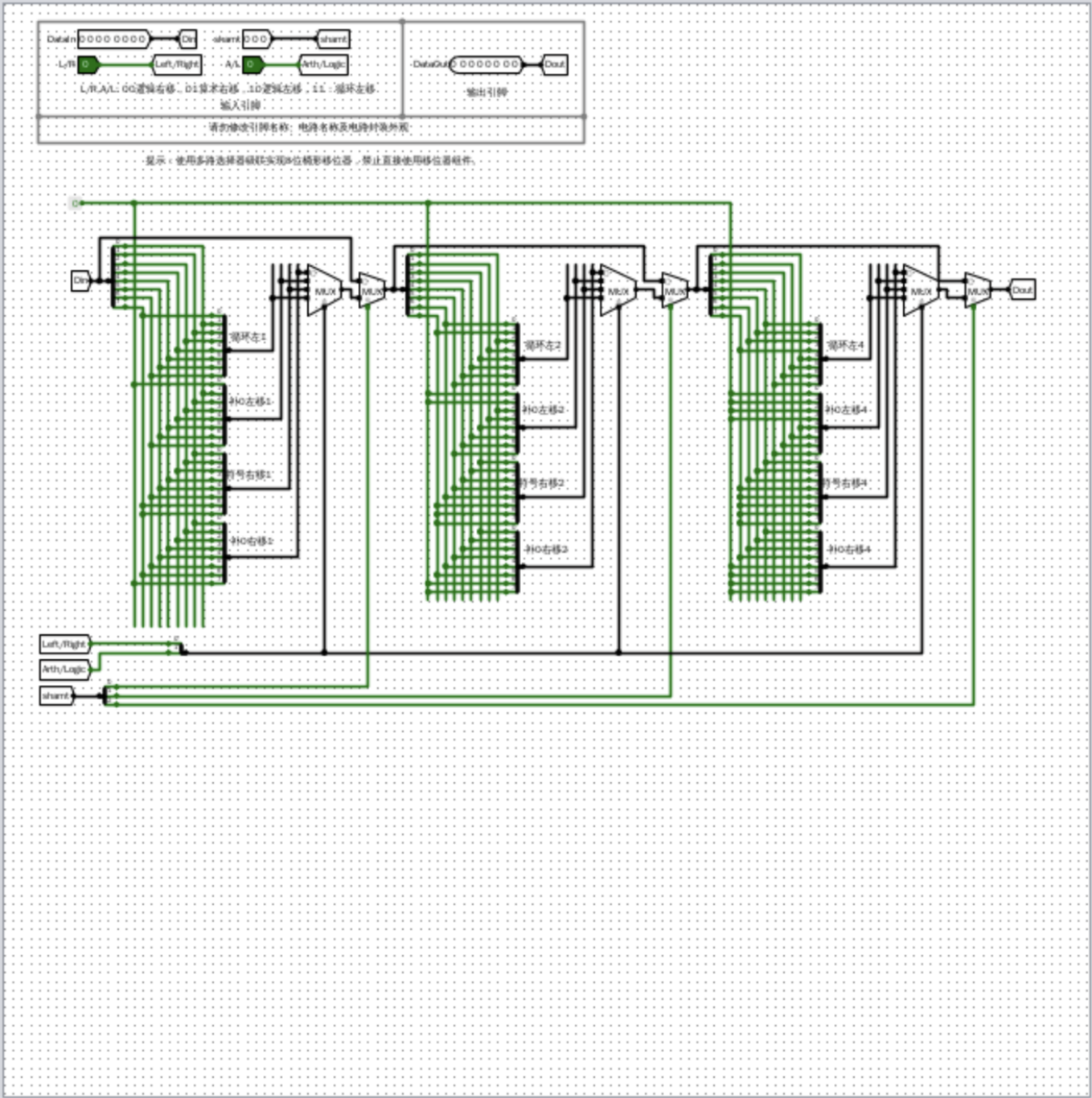
(2) 实验原理图和电路图

要求：给出每个子模块的原理图和 Logisim 中的电路图，定义子模块的外观图。如果对实验指导讲义中的内容提出优化或改进，需要此说明原因、方法和效果。



桶形移位器原

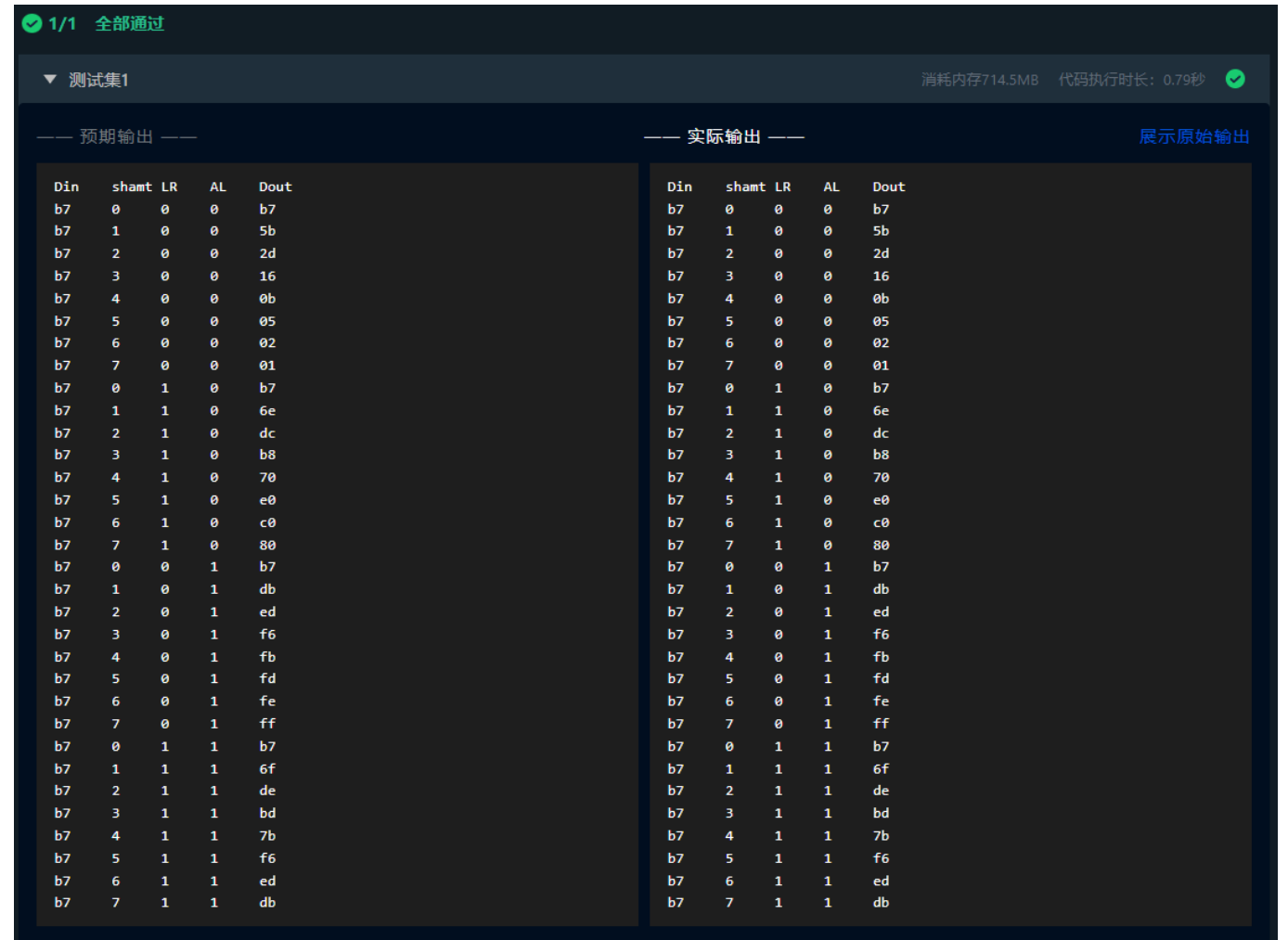
理图



桶形移位器电路图

(3) 实验数据仿真测试图

要求：根据实验要求，输入测试数据，选择单步时钟执行，截取仿真运行时的电路图，分析电路状态是否满足设计需求。说明子模块的功能，列出子模块的功能表。



仿真测试截图

真值表

附在实验报告末尾

(4) 错误现象及分析

要求：在电路设计、连接和仿真运行时，遇到的任何错误，都需要截屏放置到实验报告中，并分析错误原因和解决办法。

在完成实验的过程中，没有遇到任何错误。

附件 真值表

译码器实验

G1	G2A_L	G2B_L	A	B	C	Y0_L	Y1_L	Y2_L	Y3_L	Y4_L	Y5_L	Y6_L	Y7_L
0	0	0	0	0	0	1	1	1	1	1	1	1	1
0	0	0	0	0	1	1	1	1	1	1	1	1	1
0	0	0	0	1	0	1	1	1	1	1	1	1	1
0	0	0	0	1	1	1	1	1	1	1	1	1	1

