Sheikh Hasina University, Netrokona
Department of Computer Science and Engineering
CSE-2205: Introduction to Mechatronics

Lec-25: Programmable Logic Controller (PLC)

Mechatronics: Electronic Control Systems in Mechanical Engineering by W. Bolton

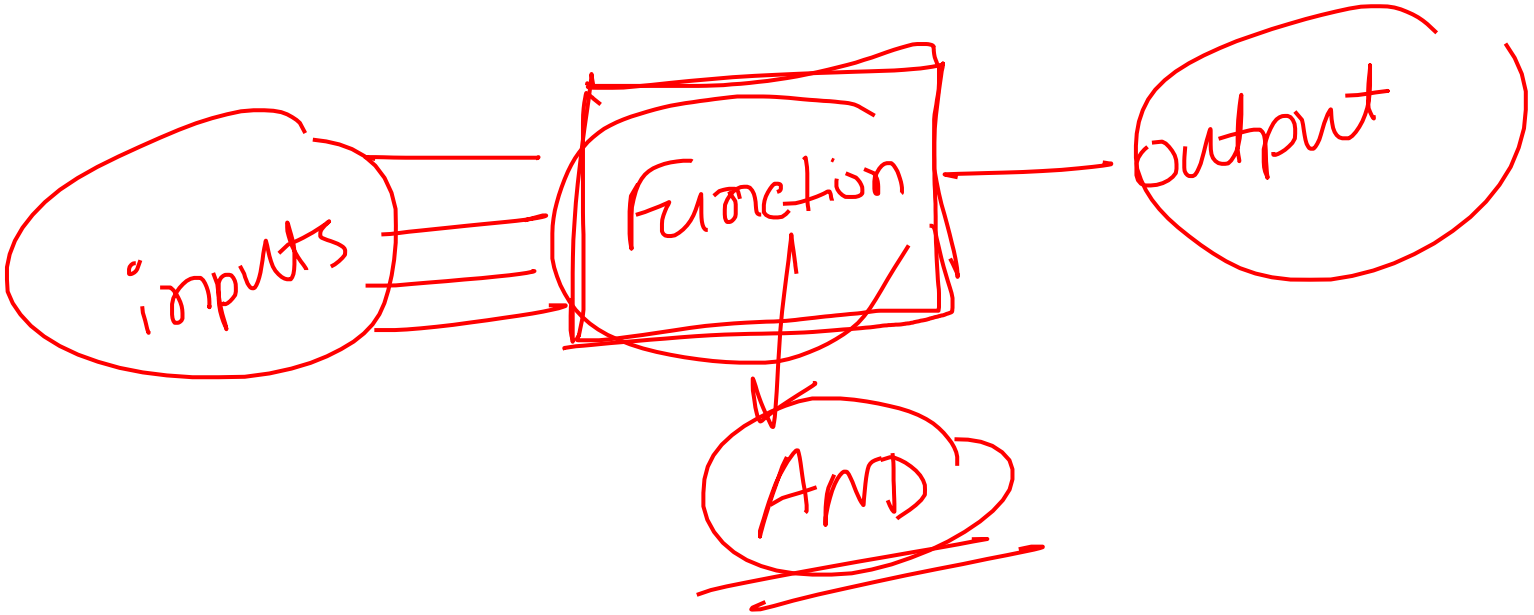
Md. Ariful Islam
Assistant Professor
Dept. of Robotics and Mechatronics Engineering
University of Dhaka
&
Adjunct Faculty
Sheikh Hasina University, Netrokona
Department of Computer Science and Engineering

Function blocks:

FBD

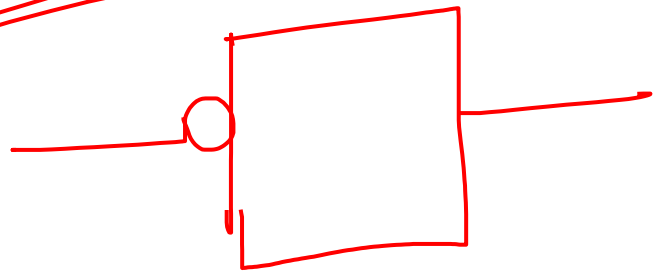
Ladder

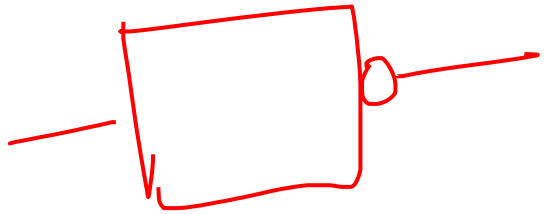
FBD



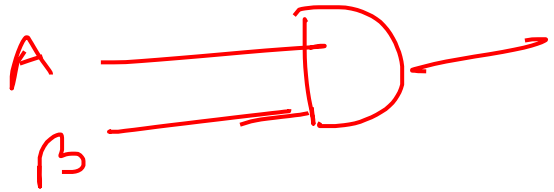
Logic Gates:

NOT Gate

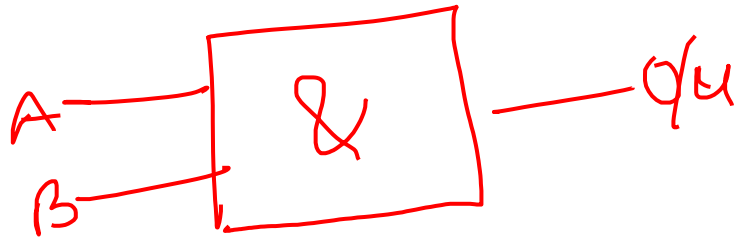




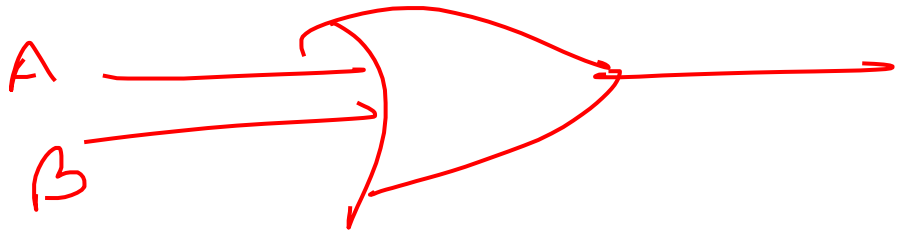
AND:



