Sheikh Hasina University, Netrokona
Department of Computer Science and Engineering

CSE-2205: Introduction to Mechatronics

Lec-27: Programmable Logic Controller (PLC)

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

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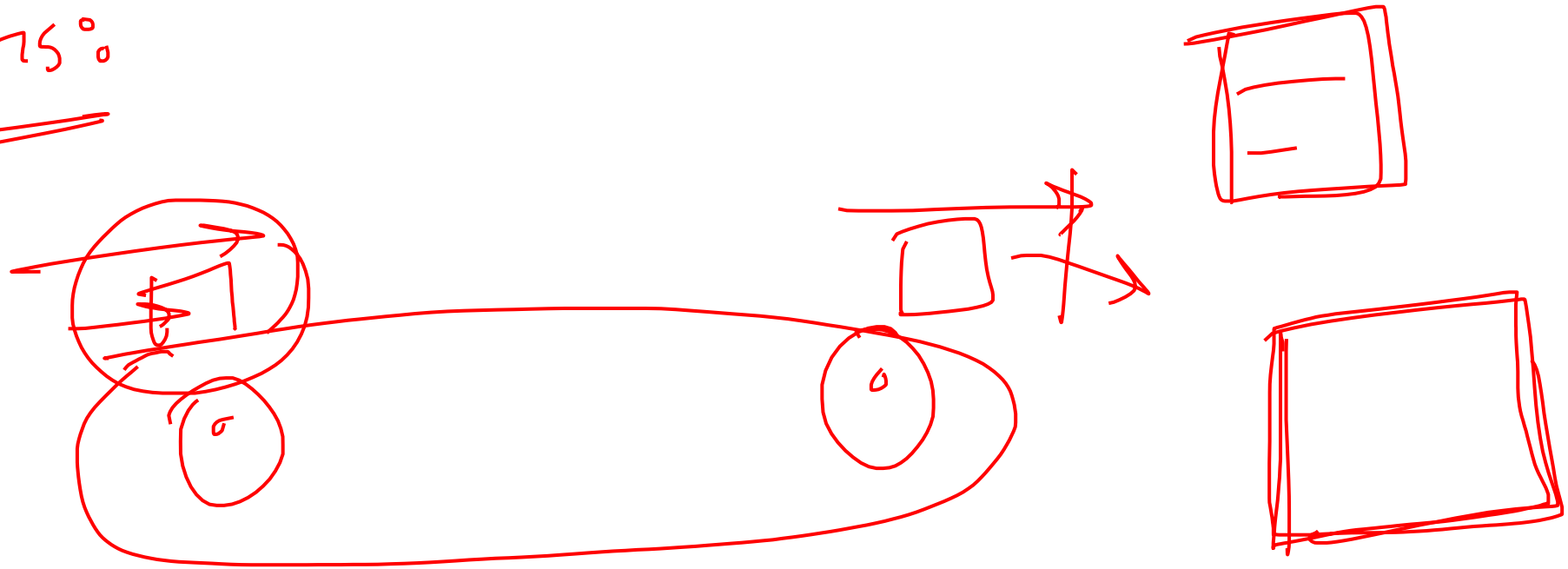
Counters:



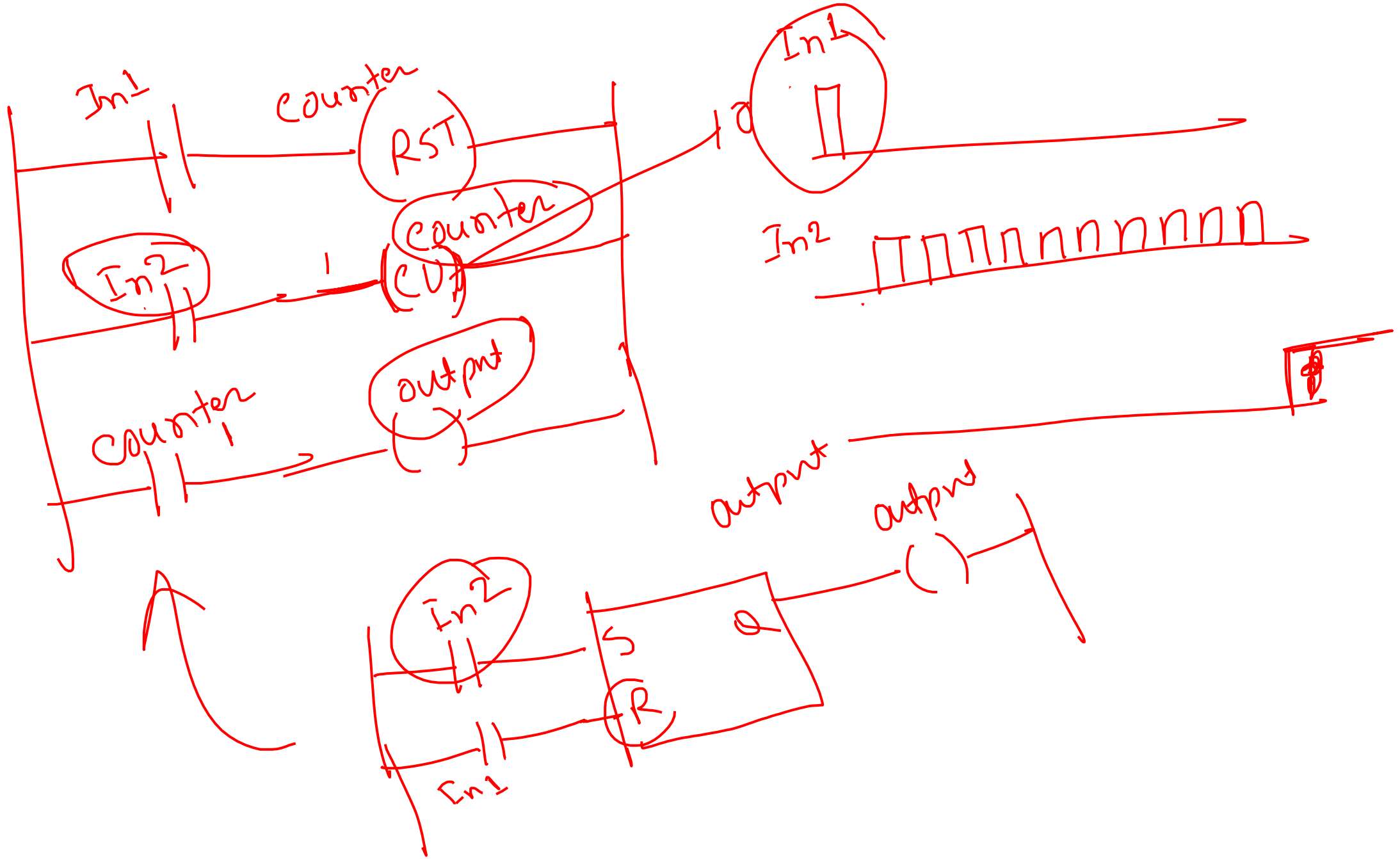
Down counter

(DC)