G1	G2A_L	G2B_L	A	B	C	Y0_L	Y1_L	Y2_L	Y3_L	Y4_L	Y5_L	Y6_L	Y7_L
0	0	0	1	0	0	1	1	1	1	1	1	1	1
0	0	0	1	0	1	1	1	1	1	1	1	1	1
0	0	0	1	1	0	1	1	1	1	1	1	1	1
0	0	0	1	1	1	1	1	1	1	1	1	1	1
0	0	1	0	0	0	1	1	1	1	1	1	1	1
0	0	1	0	0	1	1	1	1	1	1	1	1	1
0	0	1	0	1	0	1	1	1	1	1	1	1	1
0	0	1	0	1	1	1	1	1	1	1	1	1	1
0	0	1	1	0	0	1	1	1	1	1	1	1	1
0	0	1	1	0	1	1	1	1	1	1	1	1	1
0	0	1	1	1	0	1	1	1	1	1	1	1	1
0	0	1	1	1	1	1	1	1	1	1	1	1	1
0	1	0	0	0	0	1	1	1	1	1	1	1	1
0	1	0	0	0	1	1	1	1	1	1	1	1	1
0	1	0	0	1	0	1	1	1	1	1	1	1	1
0	1	0	0	1	1	1	1	1	1	1	1	1	1
0	1	0	1	0	0	1	1	1	1	1	1	1	1
0	1	0	1	0	1	1	1	1	1	1	1	1	1
0	1	0	1	1	0	1	1	1	1	1	1	1	1
0	1	0	1	1	1	1	1	1	1	1	1	1	1
0	1	1	0	0	0	1	1	1	1	1	1	1	1
0	1	1	0	0	1	1	1	1	1	1	1	1	1
0	1	1	0	1	0	1	1	1	1	1	1	1	1
0	1	1	0	1	1	1	1	1	1	1	1	1	1
0	1	1	1	0	0	1	1	1	1	1	1	1	1
0	1	1	1	0	1	1	1	1	1	1	1	1	1
0	1	1	1	1	0	1	1	1	1	1	1	1	1
0	1	1	1	1	1	1	1	1	1	1	1	1	1
1	0	0	0	0	0	0	1	1	1	1	1	1	1
1	0	0	0	0	1	1	1	1	1	0	1	1	1

G1	G2A_L	G2B_L	A	B	C	Y0_L	Y1_L	Y2_L	Y3_L	Y4_L	Y5_L	Y6_L	Y7_L
1	0	0	0	1	0	1	1	0	1	1	1	1	1
1	0	0	0	1	1	1	1	1	1	1	1	0	1
1	0	0	1	0	0	1	0	1	1	1	1	1	1
1	0	0	1	0	1	1	1	1	1	1	0	1	1
1	0	0	1	1	0	1	1	1	0	1	1	1	1
1	0	0	1	1	1	1	1	1	1	1	1	1	0
1	0	1	0	0	0	1	1	1	1	1	1	1	1
1	0	1	0	0	1	1	1	1	1	1	1	1	1
1	0	1	0	1	0	1	1	1	1	1	1	1	1
1	0	1	0	1	1	1	1	1	1	1	1	1	1
1	0	1	1	0	0	1	1	1	1	1	1	1	1
1	0	1	1	0	1	1	1	1	1	1	1	1	1
1	0	1	1	1	0	1	1	1	1	1	1	1	1
1	0	1	1	1	1	1	1	1	1	1	1	1	1
1	1	0	0	0	0	1	1	1	1	1	1	1	1
1	1	0	0	0	1	1	1	1	1	1	1	1	1
1	1	0	0	1	0	1	1	1	1	1	1	1	1
1	1	0	0	1	1	1	1	1	1	1	1	1	1
1	1	0	1	0	0	1	1	1	1	1	1	1	1
1	1	0	1	0	1	1	1	1	1	1	1	1	1
1	1	0	1	1	0	1	1	1	1	1	1	1	1
1	1	0	1	1	1	1	1	1	1	1	1	1	1
1	1	1	0	0	0	1	1	1	1	1	1	1	1
1	1	1	0	0	1	1	1	1	1	1	1	1	1
1	1	1	0	1	0	1	1	1	1	1	1	1	1
1	1	1	0	1	1	1	1	1	1	1	1	1	1
1	1	1	1	0	0	1	1	1	1	1	1	1	1
1	1	1	1	0	1	1	1	1	1	1	1	1	1
1	1	1	1	1	0	1	1	1	1	1	1	1	1
1	1	1	1	1	1	1	1	1	1	1	1	1	1

编码器实验

I0	I1	I2	I4	I5	I3	I6	I7	O0	O1	O2
0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	1	1	1	1
0	0	0	0	0	0	1	0	1	1	0
0	0	0	0	0	0	1	1	1	1	0
0	0	0	0	0	1	0	0	0	1	1
0	0	0	0	0	1	0	1	0	1	1
0	0	0	0	0	1	1	0	0	1	1
0	0	0	0	0	1	1	1	0	1	1
0	0	0	0	1	0	0	0	1	0	1
0	0	0	0	1	0	0	1	1	0	1
0	0	0	0	1	0	1	0	1	0	1
0	0	0	0	1	0	1	1	1	0	1
0	0	0	0	1	1	0	0	0	1	1
0	0	0	0	1	1	0	1	0	1	1
0	0	0	0	1	1	1	0	0	1	1
0	0	0	0	1	1	1	1	0	1	1
0	0	0	1	0	0	0	0	1	0	0
0	0	0	1	0	0	0	1	1	0	0
0	0	0	1	0	0	1	0	1	0	0
0	0	0	1	0	0	1	1	1	0	0
0	0	0	1	0	1	0	0	0	1	1
0	0	0	1	0	1	0	1	0	1	1
0	0	0	1	0	1	1	0	0	1	1
0	0	0	1	0	1	1	1	0	1	1
0	0	0	1	1	0	0	0	1	0	0
0	0	0	1	1	0	0	1	1	0	0
0	0	0	1	1	0	1	0	1	0	0
0	0	0	1	1	0	1	1	1	0	0
0	0	0	1	1	1	0	0	0	1	1

I0	I1	I2	I4	I5	I3	I6	I7	O0	O1	O2
0	0	0	1	1	1	0	1	0	1	1
0	0	0	1	1	1	1	0	0	1	1
0	0	0	1	1	1	1	1	0	1	1
0	0	1	0	0	0	0	0	0	1	0
0	0	1	0	0	0	0	1	0	1	0
0	0	1	0	0	0	1	0	0	1	0
0	0	1	0	0	0	1	1	0	1	0
0	0	1	0	0	1	0	0	0	1	0
0	0	1	0	0	1	0	1	0	1	0
0	0	1	0	0	1	1	0	0	1	0
0	0	1	0	0	1	1	1	0	1	0
0	0	1	0	1	0	0	0	0	1	0
0	0	1	0	1	0	0	1	0	1	0
0	0	1	0	1	0	1	0	0	1	0
0	0	1	0	1	0	1	1	0	1	0
0	0	1	0	1	1	0	0	0	1	0
0	0	1	0	1	1	0	1	0	1	0
0	0	1	0	1	1	1	0	0	1	0
0	0	1	0	1	1	1	1	0	1	0
0	0	1	1	0	0	0	0	0	1	0
0	0	1	1	0	0	0	1	0	1	0
0	0	1	1	0	0	1	0	0	1	0
0	0	1	1	0	0	1	1	0	1	0
0	0	1	1	0	1	0	0	0	1	0
0	0	1	1	0	1	0	1	0	1	0
0	0	1	1	0	1	1	0	0	1	0
0	0	1	1	0	1	1	1	0	1	0
0	0	1	1	1	0	0	0	0	1	0
0	0	1	1	1	0	0	1	0	1	0
0	0	1	1	1	0	1	0	0	1	0

I0	I1	I2	I4	I5	I3	I6	I7	O0	O1	O2
0	0	1	1	1	0	1	1	0	1	0
0	0	1	1	1	1	0	0	0	1	0
0	0	1	1	1	1	0	1	0	1	0
0	0	1	1	1	1	1	0	0	1	0
0	0	1	1	1	1	1	1	0	1	0
0	1	0	0	0	0	0	0	0	0	1
0	1	0	0	0	0	0	1	0	0	1
0	1	0	0	0	0	1	0	0	0	1
0	1	0	0	0	0	1	1	0	0	1
0	1	0	0	0	1	0	0	0	0	1
0	1	0	0	0	1	0	1	0	0	1
0	1	0	0	0	1	1	0	0	0	1
0	1	0	0	0	1	1	1	0	0	1
0	1	0	0	1	0	0	0	0	0	1
0	1	0	0	1	0	0	1	0	0	1
0	1	0	0	1	0	1	0	0	0	1
0	1	0	0	1	0	1	1	0	0	1
0	1	0	0	1	1	0	0	0	0	1
0	1	0	0	1	1	0	1	0	0	1
0	1	0	0	1	1	1	0	0	0	1
0	1	0	0	1	1	1	1	0	0	1
0	1	0	1	0	0	0	0	0	0	1
0	1	0	1	0	0	0	1	0	0	1
0	1	0	1	0	0	1	0	0	0	1
0	1	0	1	0	0	1	1	0	0	1
0	1	0	1	0	1	0	0	0	0	1
0	1	0	1	0	1	0	1	0	0	1
0	1	0	1	0	1	1	0	0	0	1
0	1	0	1	0	1	1	1	0	0	1
0	1	0	1	1	0	0	0	0	0	1