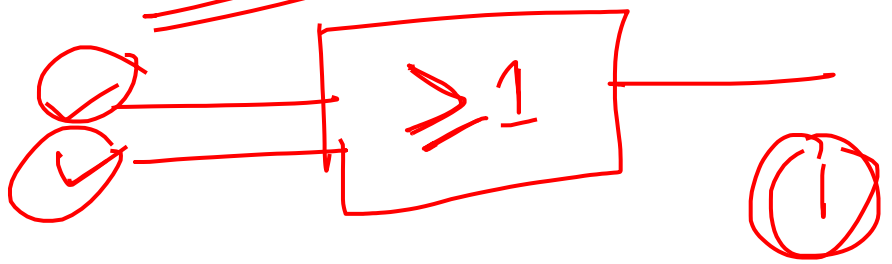
FBD



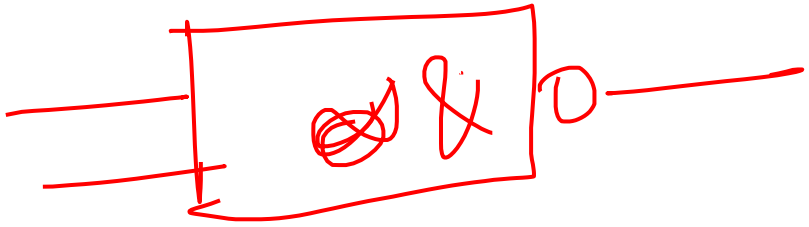
OR



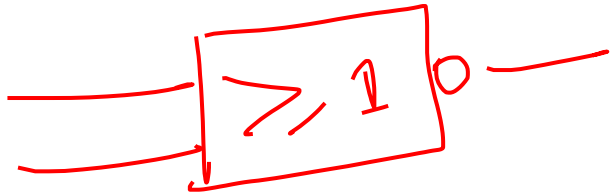
FBD



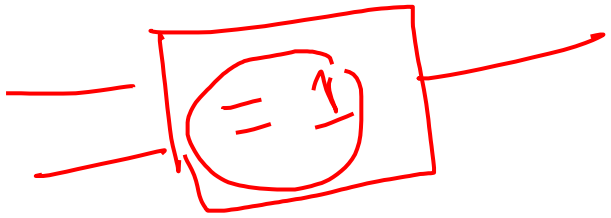
NAND.

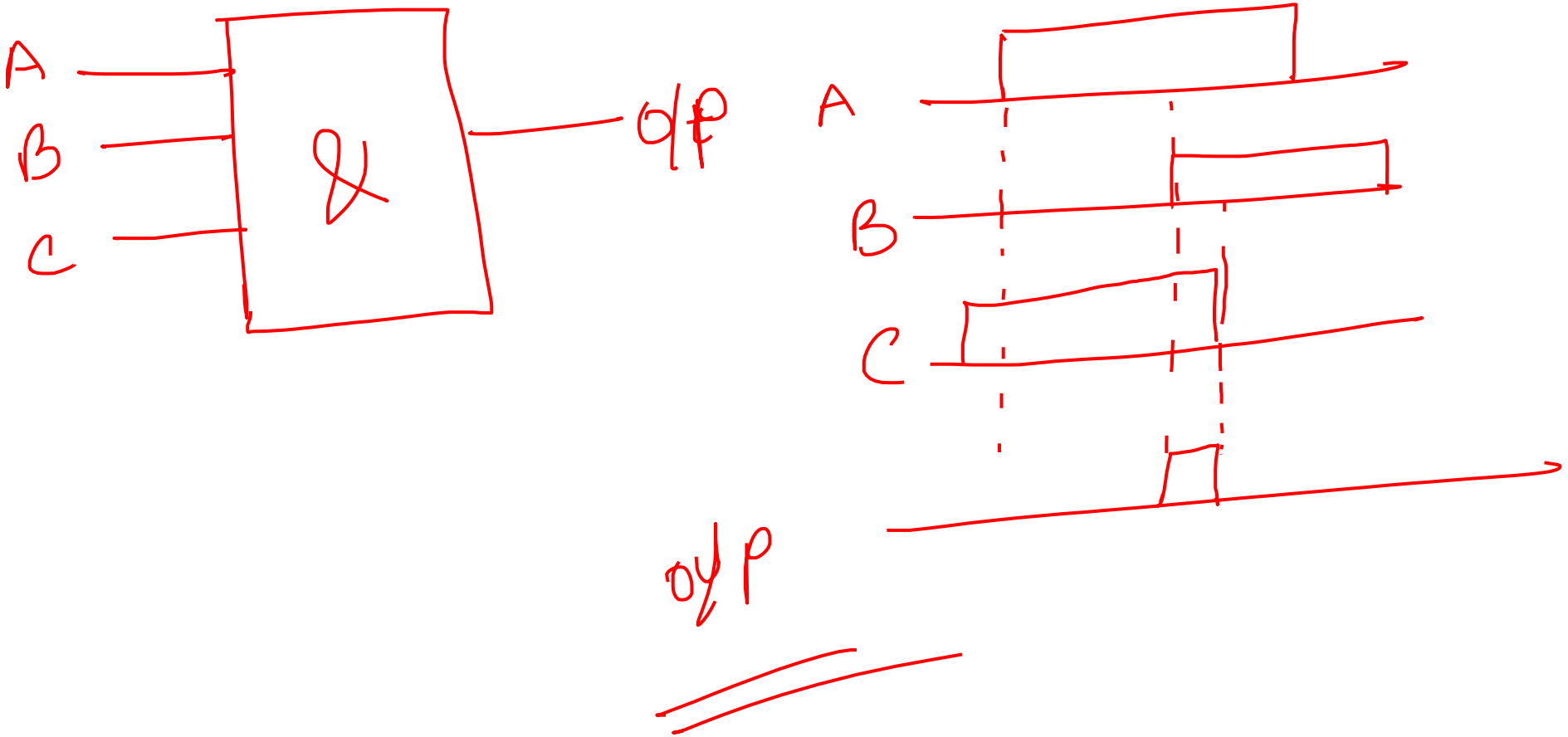


NOR:

