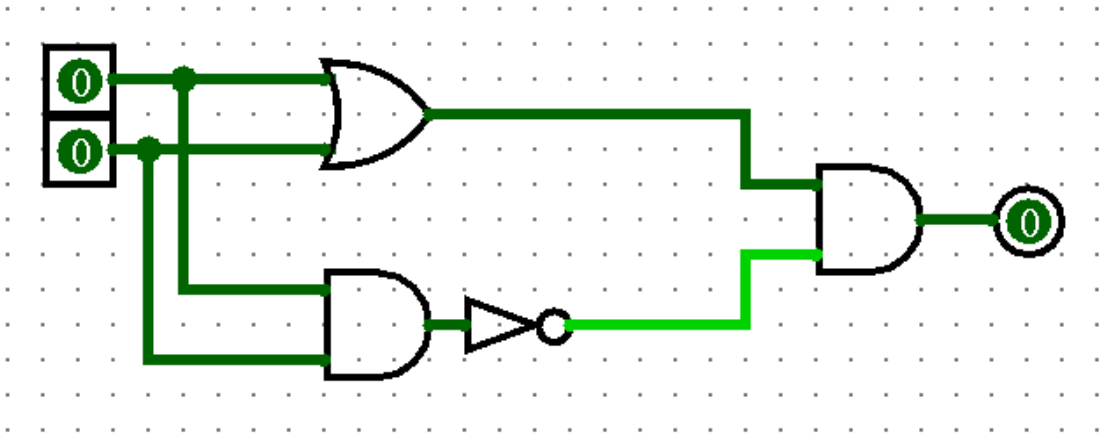
COD HW 01

1.

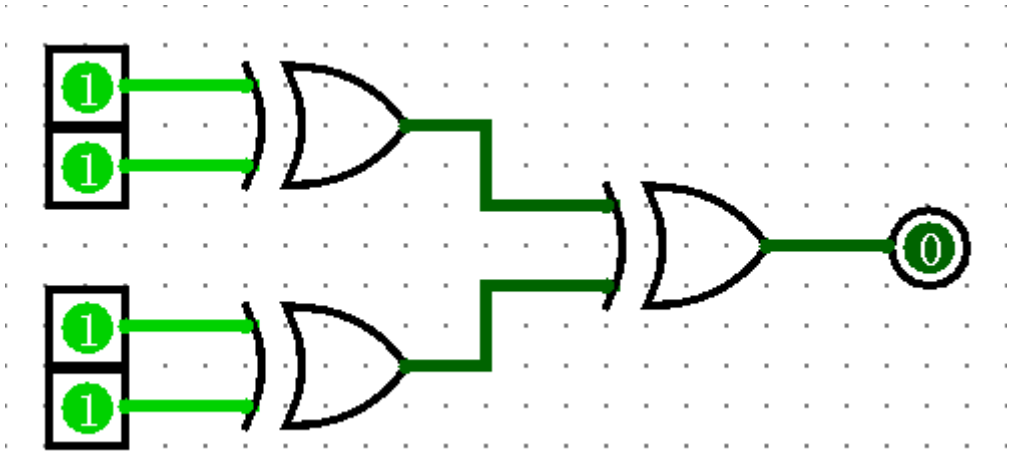
```
  ABC' + AB'C + A'BC + ABC
= ABC' + ABC + AB'C + ABC + A'BC + ABC
= AB + AC + BC
= AB + AC + BC + (ABC)' + ABC
```

2.