I0	I1	I2	I4	I5	I3	I6	I7	O0	O1	O2
0	1	0	1	1	0	0	1	0	0	1
0	1	0	1	1	0	1	0	0	0	1
0	1	0	1	1	0	1	1	0	0	1
0	1	0	1	1	1	0	0	0	0	1
0	1	0	1	1	1	0	1	0	0	1
0	1	0	1	1	1	1	0	0	0	1
0	1	0	1	1	1	1	1	0	0	1
0	1	1	0	0	0	0	0	0	0	1
0	1	1	0	0	0	0	1	0	0	1
0	1	1	0	0	0	1	0	0	0	1
0	1	1	0	0	0	1	1	0	0	1
0	1	1	0	0	1	0	0	0	0	1
0	1	1	0	0	1	1	0	0	0	1
0	1	1	0	0	1	1	1	0	0	1
0	1	1	0	1	0	0	0	0	0	1
0	1	1	0	1	0	0	1	0	0	1
0	1	1	0	1	0	1	0	0	0	1
0	1	1	0	1	0	1	1	0	0	1
0	1	1	0	1	1	0	0	0	0	1
0	1	1	0	1	1	1	0	0	0	1
0	1	1	0	1	1	1	1	0	0	1
0	1	1	1	0	0	0	0	0	0	1
0	1	1	1	0	0	0	1	0	0	1
0	1	1	1	0	0	1	0	0	0	1
0	1	1	1	0	0	1	1	0	0	1
0	1	1	1	0	1	0	0	0	0	1
0	1	1	1	0	1	0	1	0	0	1
0	1	1	1	0	1	1	0	0	0	1

I0	I1	I2	I4	I5	I3	I6	I7	O0	O1	O2
0	1	1	1	0	1	1	1	0	0	1
0	1	1	1	1	0	0	0	0	0	1
0	1	1	1	1	0	0	1	0	0	1
0	1	1	1	1	0	1	0	0	0	1
0	1	1	1	1	0	1	1	0	0	1
0	1	1	1	1	1	0	0	0	0	1
0	1	1	1	1	1	0	1	0	0	1
0	1	1	1	1	1	1	1	0	0	1
0	1	1	1	1	1	1	1	1	0	1
1	0	0	0	0	0	0	0	0	0	0
1	0	0	0	0	0	0	1	0	0	0
1	0	0	0	0	0	1	0	0	0	0
1	0	0	0	0	0	1	1	0	0	0
1	0	0	0	0	1	0	0	0	0	0
1	0	0	0	0	1	0	1	0	0	0
1	0	0	0	0	1	1	0	0	0	0
1	0	0	0	0	1	1	1	0	0	0
1	0	0	0	1	0	0	0	0	0	0
1	0	0	0	1	0	0	1	0	0	0
1	0	0	0	1	0	1	0	0	0	0
1	0	0	0	1	0	1	1	0	0	0
1	0	0	0	1	1	0	0	0	0	0
1	0	0	0	1	1	0	1	0	0	0
1	0	0	0	1	1	1	0	0	0	0
1	0	0	0	1	1	1	1	0	0	0
1	0	0	1	0	0	0	0	0	0	0
1	0	0	1	0	0	0	1	0	0	0
1	0	0	1	0	0	1	0	0	0	0
1	0	0	1	0	0	1	1	0	0	0
1	0	0	1	0	1	0	0	0	0	0

I0	I1	I2	I4	I5	I3	I6	I7	O0	O1	O2
1	0	0	1	0	1	0	1	0	0	0
1	0	0	1	0	1	1	0	0	0	0
1	0	0	1	0	1	1	1	0	0	0
1	0	0	1	1	0	0	0	0	0	0
1	0	0	1	1	0	0	1	0	0	0
1	0	0	1	1	0	1	0	0	0	0
1	0	0	1	1	0	1	1	0	0	0
1	0	0	1	1	1	0	0	0	0	0
1	0	0	1	1	1	0	1	0	0	0
1	0	0	1	1	1	1	0	0	0	0
1	0	0	1	1	1	1	1	0	0	0
1	0	1	0	0	0	0	0	0	0	0
1	0	1	0	0	0	0	1	0	0	0
1	0	1	0	0	0	1	0	0	0	0
1	0	1	0	0	0	1	1	0	0	0
1	0	1	0	0	1	0	0	0	0	0
1	0	1	0	0	1	0	1	0	0	0
1	0	1	0	0	1	1	0	0	0	0
1	0	1	0	0	1	1	1	0	0	0
1	0	1	0	1	0	0	0	0	0	0
1	0	1	0	1	0	0	1	0	0	0
1	0	1	0	1	0	1	0	0	0	0
1	0	1	0	1	0	1	1	0	0	0
1	0	1	0	1	1	0	0	0	0	0
1	0	1	0	1	1	0	1	0	0	0
1	0	1	0	1	1	1	0	0	0	0
1	0	1	1	0	0	0	0	0	0	0
1	0	1	1	0	0	0	1	0	0	0
1	0	1	1	0	0	1	0	0	0	0

I0	I1	I2	I4	I5	I3	I6	I7	O0	O1	O2
1	0	1	1	0	0	1	1	0	0	0
1	0	1	1	0	1	0	0	0	0	0
1	0	1	1	0	1	0	1	0	0	0
1	0	1	1	0	1	1	0	0	0	0
1	0	1	1	0	1	1	1	0	0	0
1	0	1	1	1	0	0	0	0	0	0
1	0	1	1	1	0	0	1	0	0	0
1	0	1	1	1	0	1	0	0	0	0
1	0	1	1	1	0	1	1	0	0	0
1	0	1	1	1	1	0	0	0	0	0
1	0	1	1	1	1	0	1	0	0	0
1	0	1	1	1	1	1	0	0	0	0
1	0	1	1	1	1	1	1	0	0	0
1	1	0	0	0	0	0	0	0	0	0
1	1	0	0	0	0	0	1	0	0	0
1	1	0	0	0	0	1	0	0	0	0
1	1	0	0	0	0	1	1	0	0	0
1	1	0	0	0	1	0	0	0	0	0
1	1	0	0	0	1	0	1	0	0	0
1	1	0	0	0	1	1	0	0	0	0
1	1	0	0	1	0	0	0	0	0	0
1	1	0	0	1	0	0	1	0	0	0
1	1	0	0	1	0	1	0	0	0	0
1	1	0	0	1	0	1	1	0	0	0
1	1	0	0	1	1	0	1	0	0	0
1	1	0	0	1	1	1	0	0	0	0
1	1	0	0	1	1	1	1	0	0	0
1	1	0	1	0	0	0	0	0	0	0

I0	I1	I2	I4	I5	I3	I6	I7	O0	O1	O2
1	1	0	1	0	0	0	1	0	0	0
1	1	0	1	0	0	1	0	0	0	0
1	1	0	1	0	0	1	1	0	0	0
1	1	0	1	0	1	0	0	0	0	0
1	1	0	1	0	1	0	1	0	0	0
1	1	0	1	0	1	1	0	0	0	0
1	1	0	1	0	1	1	1	0	0	0
1	1	0	1	1	0	0	0	0	0	0
1	1	0	1	1	0	0	1	0	0	0
1	1	0	1	1	0	1	0	0	0	0
1	1	0	1	1	0	1	1	0	0	0
1	1	0	1	1	1	0	0	0	0	0
1	1	0	1	1	1	0	1	0	0	0
1	1	0	1	1	1	1	0	0	0	0
1	1	0	1	1	1	1	1	0	0	0
1	1	1	0	0	0	0	0	0	0	0
1	1	1	0	0	0	0	1	0	0	0
1	1	1	0	0	0	1	0	0	0	0
1	1	1	0	0	0	1	1	0	0	0
1	1	1	0	0	1	0	0	0	0	0
1	1	1	0	0	1	1	0	0	0	0
1	1	1	0	0	1	1	1	0	0	0
1	1	1	0	1	0	0	0	0	0	0
1	1	1	0	1	0	0	1	0	0	0
1	1	1	0	1	0	1	0	0	0	0
1	1	1	0	1	0	1	1	0	0	0
1	1	1	0	1	1	0	0	0	0	0
1	1	1	0	1	1	0	1	0	0	0
1	1	1	0	1	1	1	0	0	0	0

I0	I1	I2	I4	I5	I3	I6	I7	O0	O1	O2
1	1	1	0	1	1	1	1	0	0	0
1	1	1	1	0	0	0	0	0	0	0
1	1	1	1	0	0	0	1	0	0	0
1	1	1	1	0	0	1	0	0	0	0
1	1	1	1	0	0	1	1	0	0	0
1	1	1	1	0	1	0	0	0	0	0
1	1	1	1	0	1	0	1	0	0	0
1	1	1	1	0	1	1	0	0	0	0
1	1	1	1	0	1	1	1	0	0	0
1	1	1	1	1	0	0	0	0	0	0
1	1	1	1	1	0	0	1	0	0	0
1	1	1	1	1	0	1	0	0	0	0
1	1	1	1	1	0	1	1	0	0	0
1	1	1	1	1	1	0	0	0	0	0
1	1	1	1	1	1	0	1	0	0	0
1	1	1	1	1	1	1	0	0	0	0
1	1	1	1	1	1	1	1	0	0	0