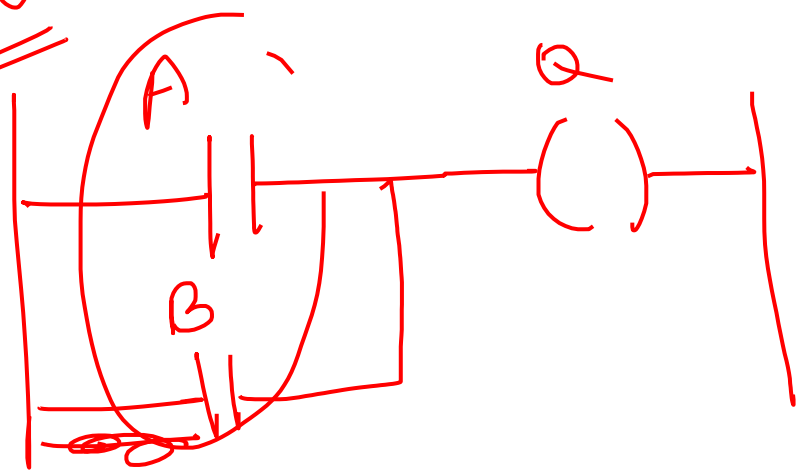


XOR

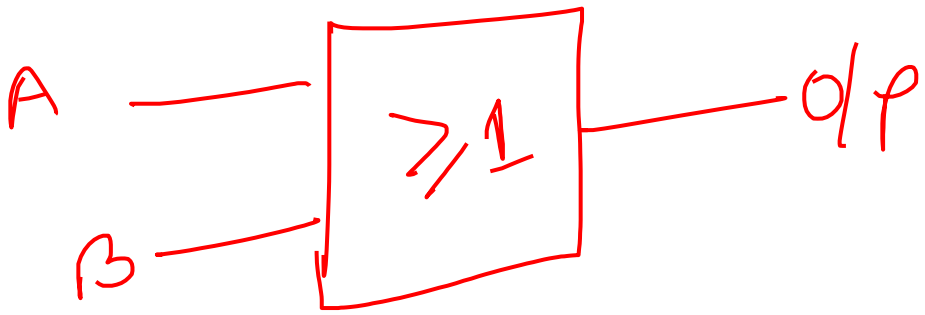



A
B
C
&
o/p
A
B
C
o/p

Ladder

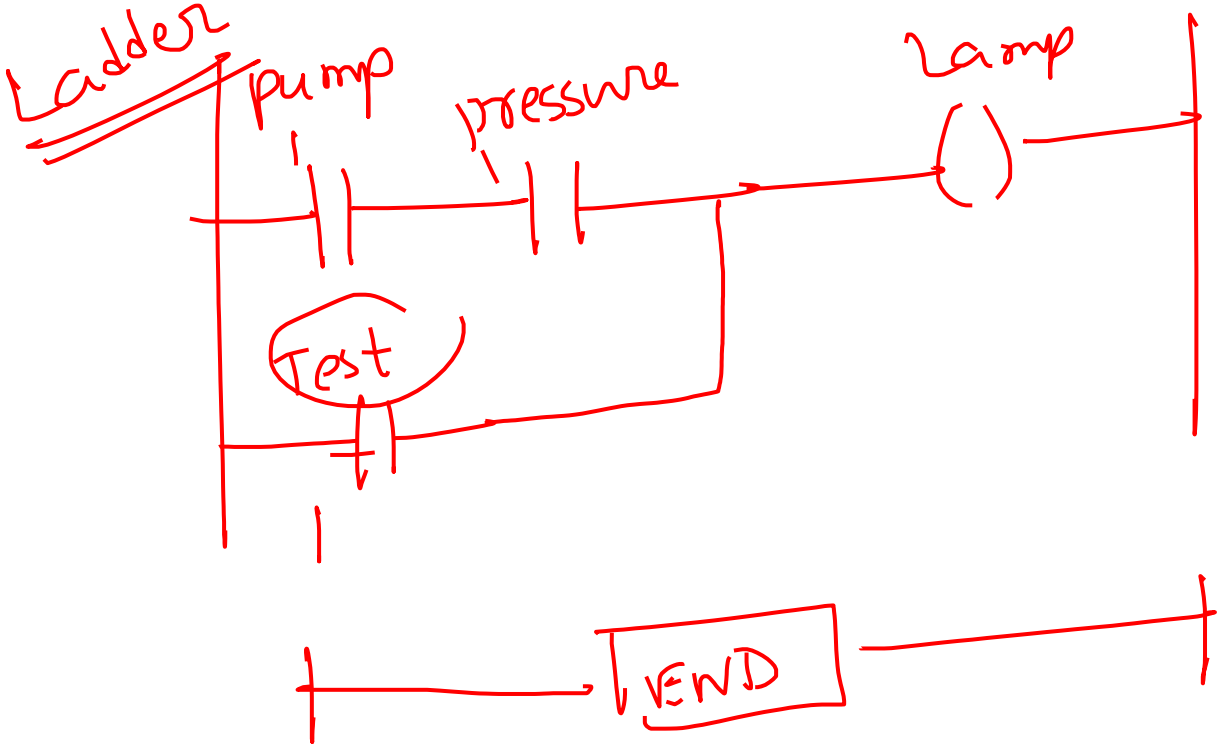


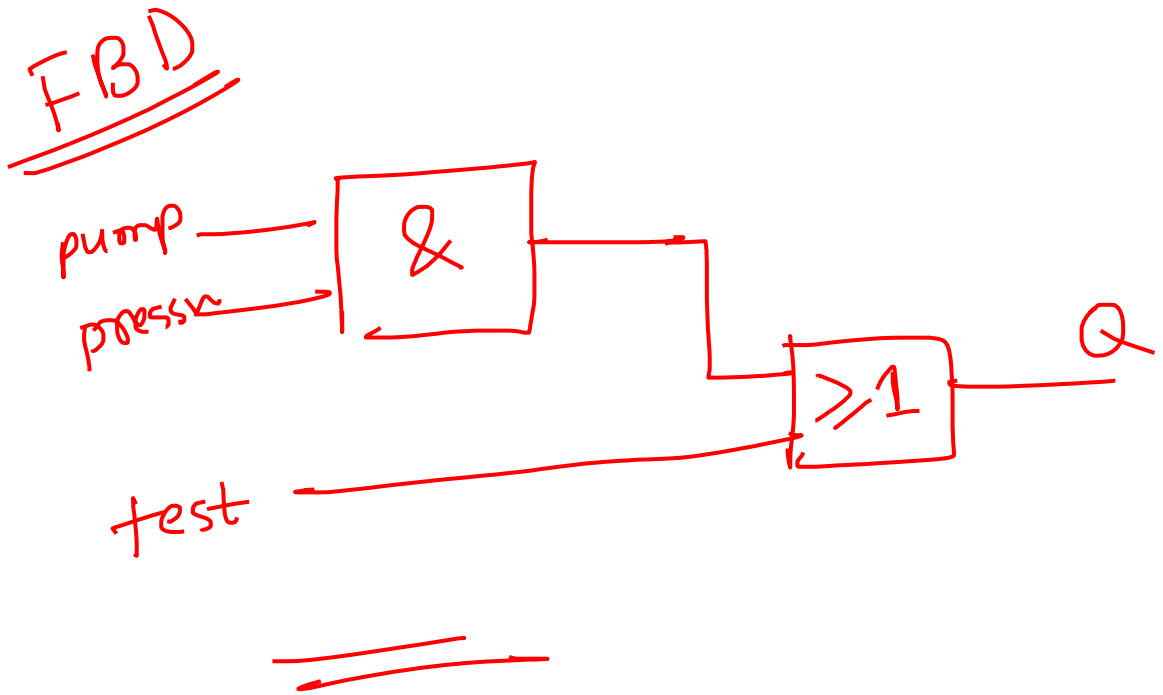
FBD



Program examples

1. A signal lamp is required to be switched on if a pump is running and the pressure is satisfactory, or if the lamp test switch is closed.