- 先利用与或非门搭建异或门

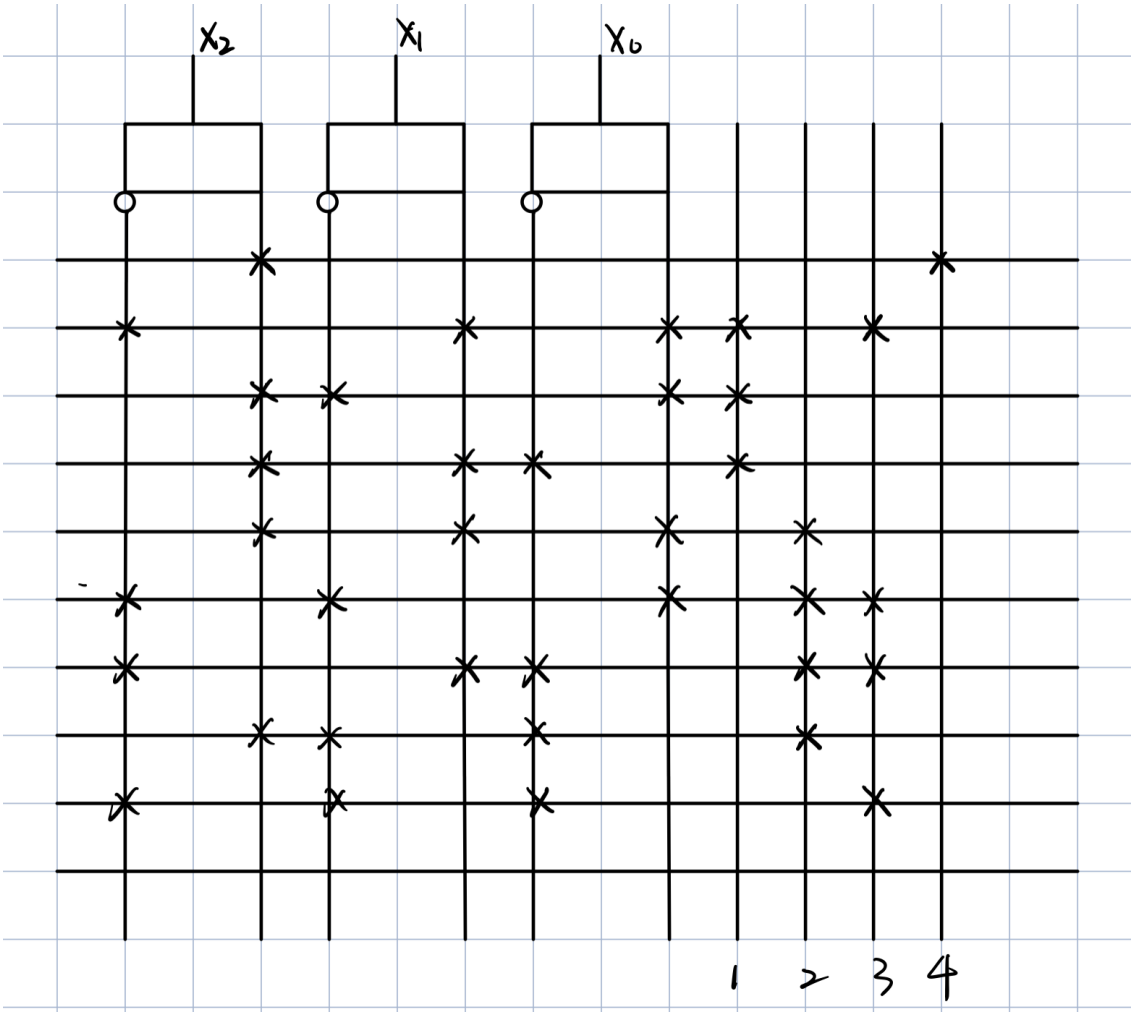


- 然后利用异或门实现电路



3.

- a
  - x0'x1x2 + x0x1'x2 + x0x1x2'
  - x0x1x2 + x0x1'x2' + x0'x1x2' + x0'x1'x2
  - x0'x1'x2' + x0x1'x2' + x0'x1x2' + x0x1x2'
  - x2
- b



4.

- 可切换式自增或自减计数器

5.

```
module sum_adder(
    input Load,
    input clk,
    input rst,
    input [15:0] load,
    input In,
    output [15:0] out);
    reg [15:0] result;
    always @ (posedge clk or negedge rst)
        begin
            if(!rst)
                result <= 0;
            else if(Load)
                result <= load;
            else
                begin
                    result <= result + In;
                end
        end
    always @ (posedge clk)
        begin
            out <= result;
```

```
        end
endmodule
```