加减法器实验

in	X1	X2	X3	X4	Y1	Y2	Y3	Y4	Cout	O1	O2	O3	O4
0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	1	0	0	0	0	1
0	0	0	0	0	0	0	1	0	0	0	0	1	0
0	0	0	0	0	0	0	1	1	0	0	0	1	1
0	0	0	0	0	0	1	0	0	0	0	1	0	0
0	0	0	0	0	0	1	0	1	0	0	1	0	1
0	0	0	0	0	0	1	1	0	0	0	1	1	0
0	0	0	0	0	0	1	1	1	0	0	1	1	1
0	0	0	0	0	1	0	0	0	0	1	0	0	0
0	0	0	0	0	1	0	0	1	0	1	0	0	1

in	X1	X2	X3	X4	Y1	Y2	Y3	Y4	Cout	O1	O2	O3	O4
0	0	0	0	0	1	0	1	0	0	1	0	1	0
0	0	0	0	0	1	0	1	1	0	1	0	1	1
0	0	0	0	0	1	1	0	0	0	1	1	0	0
0	0	0	0	0	1	1	0	1	0	1	1	0	1
0	0	0	0	0	1	1	1	0	0	1	1	1	0
0	0	0	0	0	1	1	1	1	0	1	1	1	1
0	0	0	0	1	0	0	0	0	0	0	0	0	1
0	0	0	0	1	0	0	0	1	1	0	0	0	0
0	0	0	0	1	0	0	1	0	0	0	0	1	1
0	0	0	0	1	0	0	1	1	1	0	0	1	0
0	0	0	0	1	0	1	0	0	0	0	1	0	1
0	0	0	0	1	0	1	0	1	1	0	1	0	0
0	0	0	0	1	0	1	1	0	0	0	1	1	1
0	0	0	0	1	0	1	1	1	1	0	1	1	0
0	0	0	0	1	1	0	0	0	0	1	0	0	1
0	0	0	0	1	1	0	0	1	1	1	0	0	0
0	0	0	0	1	1	0	1	0	0	1	0	1	1
0	0	0	0	1	1	0	1	1	1	1	0	1	0
0	0	0	0	1	1	1	0	0	0	1	1	0	1
0	0	0	0	1	1	1	0	1	1	1	1	0	0
0	0	0	0	1	1	1	1	1	1	1	1	1	0
0	0	0	1	0	0	0	0	0	0	0	0	1	0
0	0	0	1	0	0	0	0	1	0	0	0	1	1
0	0	0	1	0	0	0	1	0	0	0	0	0	1
0	0	0	1	0	0	0	1	1	1	0	0	0	0
0	0	0	1	0	0	1	0	0	0	0	1	1	0
0	0	0	1	0	0	1	0	1	0	0	1	1	1
0	0	0	1	0	0	1	1	0	0	0	1	0	1
0	0	0	1	0	0	1	1	1	1	0	1	0	0

in	X1	X2	X3	X4	Y1	Y2	Y3	Y4	Cout	O1	O2	O3	O4
0	0	0	1	0	1	0	0	0	0	1	0	1	0
0	0	0	1	0	1	0	0	1	0	1	0	1	1
0	0	0	1	0	1	0	1	0	0	1	0	0	1
0	0	0	1	0	1	0	1	1	1	1	0	0	0
0	0	0	1	0	1	1	0	0	0	1	1	1	0
0	0	0	1	0	1	1	0	1	0	1	1	1	1
0	0	0	1	0	1	1	1	0	0	1	1	0	1
0	0	0	1	0	1	1	1	1	1	1	1	0	0
0	0	0	1	1	0	0	0	0	0	0	0	1	1
0	0	0	1	1	0	0	0	1	1	0	0	1	0
0	0	0	1	1	0	0	1	0	1	0	0	0	0
0	0	0	1	1	0	0	1	1	1	0	0	0	1
0	0	0	1	1	0	1	0	0	0	0	1	1	1
0	0	0	1	1	0	1	0	1	1	0	1	1	0
0	0	0	1	1	0	1	1	0	1	0	1	0	0
0	0	0	1	1	0	1	1	1	1	0	1	0	1
0	0	0	1	1	1	0	0	0	0	1	0	1	1
0	0	0	1	1	1	0	0	1	1	1	0	1	0
0	0	0	1	1	1	0	1	0	1	1	0	0	0
0	0	0	1	1	1	0	1	1	1	1	0	0	1
0	0	0	1	1	1	1	0	0	0	1	1	1	1
0	0	0	1	1	1	1	0	1	1	1	1	1	0
0	0	0	1	1	1	1	1	0	1	1	1	0	0
0	0	0	1	1	1	1	1	1	1	1	1	0	1
0	0	1	0	0	0	0	0	0	0	0	1	0	0
0	0	1	0	0	0	0	0	1	0	0	1	0	1
0	0	1	0	0	0	0	1	0	0	0	1	1	0
0	0	1	0	0	0	0	1	1	0	0	1	1	1
0	0	1	0	0	0	1	0	0	0	0	0	1	0
0	0	1	0	0	0	1	0	1	0	0	0	1	1

in	X1	X2	X3	X4	Y1	Y2	Y3	Y4	Cout	O1	O2	O3	O4
0	0	1	0	0	0	1	1	0	0	0	0	0	1
0	0	1	0	0	0	1	1	1	1	0	0	0	0
0	0	1	0	0	1	0	0	0	0	1	1	0	0
0	0	1	0	0	1	0	0	1	0	1	1	0	1
0	0	1	0	0	1	0	1	0	0	1	1	1	0
0	0	1	0	0	1	0	1	1	0	1	1	1	1
0	0	1	0	0	1	1	0	0	0	1	0	1	0
0	0	1	0	0	1	1	0	1	0	1	0	1	1
0	0	1	0	0	1	1	1	0	0	1	0	0	1
0	0	1	0	0	1	1	1	1	1	1	0	0	0
0	0	1	0	1	0	0	0	0	0	0	1	0	1
0	0	1	0	1	0	0	0	1	1	0	1	0	0
0	0	1	0	1	0	0	1	0	0	0	1	1	1
0	0	1	0	1	0	0	1	1	1	0	1	1	0
0	0	1	0	1	0	1	0	0	0	0	0	1	1
0	0	1	0	1	0	1	0	1	1	0	0	1	0
0	0	1	0	1	0	1	1	0	1	0	0	0	0
0	0	1	0	1	0	1	1	1	1	0	0	0	1
0	0	1	0	1	1	0	0	0	0	1	1	0	1
0	0	1	0	1	1	0	0	1	1	1	1	0	0
0	0	1	0	1	1	0	1	0	0	1	1	1	1
0	0	1	0	1	1	1	0	0	0	1	0	1	1
0	0	1	0	1	1	1	0	1	1	1	0	1	0
0	0	1	0	1	1	1	1	0	1	1	0	0	0
0	0	1	0	1	1	1	1	1	1	1	0	0	1
0	0	1	1	0	0	0	0	0	0	0	1	1	0
0	0	1	1	0	0	0	0	1	0	0	1	1	1
0	0	1	1	0	0	0	1	0	0	0	1	0	1
0	0	1	1	0	0	0	1	1	1	0	1	0	0

in	X1	X2	X3	X4	Y1	Y2	Y3	Y4	Cout	O1	O2	O3	O4
0	0	1	1	0	0	1	0	0	0	0	0	0	1
0	0	1	1	0	0	1	0	1	1	0	0	0	0
0	0	1	1	0	0	1	1	0	0	0	0	1	1
0	0	1	1	0	0	1	1	1	1	0	0	1	0
0	0	1	1	0	1	0	0	0	0	1	1	1	0
0	0	1	1	0	1	0	0	1	0	1	1	1	1
0	0	1	1	0	1	0	1	0	0	1	1	0	1
0	0	1	1	0	1	0	1	1	1	1	1	0	0
0	0	1	1	0	1	1	0	0	0	1	0	0	1
0	0	1	1	0	1	1	0	1	1	1	0	0	0
0	0	1	1	0	1	1	1	0	0	1	0	1	1
0	0	1	1	0	1	1	1	1	1	1	0	1	0
0	0	1	1	1	0	0	0	0	0	0	1	1	1
0	0	1	1	1	0	0	0	1	1	0	1	1	0
0	0	1	1	1	0	0	1	0	1	0	1	0	0
0	0	1	1	1	0	0	1	1	1	0	1	0	1
0	0	1	1	1	0	1	0	0	1	0	0	0	0
0	0	1	1	1	0	1	0	1	1	0	0	0	1
0	0	1	1	1	0	1	1	0	1	0	0	1	0
0	0	1	1	1	0	1	1	1	1	0	0	1	1
0	0	1	1	1	1	0	0	0	0	1	1	1	1
0	0	1	1	1	1	0	0	1	1	1	1	1	0
0	0	1	1	1	1	0	1	0	1	1	1	0	0
0	0	1	1	1	1	0	1	1	1	1	1	0	1
0	0	1	1	1	1	1	0	0	1	1	0	0	0
0	0	1	1	1	1	1	0	1	1	1	0	0	1
0	0	1	1	1	1	1	1	0	1	1	0	1	0
0	0	1	1	1	1	1	1	1	1	1	0	1	1
0	1	0	0	0	0	0	0	0	0	1	0	0	0
0	1	0	0	0	0	0	0	1	0	1	0	0	1