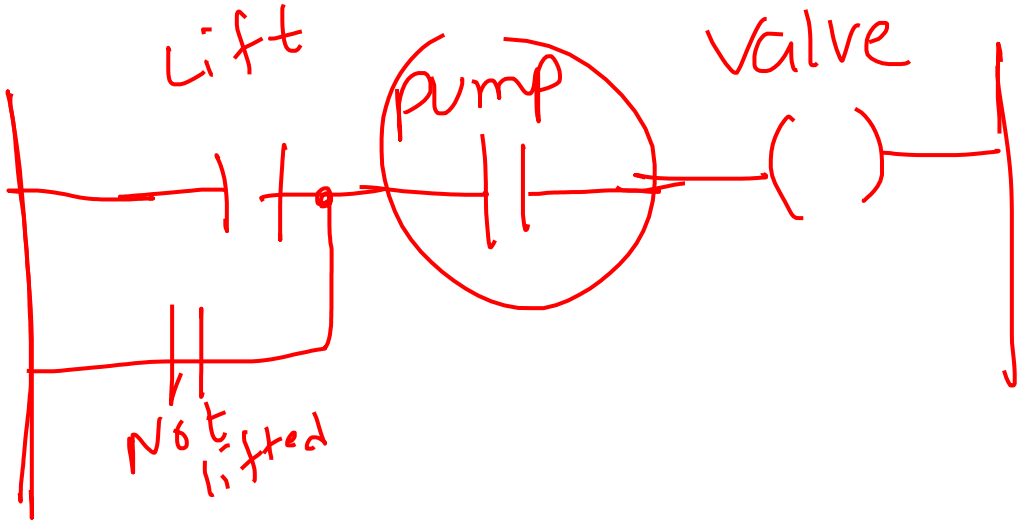




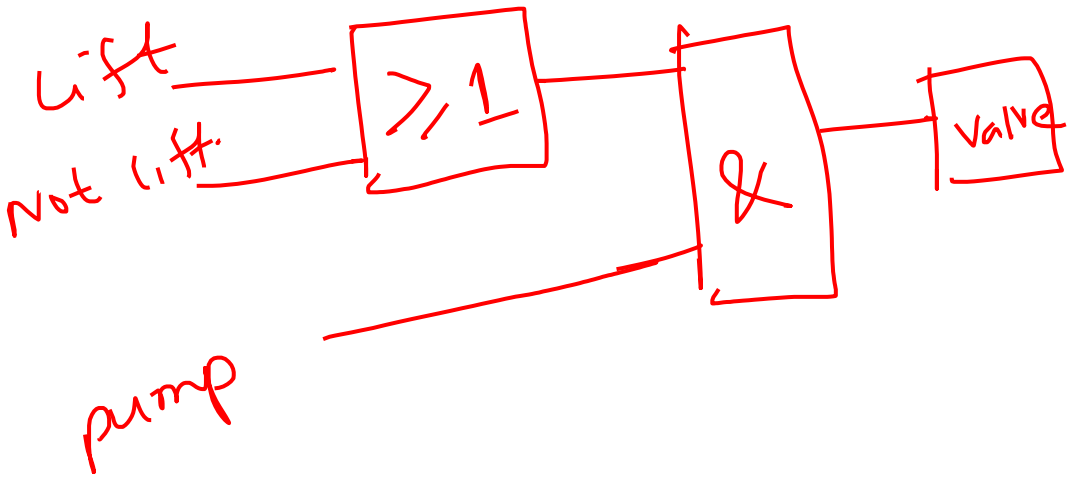
Program examples

2. Consider a valve which is to be operated to lift a load when a pump is running and either the lift switch is operated or a switch operated indicating that the load has not already been lifted and is at the bottom of its lift channel.

Ladder:



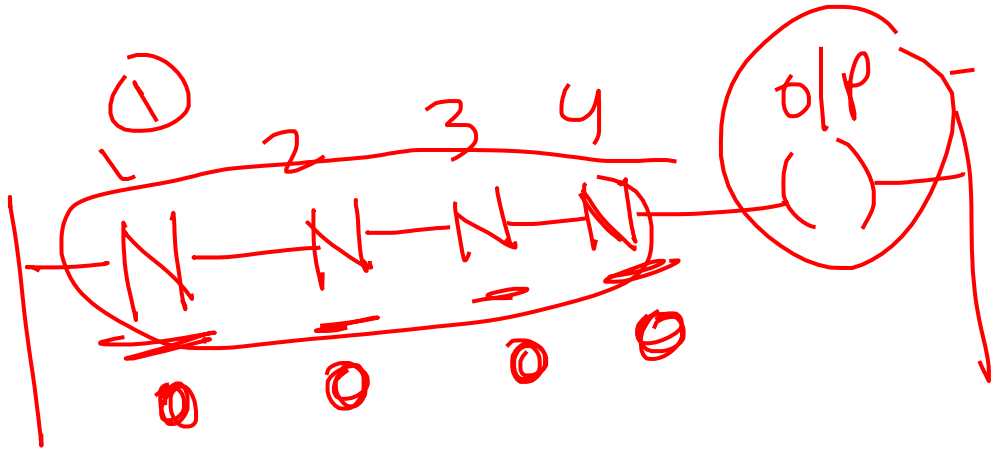
FBD:

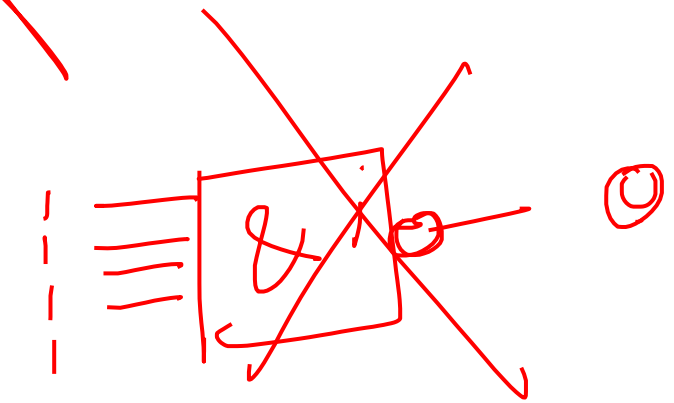


Program examples

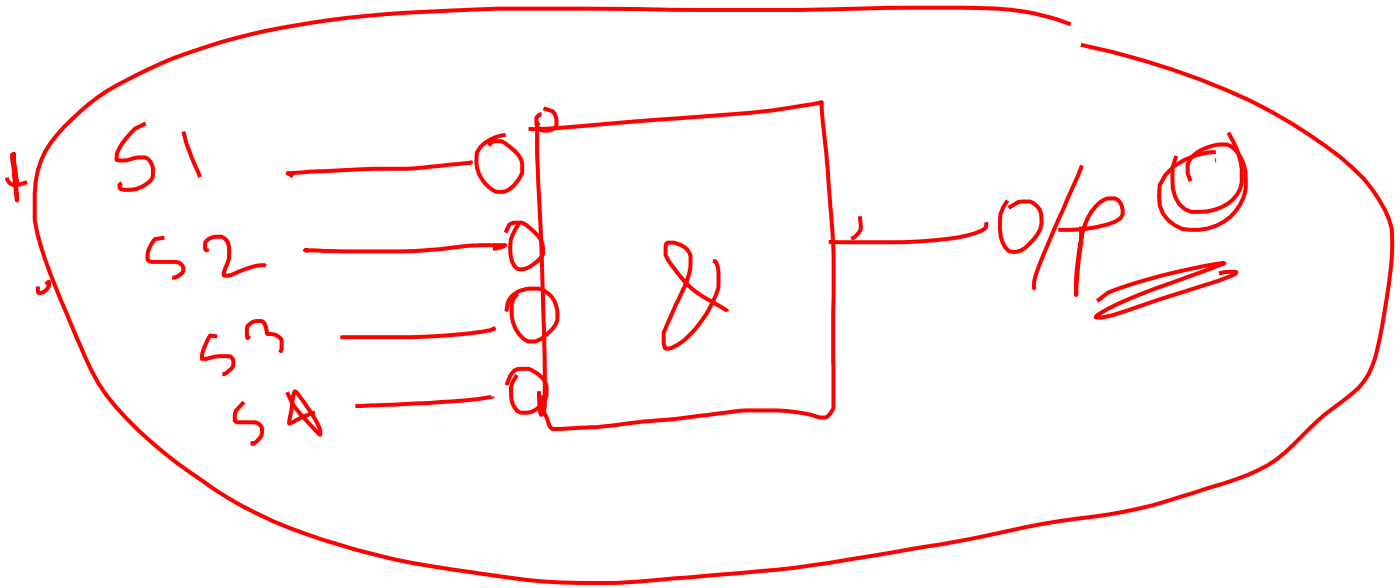
3. Consider a system where there has to be no output when any one of four sensors gives an output, otherwise there is to be an output.