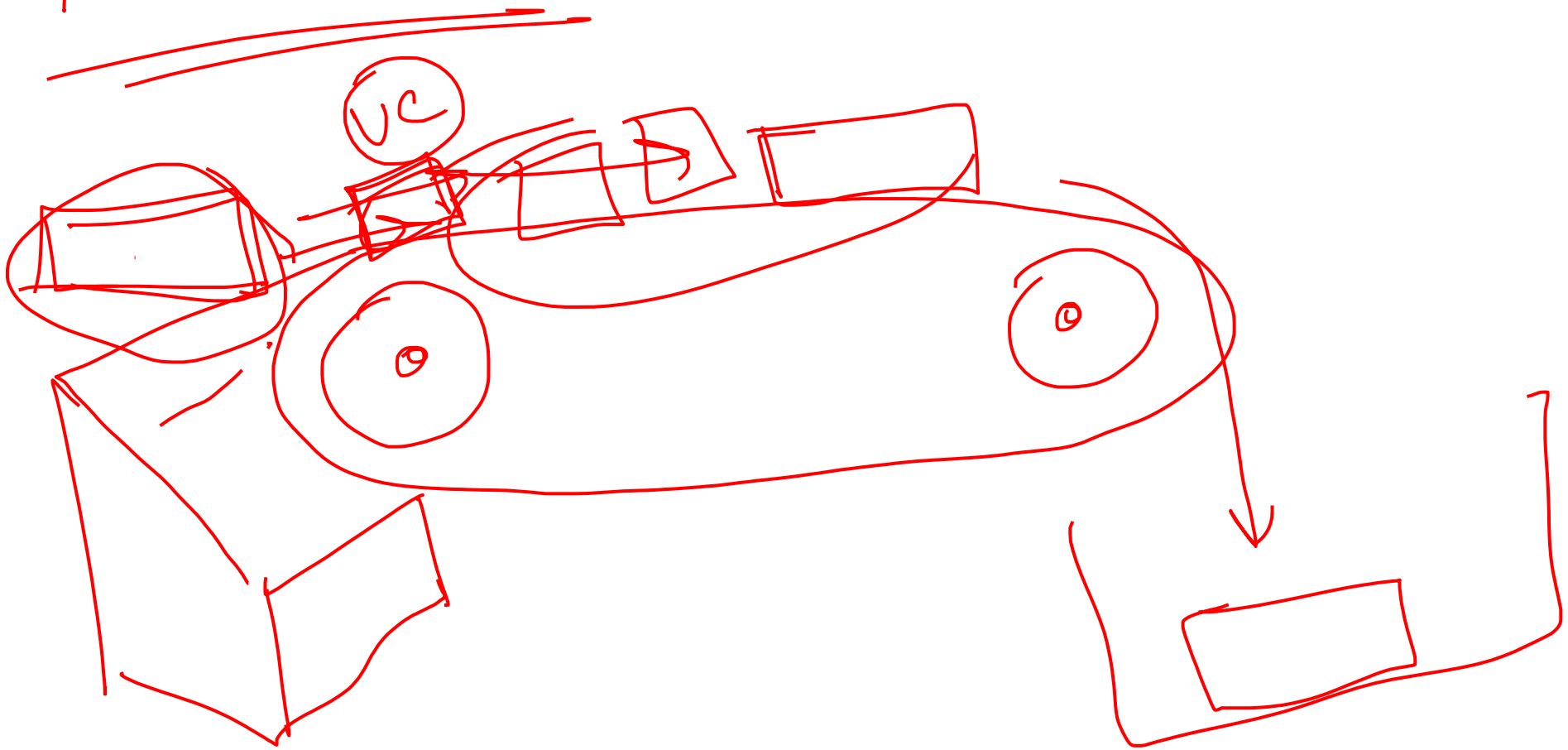
preset to zero

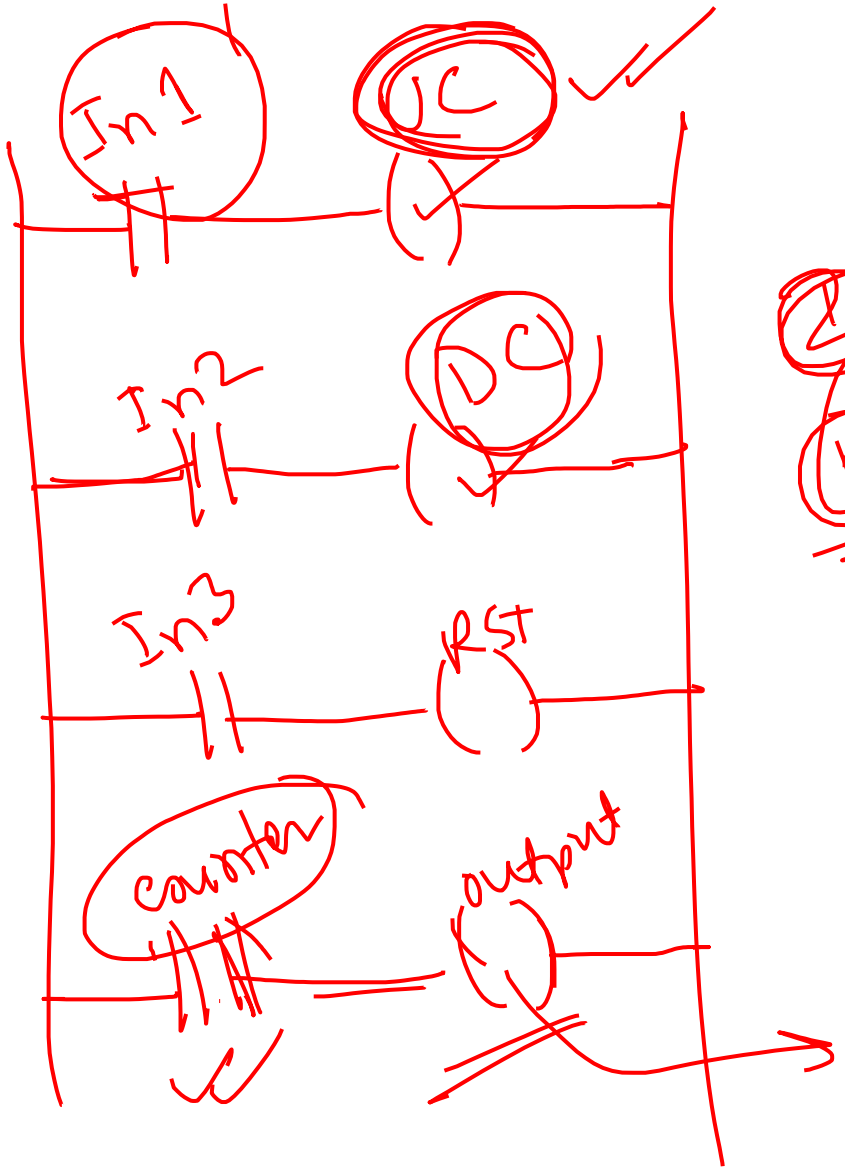
(UC)