in	X1	X2	X3	X4	Y1	Y2	Y3	Y4	Cout	O1	O2	O3	O4
0	1	0	0	0	0	0	1	0	0	1	0	1	0
0	1	0	0	0	0	0	1	1	0	1	0	1	1
0	1	0	0	0	0	1	0	0	0	1	1	0	0
0	1	0	0	0	0	1	0	1	0	1	1	0	1
0	1	0	0	0	0	1	1	0	0	1	1	1	0
0	1	0	0	0	0	1	1	1	0	1	1	1	1
0	1	0	0	0	1	0	0	0	0	0	1	0	0
0	1	0	0	0	1	0	0	1	0	0	1	0	1
0	1	0	0	0	1	0	1	0	0	0	1	1	0
0	1	0	0	0	1	0	1	1	0	0	1	1	1
0	1	0	0	0	1	1	0	0	0	0	0	1	0
0	1	0	0	0	1	1	0	1	0	0	0	1	1
0	1	0	0	0	1	1	1	0	0	0	0	0	1
0	1	0	0	0	1	1	1	1	1	0	0	0	0
0	1	0	0	1	0	0	0	0	0	1	0	0	1
0	1	0	0	1	0	0	0	0	1	1	0	0	0
0	1	0	0	1	0	0	1	0	0	1	0	1	1
0	1	0	0	1	0	0	1	1	1	1	0	1	0
0	1	0	0	1	0	1	0	0	0	1	1	0	1
0	1	0	0	1	0	1	0	1	1	1	1	0	0
0	1	0	0	1	0	1	1	1	1	1	1	1	0
0	1	0	0	1	1	0	0	0	0	0	1	0	1
0	1	0	0	1	1	0	0	1	1	0	1	0	0
0	1	0	0	1	1	0	1	0	0	0	1	1	1
0	1	0	0	1	1	0	1	1	1	0	1	1	0
0	1	0	0	1	1	1	0	0	0	0	0	1	1
0	1	0	0	1	1	1	1	0	1	0	0	1	0
0	1	0	0	1	1	1	1	1	0	1	0	0	0
0	1	0	0	1	1	1	1	1	1	0	0	0	1

in	X1	X2	X3	X4	Y1	Y2	Y3	Y4	Cout	O1	O2	O3	O4
0	1	0	1	0	0	0	0	0	0	1	0	1	0
0	1	0	1	0	0	0	0	1	0	1	0	1	1
0	1	0	1	0	0	0	1	0	0	1	0	0	1
0	1	0	1	0	0	0	1	1	1	1	0	0	0
0	1	0	1	0	0	1	0	0	0	1	1	1	0
0	1	0	1	0	0	1	0	1	0	1	1	1	1
0	1	0	1	0	0	1	1	0	0	1	1	0	1
0	1	0	1	0	0	1	1	1	1	1	1	0	0
0	1	0	1	0	1	0	0	0	0	0	1	1	0
0	1	0	1	0	1	0	0	1	0	0	1	1	1
0	1	0	1	0	1	0	1	0	0	0	1	0	1
0	1	0	1	0	1	0	1	1	1	0	1	0	0
0	1	0	1	0	1	1	0	0	0	0	0	0	1
0	1	0	1	0	1	1	0	1	1	0	0	0	0
0	1	0	1	0	1	1	1	0	0	0	0	1	1
0	1	0	1	0	1	1	1	1	1	0	0	1	0
0	1	0	1	1	0	0	0	0	0	1	0	1	1
0	1	0	1	1	0	0	0	1	1	1	0	1	0
0	1	0	1	1	0	0	1	0	1	1	0	0	0
0	1	0	1	1	0	0	1	1	1	1	0	0	1
0	1	0	1	1	0	1	0	0	0	1	1	1	1
0	1	0	1	1	0	1	0	1	1	1	1	1	0
0	1	0	1	1	0	1	1	0	1	1	1	0	0
0	1	0	1	1	0	1	1	1	1	1	1	0	1
0	1	0	1	1	1	0	0	0	0	0	1	1	1
0	1	0	1	1	1	0	0	1	1	0	1	1	0
0	1	0	1	1	1	0	1	0	1	0	1	0	0
0	1	0	1	1	1	0	1	1	1	0	1	0	1
0	1	0	1	1	1	1	0	0	1	0	0	0	0
0	1	0	1	1	1	1	0	1	1	0	0	0	1

in	X1	X2	X3	X4	Y1	Y2	Y3	Y4	Cout	O1	O2	O3	O4
0	1	0	1	1	1	1	1	0	1	0	0	1	0
0	1	0	1	1	1	1	1	1	1	0	0	1	1
0	1	1	0	0	0	0	0	0	0	1	1	0	0
0	1	1	0	0	0	0	0	1	0	1	1	0	1
0	1	1	0	0	0	0	1	0	0	1	1	1	0
0	1	1	0	0	0	0	1	1	0	1	1	1	1
0	1	1	0	0	0	1	0	0	0	1	0	1	0
0	1	1	0	0	0	1	0	1	0	1	0	1	1
0	1	1	0	0	0	1	1	0	0	1	0	0	1
0	1	1	0	0	0	1	1	1	1	1	0	0	0
0	1	1	0	0	1	0	0	0	0	0	0	1	0
0	1	1	0	0	1	0	0	1	0	0	0	1	1
0	1	1	0	0	1	0	1	0	0	0	0	0	1
0	1	1	0	0	1	0	1	1	1	0	0	0	0
0	1	1	0	0	1	1	0	0	0	0	1	1	0
0	1	1	0	0	1	1	0	1	0	0	1	1	1
0	1	1	0	0	1	1	1	0	0	0	1	0	1
0	1	1	0	0	1	1	1	1	1	0	1	0	0
0	1	1	0	1	0	0	0	0	0	1	1	0	1
0	1	1	0	1	0	0	0	1	1	1	1	0	0
0	1	1	0	1	0	0	1	0	0	1	0	1	1
0	1	1	0	1	0	1	0	1	1	1	0	1	0
0	1	1	0	1	0	1	1	0	1	1	0	0	0
0	1	1	0	1	0	1	1	1	1	1	0	0	1
0	1	1	0	1	1	0	0	0	0	0	0	1	1
0	1	1	0	1	1	0	0	1	1	0	0	1	0
0	1	1	0	1	1	0	1	0	1	0	0	0	0
0	1	1	0	1	1	0	1	1	1	0	0	0	1

in	X1	X2	X3	X4	Y1	Y2	Y3	Y4	Cout	O1	O2	O3	O4
0	1	1	0	1	1	1	0	0	0	0	1	1	1
0	1	1	0	1	1	1	0	1	1	0	1	1	0
0	1	1	0	1	1	1	1	0	1	0	1	0	0
0	1	1	0	1	1	1	1	1	1	0	1	0	1
0	1	1	1	0	0	0	0	0	0	1	1	1	0
0	1	1	1	0	0	0	0	1	0	1	1	1	1
0	1	1	1	0	0	0	1	0	0	1	1	0	1
0	1	1	1	0	0	0	1	1	1	1	1	0	0
0	1	1	1	0	0	1	0	0	0	1	0	0	1
0	1	1	1	0	0	1	0	1	1	1	0	0	0
0	1	1	1	0	0	1	1	0	0	1	0	1	1
0	1	1	1	0	0	1	1	1	1	1	0	1	0
0	1	1	1	0	1	0	0	0	0	0	0	0	1
0	1	1	1	0	1	0	0	1	1	0	0	0	0
0	1	1	1	0	1	0	1	0	0	0	0	1	1
0	1	1	1	0	1	0	1	1	1	0	0	1	0
0	1	1	1	0	1	1	0	0	0	0	1	0	1
0	1	1	1	0	1	1	0	1	1	0	1	0	0
0	1	1	1	0	1	1	1	0	0	0	1	1	1
0	1	1	1	0	1	1	1	1	1	0	1	1	0
0	1	1	1	1	0	0	0	1	1	1	1	1	0
0	1	1	1	1	0	0	1	0	1	1	1	0	0
0	1	1	1	1	0	0	1	1	1	1	1	0	1
0	1	1	1	1	0	1	0	0	1	1	0	0	0
0	1	1	1	1	0	1	0	1	1	1	0	0	1
0	1	1	1	1	0	1	1	0	1	1	0	1	0
0	1	1	1	1	0	1	1	1	1	1	0	1	1
0	1	1	1	1	1	0	0	0	1	0	0	0	0
0	1	1	1	1	1	0	0	1	1	0	0	0	1

in	X1	X2	X3	X4	Y1	Y2	Y3	Y4	Cout	O1	O2	O3	O4
0	1	1	1	1	1	0	1	0	1	0	0	1	0
0	1	1	1	1	1	0	1	1	1	0	0	1	1
0	1	1	1	1	1	1	0	0	1	0	1	0	0
0	1	1	1	1	1	1	0	1	1	0	1	0	1
0	1	1	1	1	1	1	1	0	1	0	1	1	0
0	1	1	1	1	1	1	1	1	1	0	1	1	1
1	0	0	0	0	0	0	0	0	1	0	0	0	0
1	0	0	0	0	0	0	0	1	0	0	0	0	1
1	0	0	0	0	0	0	1	0	0	0	0	1	1
1	0	0	0	0	0	0	1	1	0	0	0	1	0
1	0	0	0	0	0	1	0	0	0	0	1	1	1
1	0	0	0	0	0	1	0	1	0	0	1	1	0
1	0	0	0	0	0	1	1	0	0	0	1	0	1
1	0	0	0	0	0	1	1	1	0	0	1	0	0
1	0	0	0	0	1	0	0	0	0	1	1	1	1
1	0	0	0	0	1	0	0	1	0	1	1	1	0
1	0	0	0	0	1	0	1	0	0	1	1	0	1
1	0	0	0	0	1	0	1	1	0	1	1	0	0
1	0	0	0	0	1	1	0	0	0	1	0	1	1
1	0	0	0	0	1	1	0	1	0	1	0	1	0
1	0	0	0	0	1	1	1	0	0	1	0	0	1
1	0	0	0	0	1	1	1	1	0	1	0	0	0
1	0	0	0	1	0	0	0	0	1	0	0	0	1
1	0	0	0	1	0	0	0	1	1	0	0	0	0
1	0	0	0	1	0	0	1	0	1	0	0	1	0
1	0	0	0	1	0	0	1	1	0	0	0	1	1
1	0	0	0	1	0	1	0	0	1	0	1	1	0
1	0	0	0	1	0	1	0	1	0	0	1	1	1
1	0	0	0	1	0	1	1	0	1	0	1	0	0
1	0	0	0	1	0	1	1	1	0	0	1	0	1