Ladder:

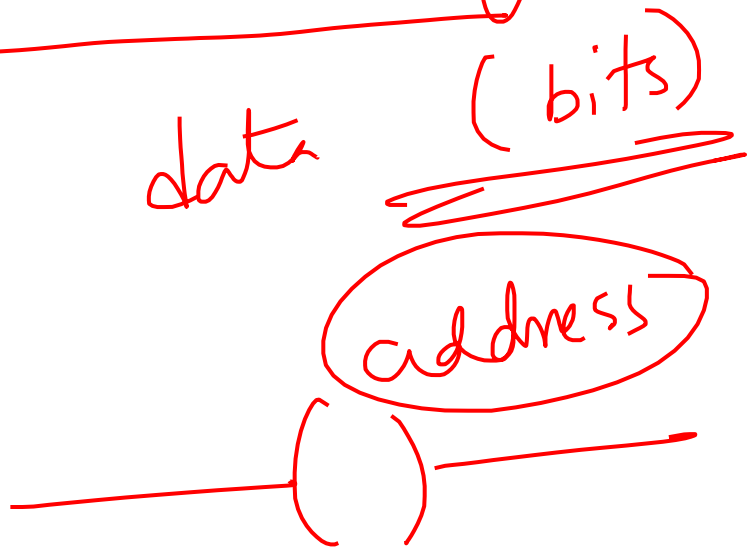




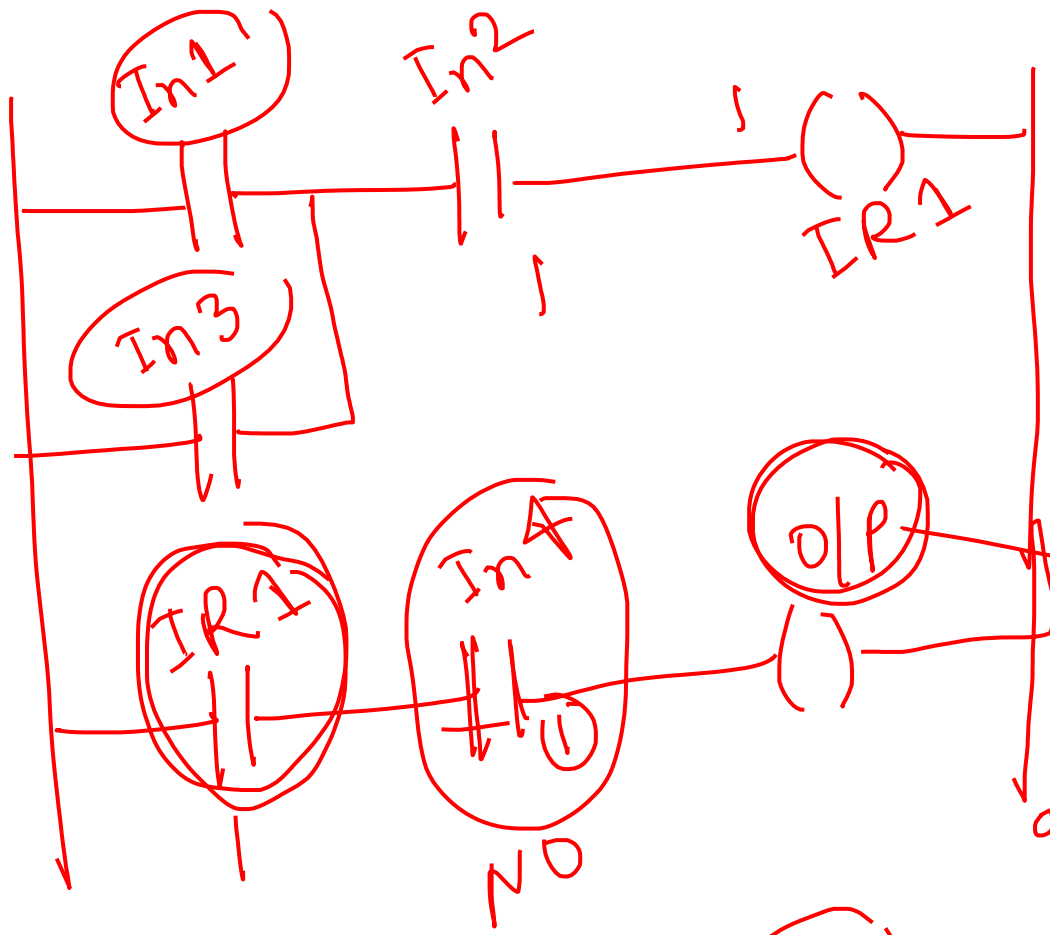
FBD

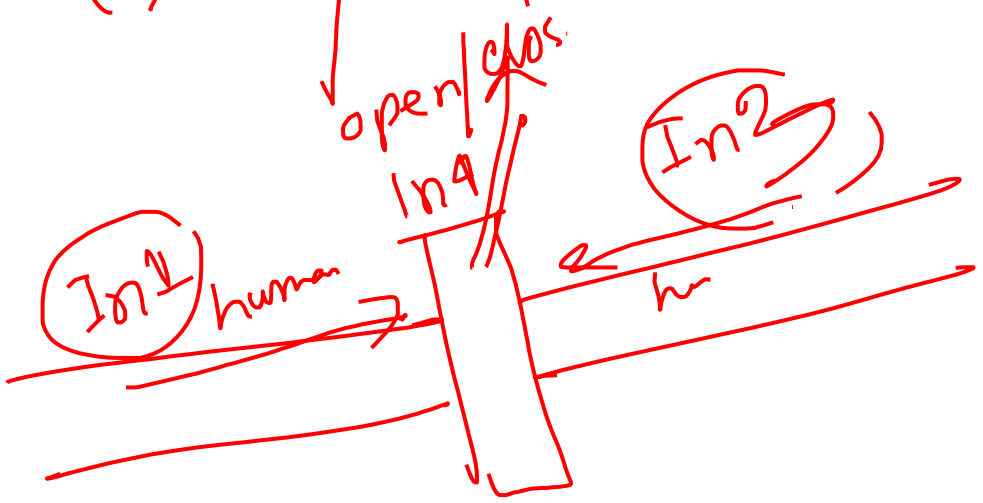


Internal Relays:



Security example:





Inputs:

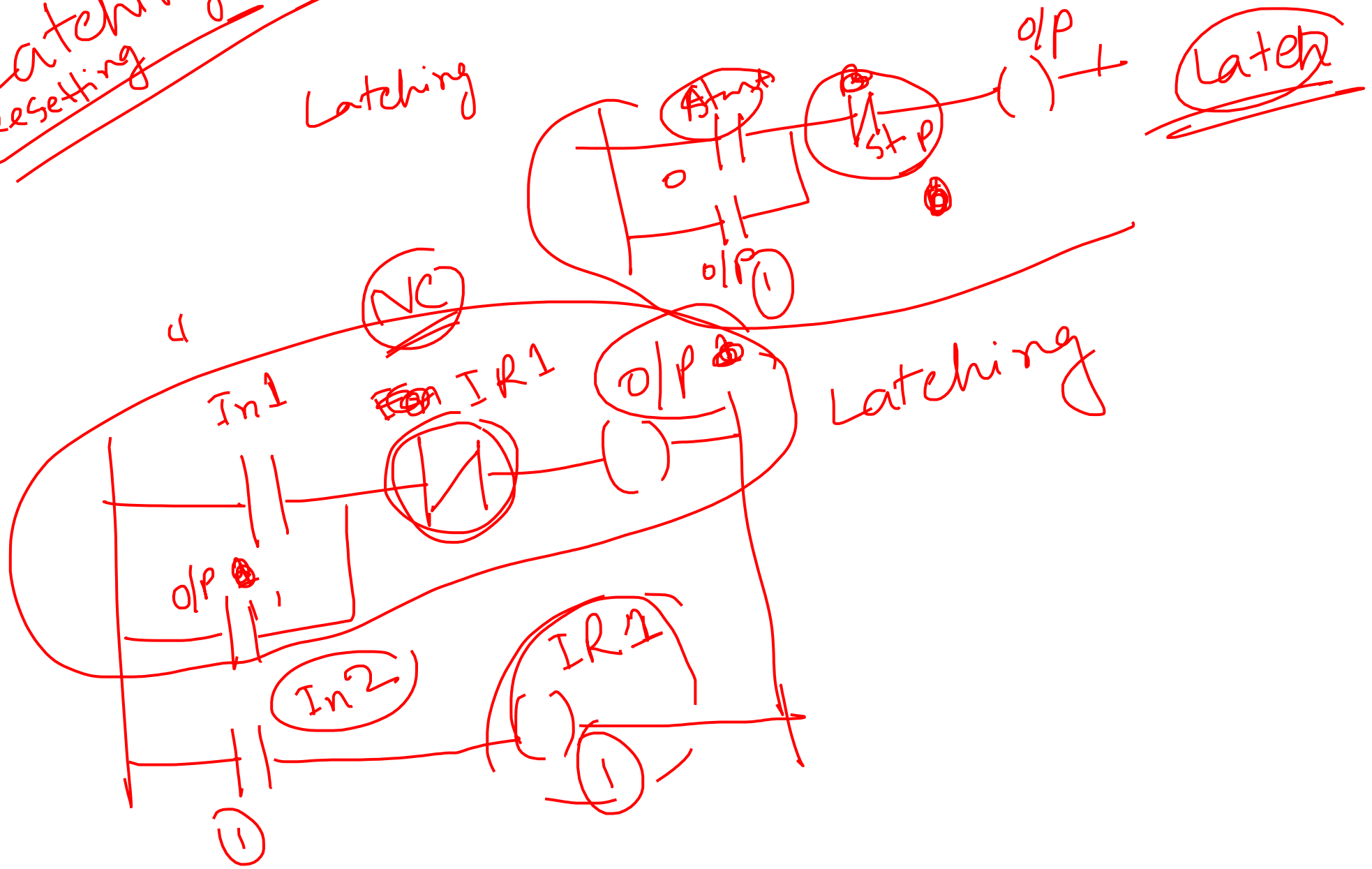
In1 = Sensor on one side

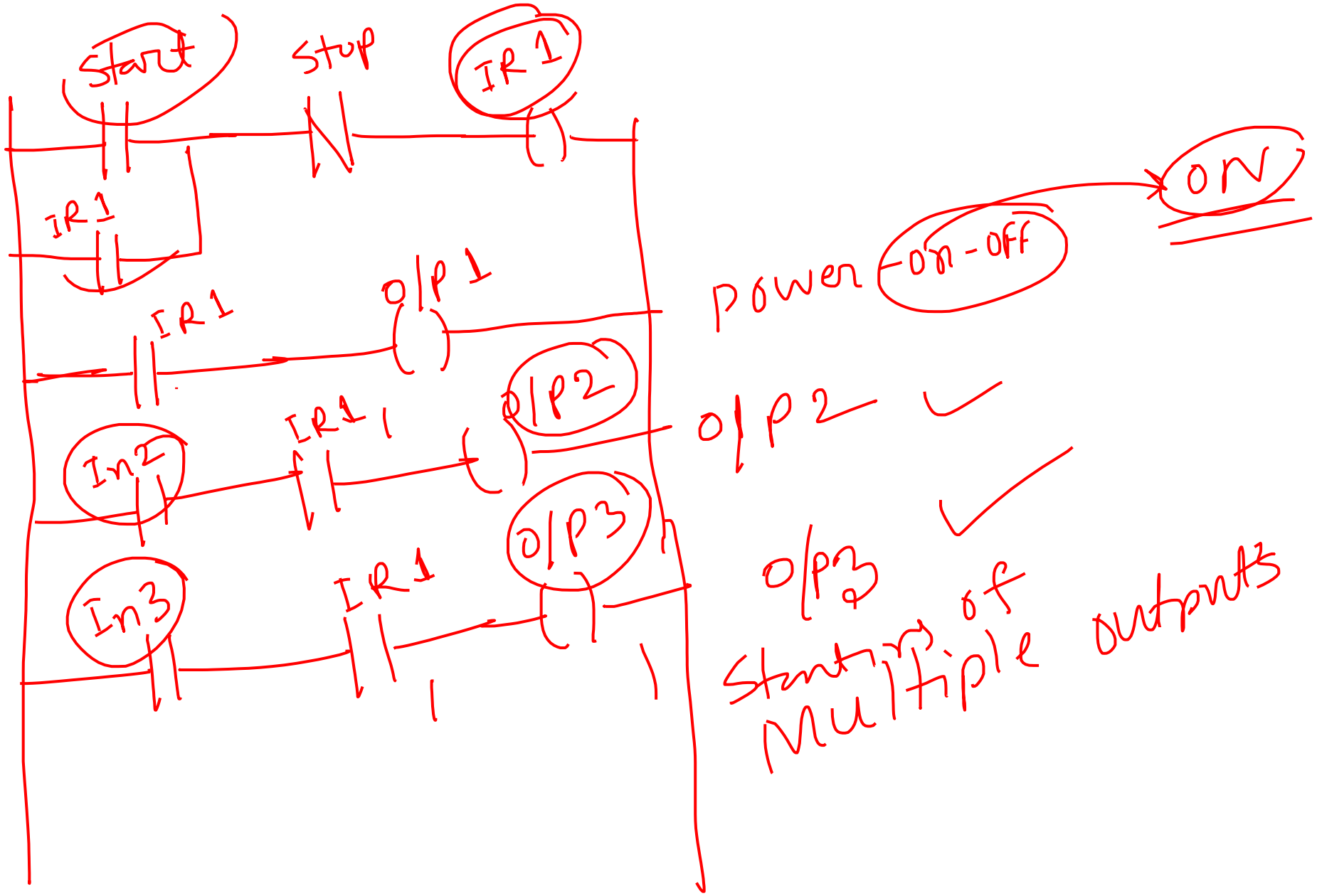
In2 = Enable switch

In3 = Sensor on other side

In4 = Limit switch

Latching
resetting