in	X1	X2	X3	X4	Y1	Y2	Y3	Y4	Cout	O1	O2	O3	O4
1	0	0	0	1	1	0	0	0	1	1	1	1	0
1	0	0	0	1	1	0	0	1	0	1	1	1	1
1	0	0	0	1	1	0	1	0	1	1	1	0	0
1	0	0	0	1	1	0	1	1	0	1	1	0	1
1	0	0	0	1	1	1	0	0	1	1	0	1	0
1	0	0	0	1	1	1	0	1	0	1	0	1	1
1	0	0	0	1	1	1	1	0	1	1	0	0	0
1	0	0	0	1	1	1	1	1	0	1	0	0	1
1	0	0	1	0	0	0	0	0	1	0	0	1	0
1	0	0	1	0	0	0	0	1	0	0	0	1	1
1	0	0	1	0	0	0	1	0	1	0	0	0	0
1	0	0	1	0	0	0	1	1	0	0	0	0	1
1	0	0	1	0	0	1	0	0	1	0	1	0	0
1	0	0	1	0	0	1	0	0	1	0	1	0	1
1	0	0	1	0	0	1	1	0	0	0	1	1	1
1	0	0	1	0	0	1	1	1	0	0	1	1	0
1	0	0	1	0	1	0	0	0	1	1	1	0	0
1	0	0	1	0	1	0	0	1	0	1	1	0	1
1	0	0	1	0	1	0	1	0	0	1	1	1	1
1	0	0	1	0	1	0	1	1	0	1	1	1	0
1	0	0	1	0	1	1	0	0	1	1	0	0	0
1	0	0	1	0	1	1	0	1	0	1	0	0	1
1	0	0	1	0	1	1	1	1	0	1	0	1	1
1	0	0	1	0	1	1	1	1	0	1	0	1	0
1	0	0	1	1	0	0	0	0	1	0	0	1	1
1	0	0	1	1	0	0	0	1	1	0	0	1	0
1	0	0	1	1	0	0	1	0	1	0	0	0	1
1	0	0	1	1	0	0	1	1	1	0	0	0	0
1	0	0	1	1	0	1	0	0	1	0	1	0	1
1	0	0	1	1	0	1	0	1	1	0	1	0	0

in	X1	X2	X3	X4	Y1	Y2	Y3	Y4	Cout	O1	O2	O3	O4
1	0	0	1	1	0	1	1	0	1	0	1	1	0
1	0	0	1	1	0	1	1	1	0	0	1	1	1
1	0	0	1	1	1	0	0	0	1	1	1	0	1
1	0	0	1	1	1	0	0	1	1	1	1	0	0
1	0	0	1	1	1	0	1	0	1	1	1	1	0
1	0	0	1	1	1	0	1	1	0	1	1	1	1
1	0	0	1	1	1	1	0	0	1	1	0	0	1
1	0	0	1	1	1	1	0	1	1	1	0	0	0
1	0	0	1	1	1	1	1	0	1	1	0	1	0
1	0	0	1	1	1	1	1	1	0	1	0	1	1
1	0	1	0	0	0	0	0	0	1	0	1	0	0
1	0	1	0	0	0	0	0	1	0	0	1	0	1
1	0	1	0	0	0	0	1	0	0	0	1	1	1
1	0	1	0	0	0	0	1	1	0	0	1	1	0
1	0	1	0	0	0	1	0	0	1	0	0	0	0
1	0	1	0	0	0	1	0	1	0	0	0	0	1
1	0	1	0	0	0	1	1	0	0	0	0	1	1
1	0	1	0	0	0	1	1	1	0	0	0	1	0
1	0	1	0	0	1	0	0	0	1	1	0	0	0
1	0	1	0	0	1	0	0	1	0	1	0	0	1
1	0	1	0	0	1	0	1	0	0	1	0	1	1
1	0	1	0	0	1	0	1	1	0	1	0	1	0
1	0	1	0	0	1	1	0	0	0	1	1	1	1
1	0	1	0	0	1	1	0	1	0	1	1	1	0
1	0	1	0	0	1	1	1	0	0	1	1	0	1
1	0	1	0	0	1	1	1	1	0	1	1	0	0
1	0	1	0	1	0	0	0	0	1	0	1	0	1
1	0	1	0	1	0	0	0	1	1	0	1	0	0
1	0	1	0	1	0	0	1	0	1	0	1	1	0
1	0	1	0	1	0	0	1	1	0	0	1	1	1

in	X1	X2	X3	X4	Y1	Y2	Y3	Y4	Cout	O1	O2	O3	O4
1	0	1	0	1	0	1	0	0	1	0	0	0	1
1	0	1	0	1	0	1	0	1	1	0	0	0	0
1	0	1	0	1	0	1	1	0	1	0	0	1	0
1	0	1	0	1	0	1	1	1	0	0	0	1	1
1	0	1	0	1	1	0	0	0	1	1	0	0	1
1	0	1	0	1	1	0	0	1	1	1	0	0	0
1	0	1	0	1	1	0	1	0	1	1	0	1	0
1	0	1	0	1	1	0	1	1	0	1	0	1	1
1	0	1	0	1	1	1	0	0	1	1	1	1	0
1	0	1	0	1	1	1	0	1	0	1	1	1	1
1	0	1	0	1	1	1	1	0	1	1	1	0	0
1	0	1	0	1	1	1	1	1	0	1	1	0	1
1	0	1	1	0	0	0	0	0	1	0	1	1	0
1	0	1	1	0	0	0	0	1	0	0	1	1	1
1	0	1	1	0	0	0	1	0	1	0	1	0	0
1	0	1	1	0	0	0	1	1	0	0	1	0	1
1	0	1	1	0	0	1	0	0	1	0	0	1	0
1	0	1	1	0	0	1	0	1	0	0	0	1	1
1	0	1	1	0	0	1	1	0	1	0	0	0	0
1	0	1	1	0	0	1	1	1	0	0	0	0	1
1	0	1	1	0	1	0	0	1	0	1	0	1	0
1	0	1	1	0	1	0	0	1	0	1	0	1	1
1	0	1	1	0	1	0	1	0	1	1	0	0	0
1	0	1	1	0	1	0	1	1	0	1	0	0	1
1	0	1	1	0	1	1	0	0	1	1	1	0	0
1	0	1	1	0	1	1	0	1	0	1	1	0	1
1	0	1	1	0	1	1	1	0	0	1	1	1	1
1	0	1	1	0	1	1	1	1	0	1	1	1	0
1	0	1	1	1	0	0	0	0	1	0	1	1	1
1	0	1	1	1	0	0	0	1	1	0	1	1	0

in	X1	X2	X3	X4	Y1	Y2	Y3	Y4	Cout	O1	O2	O3	O4
1	0	1	1	1	0	0	1	0	1	0	1	0	1
1	0	1	1	1	0	0	1	1	1	0	1	0	0
1	0	1	1	1	0	1	0	0	1	0	0	1	1
1	0	1	1	1	0	1	0	1	1	0	0	1	0
1	0	1	1	1	0	1	1	0	1	0	0	0	1
1	0	1	1	1	0	1	1	1	1	0	0	0	0
1	0	1	1	1	1	0	0	0	1	1	0	1	1
1	0	1	1	1	1	0	0	1	1	1	0	1	0
1	0	1	1	1	1	0	1	0	1	1	0	0	1
1	0	1	1	1	1	0	1	1	1	1	0	0	0
1	0	1	1	1	1	1	0	0	1	1	1	0	1
1	0	1	1	1	1	1	0	1	1	1	1	0	0
1	0	1	1	1	1	1	1	0	1	1	1	1	0
1	0	1	1	1	1	1	1	1	0	1	1	1	1
1	1	0	0	0	0	0	0	0	1	1	0	0	0
1	1	0	0	0	0	0	0	1	0	1	0	0	1
1	1	0	0	0	0	0	1	0	0	1	0	1	1
1	1	0	0	0	0	0	1	1	0	1	0	1	0
1	1	0	0	0	0	1	0	0	0	1	1	1	1
1	1	0	0	0	0	1	0	1	0	1	1	1	0
1	1	0	0	0	0	1	0	1	0	1	1	1	0
1	1	0	0	0	0	1	0	1	0	0	0	1	1
1	1	0	0	0	1	0	1	1	0	0	0	1	0
1	1	0	0	0	1	1	0	0	0	0	1	1	1
1	1	0	0	0	1	1	0	1	0	0	1	0	1
1	1	0	0	0	1	1	1	0	0	0	1	0	0
1	1	0	0	0	1	1	1	1	0	0	1	0	0

in	X1	X2	X3	X4	Y1	Y2	Y3	Y4	Cout	O1	O2	O3	O4
1	1	0	0	1	0	0	0	0	1	1	0	0	1
1	1	0	0	1	0	0	0	1	1	1	0	0	0
1	1	0	0	1	0	0	1	0	1	1	0	1	0
1	1	0	0	1	0	0	1	1	0	1	0	1	1
1	1	0	0	1	0	1	0	0	1	1	1	1	0
1	1	0	0	1	0	1	0	1	0	1	1	1	1
1	1	0	0	1	0	1	1	0	1	1	1	0	0
1	1	0	0	1	0	1	1	1	0	1	1	0	1
1	1	0	0	1	1	0	0	0	1	0	0	0	1
1	1	0	0	1	1	0	0	1	1	0	0	0	0
1	1	0	0	1	1	0	1	0	1	0	0	1	0
1	1	0	0	1	1	0	1	1	0	0	0	1	1
1	1	0	0	1	1	1	0	0	1	0	1	1	0
1	1	0	0	1	1	1	0	1	0	0	1	1	1
1	1	0	0	1	1	1	1	0	1	0	1	0	0
1	1	0	0	1	1	1	1	1	0	0	1	0	1
1	1	0	1	0	0	0	0	0	1	1	0	1	0
1	1	0	1	0	0	0	0	1	0	1	0	1	1
1	1	0	1	0	0	0	1	0	1	1	0	0	0
1	1	0	1	0	0	0	1	1	0	1	0	0	1
1	1	0	1	0	0	0	1	0	0	1	1	0	0
1	1	0	1	0	0	1	0	1	0	1	1	0	1
1	1	0	1	0	0	1	1	0	0	1	1	1	1
1	1	0	1	0	0	1	1	1	0	1	1	1	0
1	1	0	1	0	1	0	0	0	1	0	0	1	0
1	1	0	1	0	1	0	0	1	0	0	0	1	1
1	1	0	1	0	1	0	1	0	1	0	0	0	0
1	1	0	1	0	1	0	1	1	0	0	0	0	1
1	1	0	1	0	1	1	0	0	1	0	1	0	0
1	1	0	1	0	1	1	0	1	0	0	1	0	1

in	X1	X2	X3	X4	Y1	Y2	Y3	Y4	Cout	O1	O2	O3	O4
1	1	0	1	0	1	1	1	0	0	0	1	1	1
1	1	0	1	0	1	1	1	1	0	0	1	1	0
1	1	0	1	1	0	0	0	0	1	1	0	1	1
1	1	0	1	1	0	0	0	1	1	1	0	1	0
1	1	0	1	1	0	0	1	0	1	1	0	0	1
1	1	0	1	1	0	0	1	1	1	1	0	0	0
1	1	0	1	1	0	1	0	0	1	1	1	0	1
1	1	0	1	1	0	1	0	1	1	1	1	0	0
1	1	0	1	1	0	1	1	0	1	1	1	1	0
1	1	0	1	1	0	1	1	1	0	1	1	1	1
1	1	0	1	1	1	0	0	0	1	0	0	1	1
1	1	0	1	1	1	0	0	1	1	0	0	1	0
1	1	0	1	1	1	0	1	0	1	0	0	0	1
1	1	0	1	1	1	0	1	1	1	0	0	0	0
1	1	0	1	1	1	1	0	0	1	0	1	0	1
1	1	0	1	1	1	1	0	1	1	0	1	0	0
1	1	0	1	1	1	1	1	0	1	0	1	1	0
1	1	0	1	1	1	1	1	1	0	0	1	1	1
1	1	1	0	0	0	0	0	0	1	1	1	0	0
1	1	1	0	0	0	0	0	1	0	1	1	0	1
1	1	1	0	0	0	0	1	0	0	1	1	1	1
1	1	1	0	0	0	0	1	1	0	1	1	1	0
1	1	1	0	0	0	1	0	0	1	1	0	0	0
1	1	1	0	0	0	1	0	1	0	1	0	0	1
1	1	1	0	0	0	1	1	0	0	1	0	1	1
1	1	1	0	0	0	1	1	1	0	1	0	1	0
1	1	1	0	0	1	0	0	0	1	0	1	0	0
1	1	1	0	0	1	0	0	1	0	0	1	0	1
1	1	1	0	0	1	0	1	0	0	0	1	1	1
1	1	1	0	0	1	0	1	1	0	0	1	1	0

in	X1	X2	X3	X4	Y1	Y2	Y3	Y4	Cout	O1	O2	O3	O4
1	1	1	0	0	1	1	0	0	1	0	0	0	0
1	1	1	0	0	1	1	0	1	0	0	0	0	1
1	1	1	0	0	1	1	1	0	0	0	0	1	1
1	1	1	0	0	1	1	1	1	0	0	0	1	0
1	1	1	0	1	0	0	0	0	1	1	1	0	1
1	1	1	0	1	0	0	0	1	1	1	1	0	0
1	1	1	0	1	0	0	1	0	1	1	1	1	0
1	1	1	0	1	0	0	1	1	0	1	1	1	1
1	1	1	0	1	0	1	0	0	1	1	0	0	1
1	1	1	0	1	0	1	0	1	1	1	0	0	0
1	1	1	0	1	0	1	1	0	1	1	0	1	0
1	1	1	0	1	0	1	1	1	0	1	0	1	1
1	1	1	0	1	1	0	0	0	1	0	1	0	1
1	1	1	0	1	1	0	0	1	1	0	1	0	0
1	1	1	0	1	1	0	1	0	1	0	1	1	0
1	1	1	0	1	1	0	1	1	0	0	1	1	1
1	1	1	0	1	1	1	0	0	1	0	0	0	1
1	1	1	0	1	1	1	0	1	1	0	0	0	0
1	1	1	0	1	1	1	1	0	1	0	0	1	0
1	1	1	0	1	1	1	1	1	0	0	0	1	1
1	1	1	1	0	0	0	0	0	1	1	1	1	0
1	1	1	1	0	0	0	0	1	0	1	1	1	1
1	1	1	1	0	0	0	1	0	1	1	1	0	0
1	1	1	1	0	0	0	1	1	0	1	1	0	1
1	1	1	1	0	0	1	0	0	1	1	0	1	0
1	1	1	1	0	0	1	0	1	0	1	0	1	1
1	1	1	1	0	0	1	1	0	1	1	0	0	0
1	1	1	1	0	0	1	1	1	0	1	0	0	1
1	1	1	1	0	1	0	0	0	1	0	1	1	0
1	1	1	1	0	1	0	0	1	0	0	1	1	1

in	X1	X2	X3	X4	Y1	Y2	Y3	Y4	Cout	O1	O2	O3	O4
1	1	1	1	0	1	0	1	0	1	0	1	0	0
1	1	1	1	0	1	0	1	1	0	0	1	0	1
1	1	1	1	0	1	1	0	0	1	0	0	1	0
1	1	1	1	0	1	1	0	1	0	0	0	1	1
1	1	1	1	0	1	1	1	0	1	0	0	0	0
1	1	1	1	0	1	1	1	1	0	0	0	0	1
1	1	1	1	1	0	0	0	0	1	1	1	1	1
1	1	1	1	1	0	0	0	1	1	1	1	1	0
1	1	1	1	1	0	0	1	0	1	1	1	0	1
1	1	1	1	1	0	0	1	1	1	1	1	0	0
1	1	1	1	1	0	1	0	0	1	1	0	1	1
1	1	1	1	1	0	1	0	1	1	1	0	1	0
1	1	1	1	1	0	1	1	0	1	1	0	0	1
1	1	1	1	1	0	1	1	1	1	1	0	0	0
1	1	1	1	1	1	0	0	0	1	0	1	1	1
1	1	1	1	1	1	0	0	1	1	0	1	1	0
1	1	1	1	1	1	0	1	0	1	0	1	0	1
1	1	1	1	1	1	0	1	1	1	0	1	0	0
1	1	1	1	1	1	1	0	0	1	0	0	1	1
1	1	1	1	1	1	1	0	1	1	0	0	1	0
1	1	1	1	1	1	1	1	0	1	0	0	0	1
1	1	1	1	1	1	1	1	1	1	0	0	0	0

汉明码校验电路

I1	I2	I3	I4	I5	I6	I7	NoError	O1	O2	O3	O4	O5	O6	O7
0	0	0	0	0	0	0	1	0	0	0	0	0	0	0
0	0	0	0	0	0	1	0	0	0	0	0	0	0	0
0	0	0	0	0	1	0	0	0	0	0	0	0	0	0
0	0	0	0	0	1	1	0	1	0	0	0	0	1	1
0	0	0	0	1	0	0	0	0	0	0	0	0	0	0