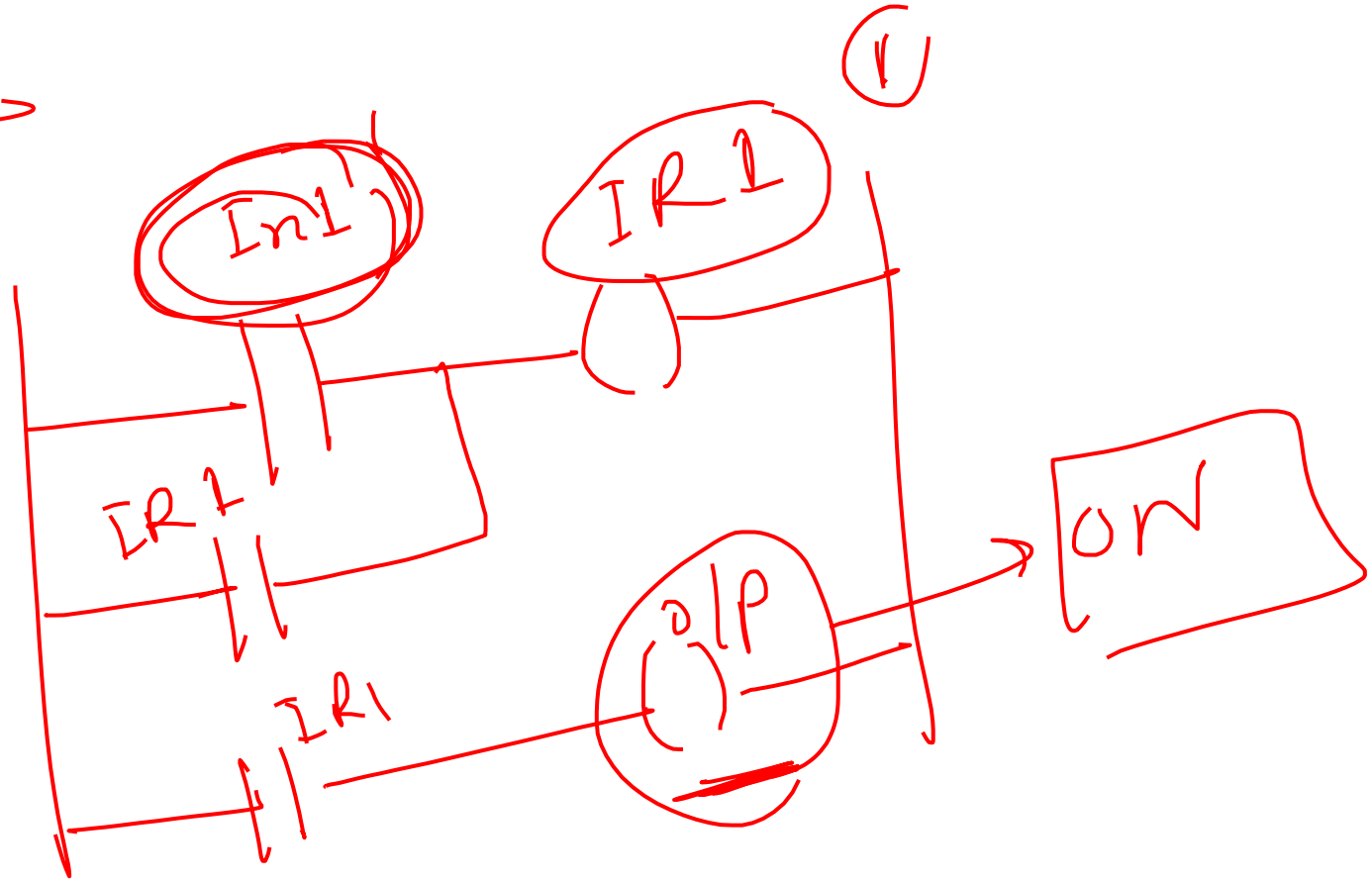
power on-off ON

O/P 2 ✓

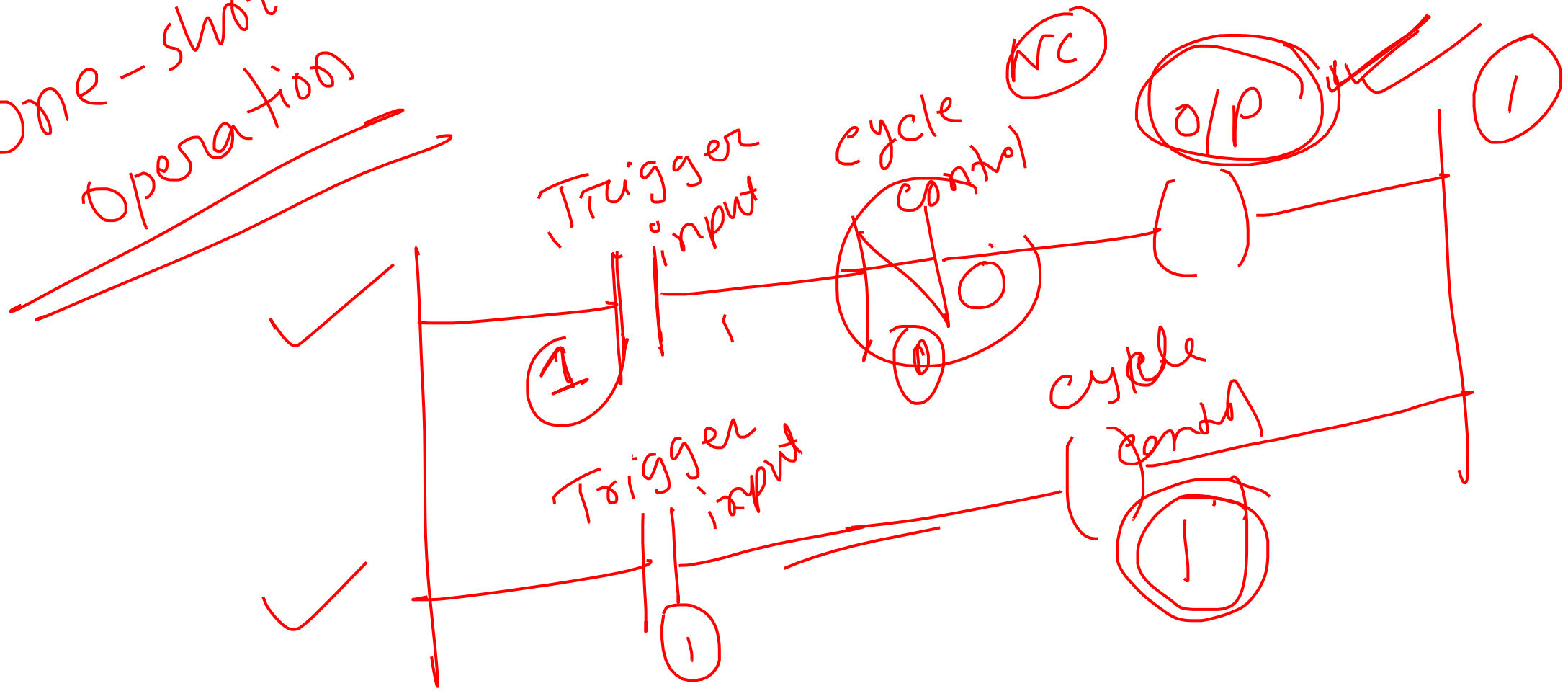
O/P 3 ✓

Starting of Multiple outputs

Battery Backed Relay

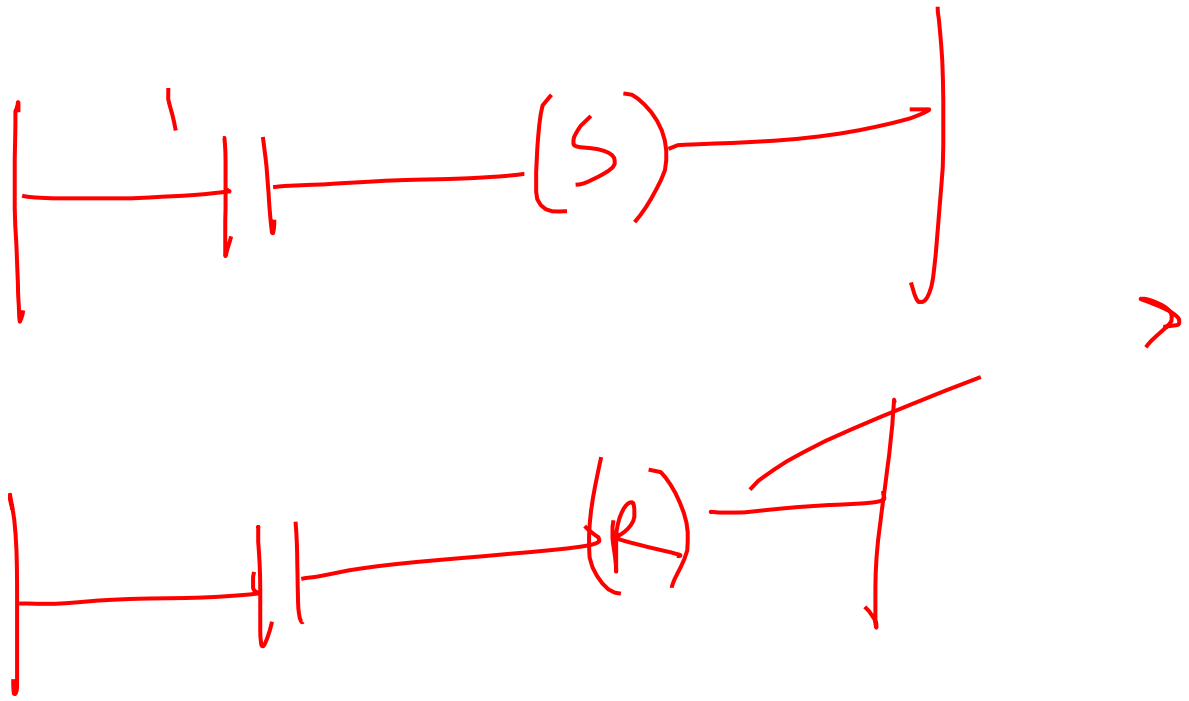


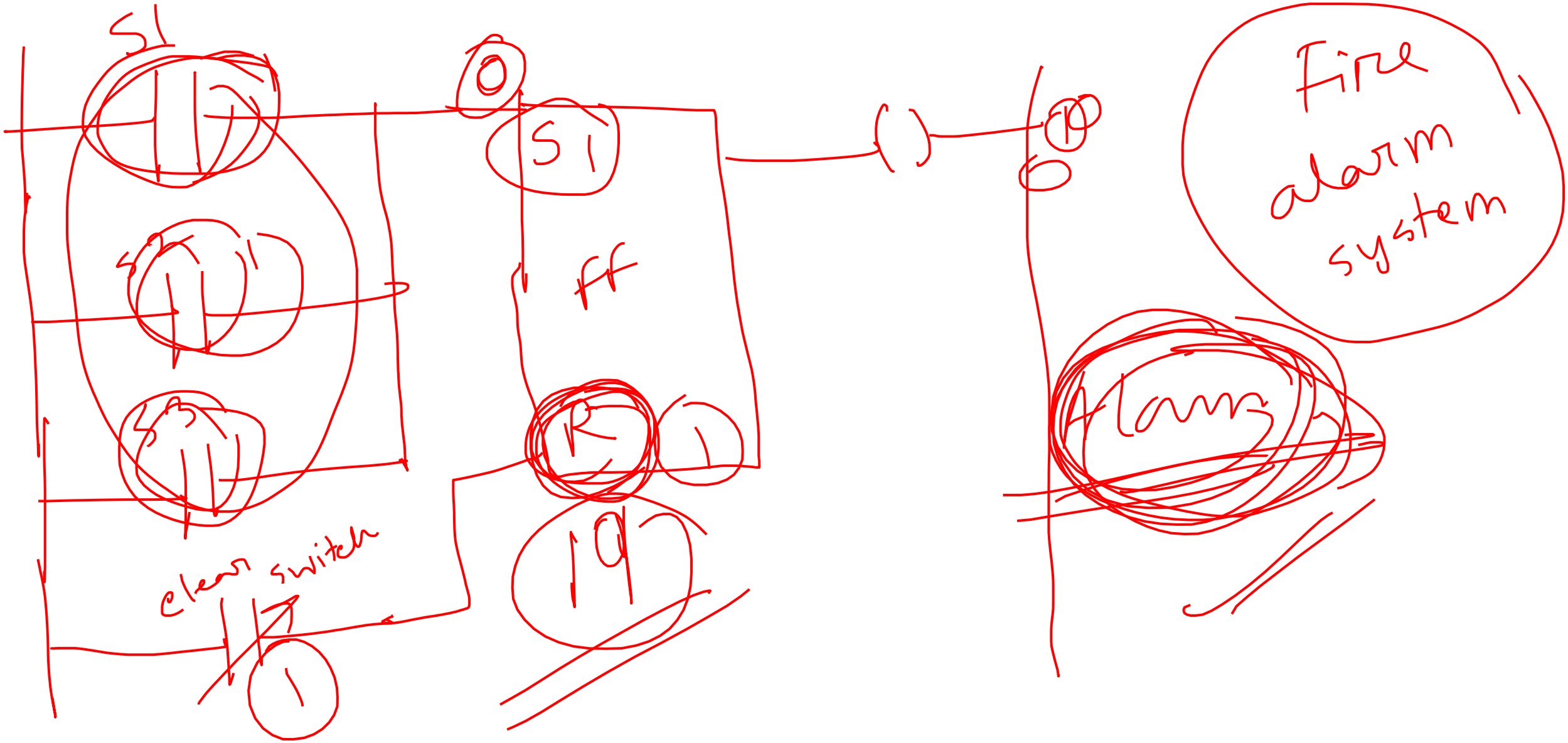
One-shot operation



SET &
RESET

Flip-flop




S1
S2
S3
clear switch
0
S1
ff
R
1
19
Fire alarm system
Alarm

S-R flip-flop

S	R	clk	Q
0	0	↑	N.C
0	1	↑	0
1	0	↑	1
1	1	↑	Invalid

J-K flip-flop

1, 0

Toggle