I1	I2	I3	I4	I5	I6	I7	NoError	O1	O2	O3	O4	O5	O6	O7
0	0	0	0	1	0	1	0	0	1	0	0	1	0	1
0	0	0	0	1	1	0	0	0	0	1	0	1	1	0
0	0	0	0	1	1	1	0	0	0	0	1	1	1	1
0	0	0	1	0	0	0	0	0	0	0	0	0	0	0
0	0	0	1	0	0	1	0	0	0	1	1	0	0	1
0	0	0	1	0	1	0	0	1	1	0	1	0	1	0
0	0	0	1	0	1	1	0	0	0	0	1	1	1	1
0	0	0	1	1	0	0	0	1	0	0	1	1	0	0
0	0	0	1	1	0	1	0	0	0	0	1	1	1	1
0	0	0	1	1	1	0	0	0	0	0	1	1	1	1
0	0	0	1	1	1	1	1	0	0	0	1	1	1	1
0	0	1	0	0	0	0	0	0	0	0	0	0	0	0
0	0	1	0	0	0	1	0	0	0	1	1	0	0	1
0	0	1	0	0	1	0	0	0	0	1	0	1	1	0
0	0	1	0	0	1	1	0	0	1	1	0	0	1	1
0	0	1	0	1	0	0	0	0	0	1	0	1	1	0
0	0	1	0	1	0	1	0	1	0	1	0	1	0	1
0	0	1	0	1	1	0	1	0	0	1	0	1	1	0
0	0	1	0	1	1	1	0	0	0	1	0	1	1	0
0	0	1	1	0	0	0	0	0	0	1	1	0	0	1
0	0	1	1	0	0	1	1	0	0	1	1	0	0	1
0	0	1	1	0	1	0	0	1	0	1	1	0	1	0
0	0	1	1	0	1	1	0	0	0	1	1	0	0	1
0	0	1	1	1	0	0	0	0	1	1	1	1	0	0
0	0	1	1	1	0	1	0	0	0	1	1	0	0	1
0	0	1	1	1	1	0	0	0	0	1	0	1	1	0
0	0	1	1	1	1	1	0	0	0	0	1	1	1	1
0	1	0	0	0	0	0	0	0	0	0	0	0	0	0
0	1	0	0	0	0	1	0	0	1	0	0	1	0	1
0	1	0	0	0	1	0	0	0	1	0	1	0	1	0

I1	I2	I3	I4	I5	I6	I7	NoError	O1	O2	O3	O4	O5	O6	O7
0	1	0	0	0	1	1	0	0	1	1	0	0	1	1
0	1	0	0	1	0	0	0	0	1	0	0	1	0	1
0	1	0	0	1	0	1	1	0	1	0	0	1	0	1
0	1	0	0	1	1	0	0	1	1	0	0	1	1	0
0	1	0	0	1	1	1	0	0	1	0	0	1	0	1
0	1	0	1	0	0	0	0	0	1	0	1	0	1	0
0	1	0	1	0	0	1	0	1	1	0	1	0	0	1
0	1	0	1	0	1	0	1	0	1	0	1	0	1	0
0	1	0	1	0	1	1	0	0	1	0	1	0	1	0
0	1	0	1	1	0	0	0	0	1	1	1	1	0	0
0	1	0	1	1	0	1	0	0	1	0	0	1	0	1
0	1	0	1	1	1	0	0	0	1	0	1	0	1	0
0	1	0	1	1	1	1	0	0	0	0	1	1	1	1
0	1	1	0	0	0	0	0	1	1	1	0	0	0	0
0	1	1	0	0	0	1	0	0	1	1	0	0	1	1
0	1	1	0	0	1	0	0	0	1	1	0	0	1	1
0	1	1	0	0	1	1	1	0	1	1	0	0	1	1
0	1	1	0	1	0	0	0	0	1	1	1	1	0	0
0	1	1	0	1	0	1	0	0	1	0	0	1	0	1
0	1	1	0	1	1	0	0	0	0	1	0	1	1	0
0	1	1	0	1	1	1	0	0	1	1	0	0	1	1
0	1	1	1	0	0	0	0	0	1	1	1	1	0	0
0	1	1	1	0	0	1	0	0	0	1	1	0	0	1
0	1	1	1	0	1	0	0	0	1	0	1	0	1	0
0	1	1	1	0	1	1	0	0	1	1	0	0	1	1
0	1	1	1	1	0	0	1	0	1	1	1	1	0	0
0	1	1	1	1	1	0	1	0	0	1	1	1	0	0
0	1	1	1	1	1	1	0	0	1	1	1	1	1	1
1	0	0	0	0	0	0	0	0	0	0	0	0	0	0

I1	I2	I3	I4	I5	I6	I7	NoError	O1	O2	O3	O4	O5	O6	O7
1	0	0	0	0	0	1	0	1	0	0	0	0	1	1
1	0	0	0	0	1	0	0	1	0	0	0	0	1	1
1	0	0	0	0	1	1	1	1	0	0	0	0	1	1
1	0	0	0	1	0	0	0	1	0	0	1	1	0	0
1	0	0	0	1	0	1	0	1	0	1	0	1	0	1
1	0	0	0	1	1	0	0	1	1	0	0	1	1	0
1	0	0	0	1	1	1	0	1	0	0	0	0	1	1
1	0	0	1	0	0	0	0	1	0	0	1	1	0	0
1	0	0	1	0	0	1	0	1	1	0	1	0	0	1
1	0	0	1	0	1	0	0	1	0	1	1	0	1	0
1	0	0	1	0	1	1	0	1	0	0	0	0	1	1
1	0	0	1	1	0	0	1	1	0	0	1	1	0	0
1	0	0	1	1	0	1	0	1	0	0	1	1	0	0
1	0	0	1	1	1	0	0	1	0	0	1	1	0	0
1	0	0	1	1	1	1	0	0	0	0	1	1	1	1
1	0	1	0	0	0	0	0	1	1	1	0	0	0	0
1	0	1	0	0	0	1	0	1	0	1	0	1	0	1
1	0	1	0	0	1	0	0	1	0	1	1	0	1	0
1	0	1	0	0	1	1	0	1	0	0	0	0	1	1
1	0	1	0	1	0	0	0	1	0	1	0	1	0	1
1	0	1	0	1	0	1	1	1	0	1	0	1	0	1
1	0	1	0	1	1	0	0	0	0	1	0	1	1	0
1	0	1	0	1	1	1	0	1	0	1	0	1	0	1
1	0	1	1	0	0	0	0	1	0	1	1	0	1	0
1	0	1	1	0	0	1	0	0	0	1	1	0	0	1
1	0	1	1	0	1	0	1	1	0	1	1	0	1	0
1	0	1	1	0	1	1	0	1	0	1	1	0	1	0
1	0	1	1	1	0	0	0	1	0	0	1	1	0	0
1	0	1	1	1	0	1	0	1	0	1	0	1	0	1
1	0	1	1	1	1	0	0	1	0	1	1	0	1	0

I1	I2	I3	I4	I5	I6	I7	NoError	O1	O2	O3	O4	O5	O6	O7
1	0	1	1	1	1	1	0	1	1	1	1	1	1	1
1	1	0	0	0	0	0	0	1	1	1	0	0	0	0
1	1	0	0	0	0	1	0	1	1	0	1	0	0	1
1	1	0	0	0	1	0	0	1	1	0	0	1	1	0
1	1	0	0	0	1	1	0	1	0	0	0	0	1	1
1	1	0	0	1	0	0	0	1	1	0	0	1	1	0
1	1	0	0	1	0	1	0	0	1	0	0	1	0	1
1	1	0	0	1	1	0	1	1	1	0	0	1	1	0
1	1	0	0	1	1	1	0	1	1	0	0	1	1	0
1	1	0	1	0	0	0	0	1	1	0	1	0	0	1
1	1	0	1	0	0	1	1	1	1	0	1	0	0	1
1	1	0	1	0	1	0	0	0	1	0	1	0	1	0
1	1	0	1	0	1	1	0	1	1	0	1	0	0	1
1	1	0	1	1	0	0	0	1	0	0	1	1	0	0
1	1	0	1	1	0	1	0	1	1	0	1	0	0	1
1	1	0	1	1	1	0	0	1	1	0	0	1	1	0
1	1	0	1	1	1	1	0	1	1	1	1	1	1	1
1	1	1	0	0	0	0	1	1	1	1	0	0	0	0
1	1	1	0	0	0	1	0	1	1	1	0	0	0	0
1	1	1	0	0	1	1	0	0	1	1	0	0	1	1
1	1	1	0	1	0	0	0	1	1	1	0	0	0	0
1	1	1	0	1	0	1	0	1	0	1	0	1	0	1
1	1	1	0	1	1	0	0	1	1	0	0	1	1	0
1	1	1	0	1	1	1	0	1	1	1	1	1	1	1
1	1	1	1	0	0	0	0	1	1	1	0	0	0	0
1	1	1	1	0	0	1	0	1	1	0	1	0	0	1
1	1	1	1	0	1	0	0	1	0	1	1	0	1	0
1	1	1	1	0	1	1	0	1	1	1	1	1	1	1
1	1	1	1	1	0	0	0	0	1	1	1	0	0	0

I1	I2	I3	I4	I5	I6	I7	NoError	O1	O2	O3	O4	O5	O6	O7
1	1	1	1	1	0	1	0	1	1	1	1	1	1	1
1	1	1	1	1	1	0	0	1	1	1	1	1	1	1
1	1	1	1	1	1	1	1	1	1	1	1	1	1	1

桶形移位器

该真值表有2^13行，不在这里展示，附在了压缩包中。

思考题在报告开头处