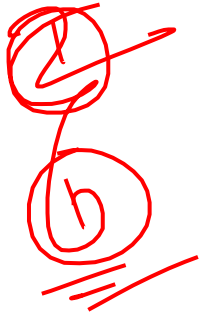
zero to preset

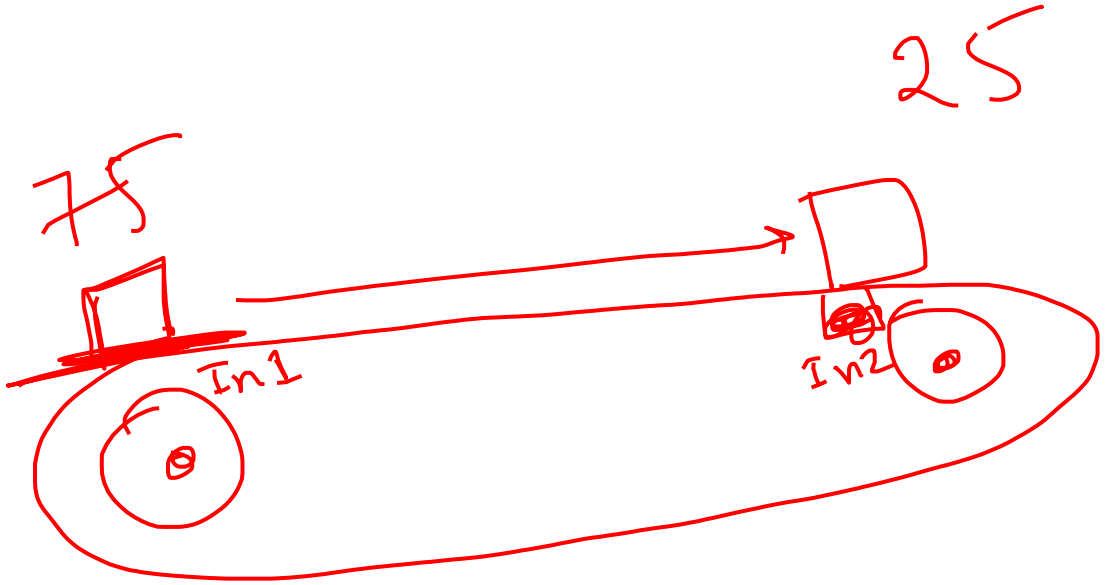

In1
counter
RST
In2
counter
CU
counter
output
In1
In2
output
output
In2
S
Q
R
In1

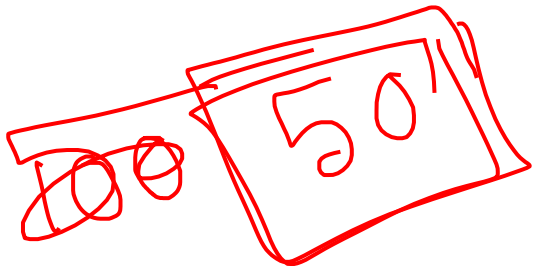
Up/ Down counting:



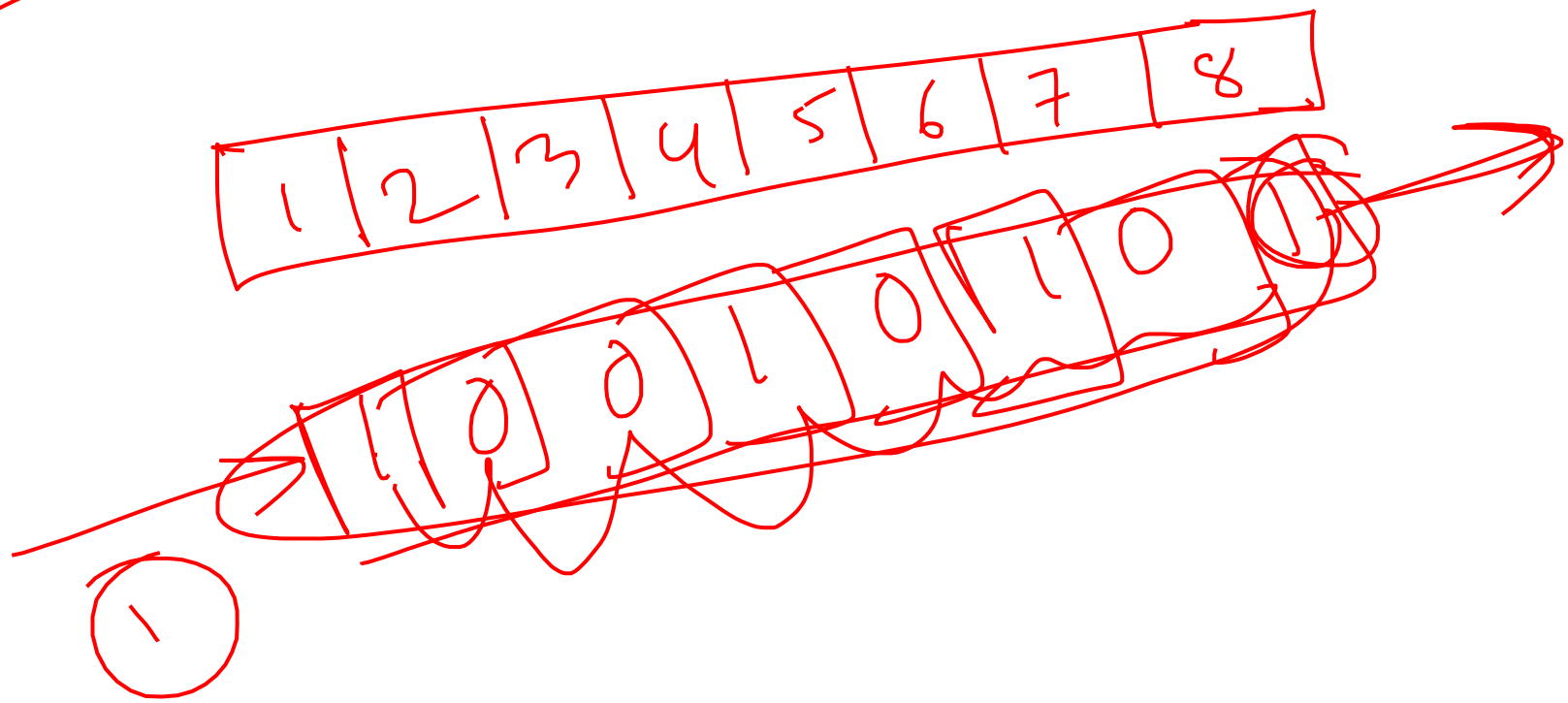

In1
IC
In2
DC
In3
RST
Counter
output

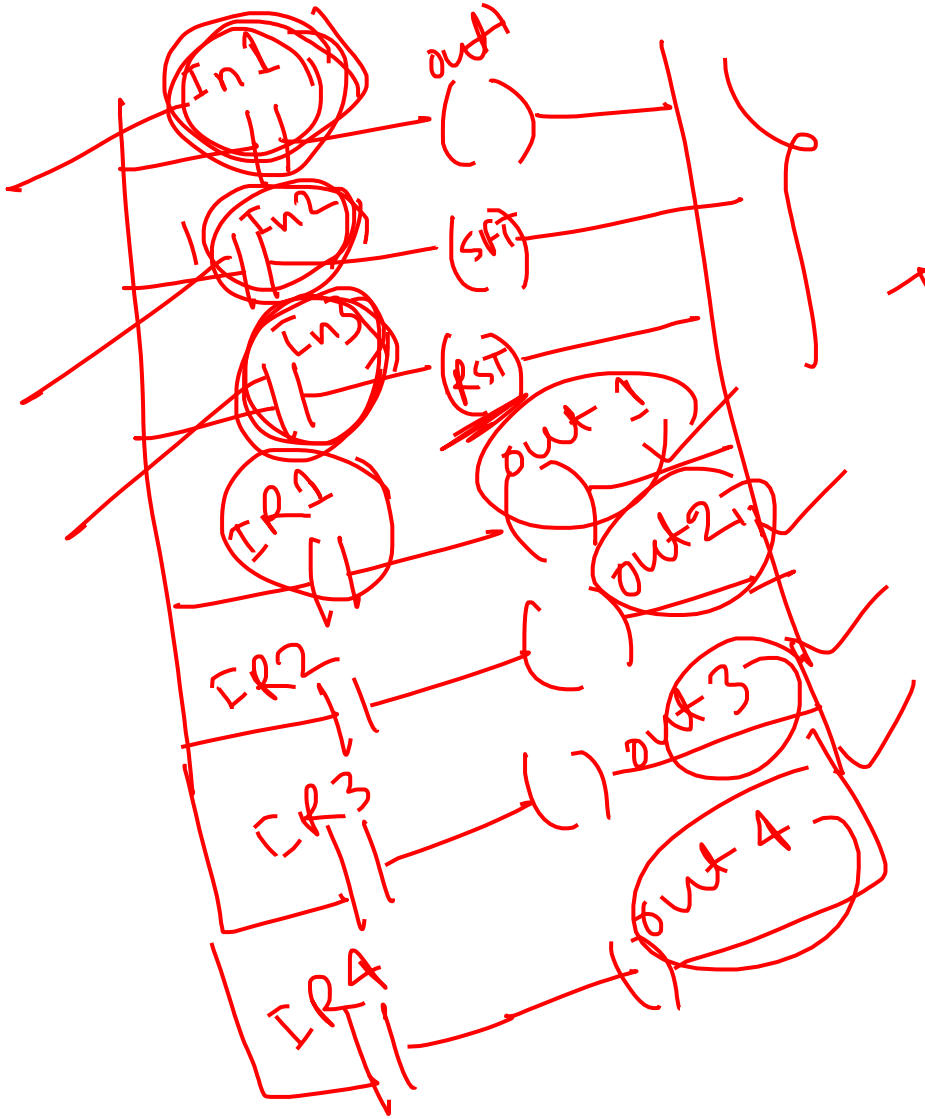

2
b

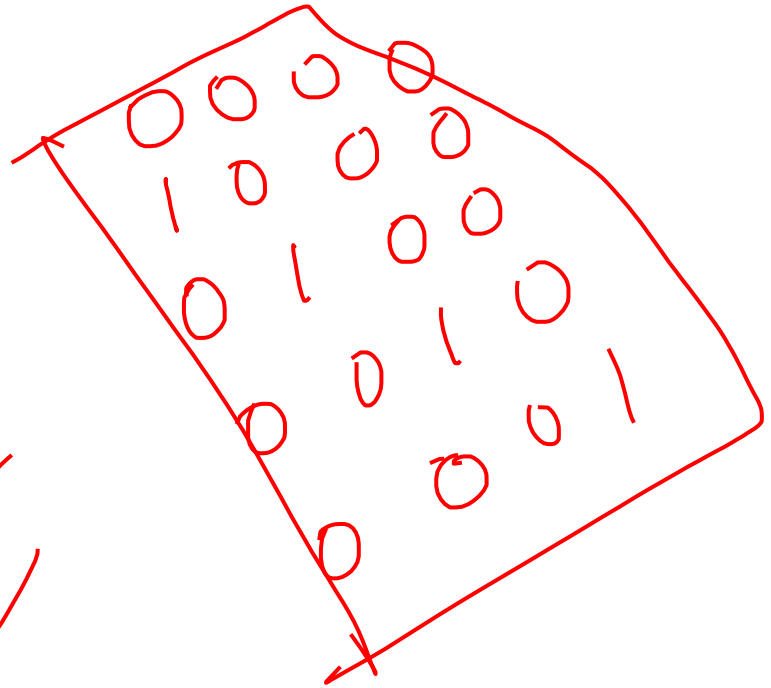

75
25
In1
In2


50

Shift Registers




In1
out
In2
SFT
In3
RST
IR1
out 1
out2
IR2
out3
IR3
out 4
IR4



Designing Systems

Program development:

→ Input / output Specification

→ Algorithm
- defined
- flowchart ✓
- pseudo code ✓

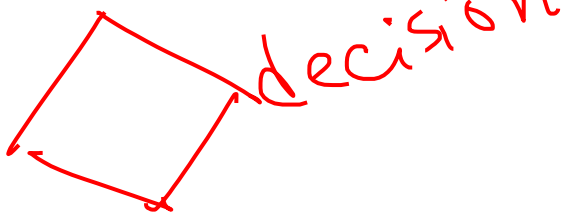
→ Algorithm to instructions

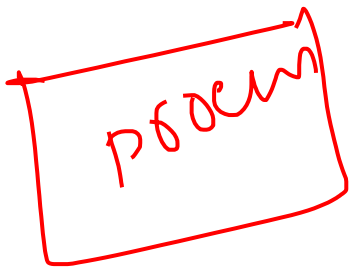
PLC

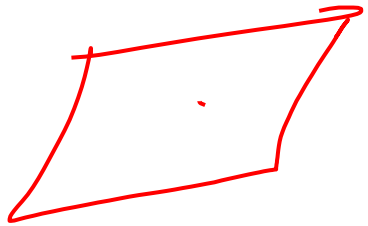
→ Program testing ✓

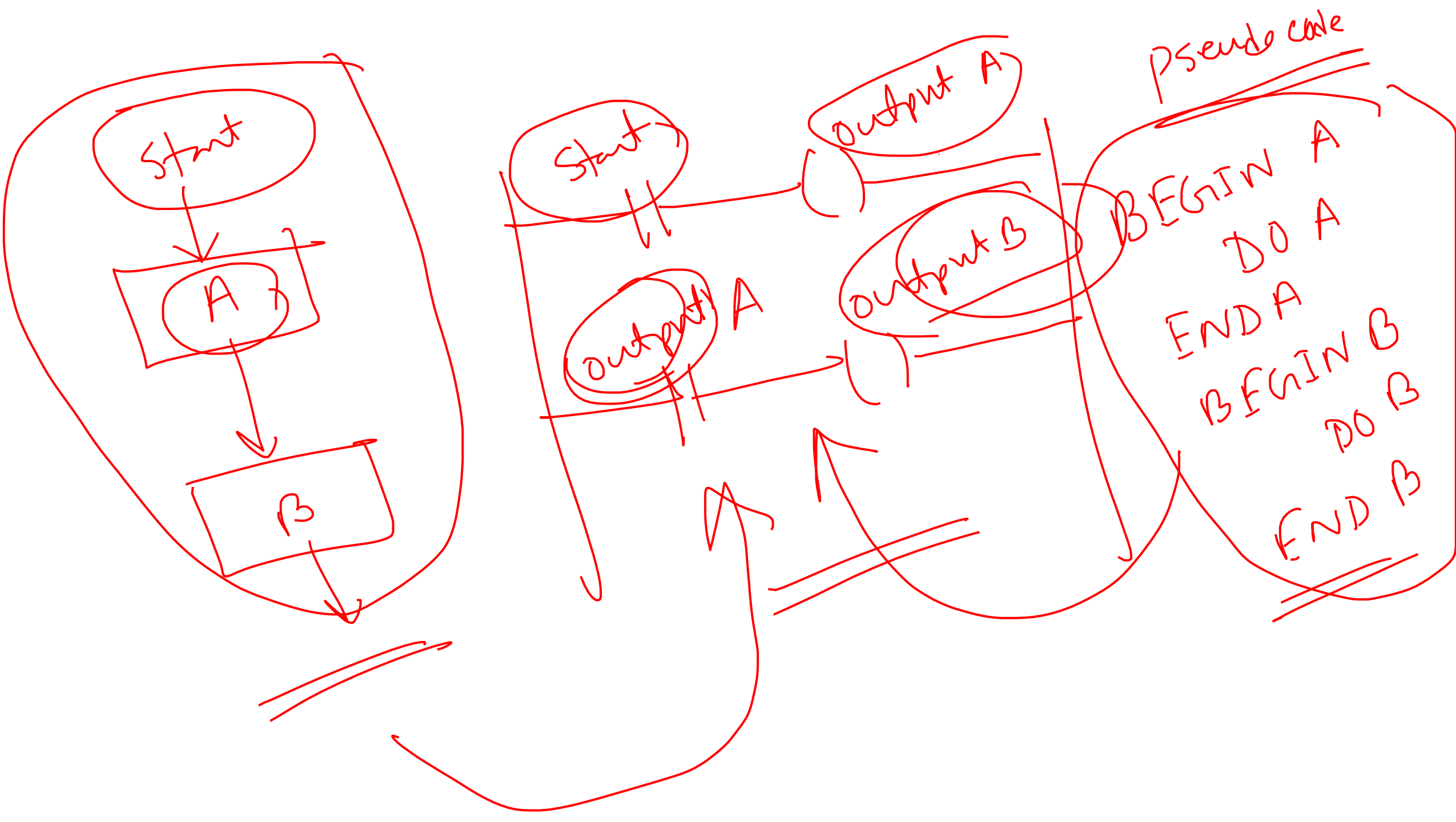
→ Documentation

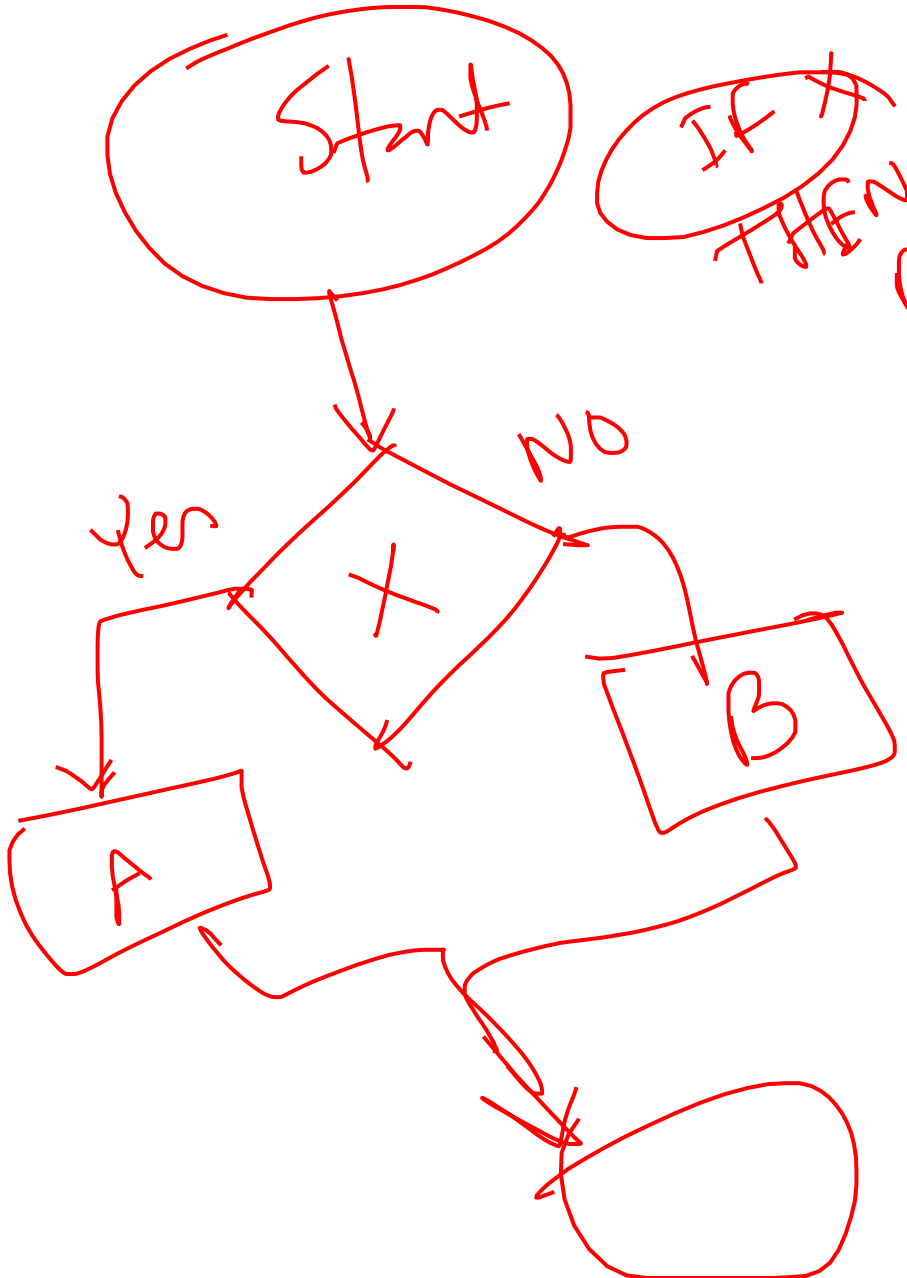
Flowchart



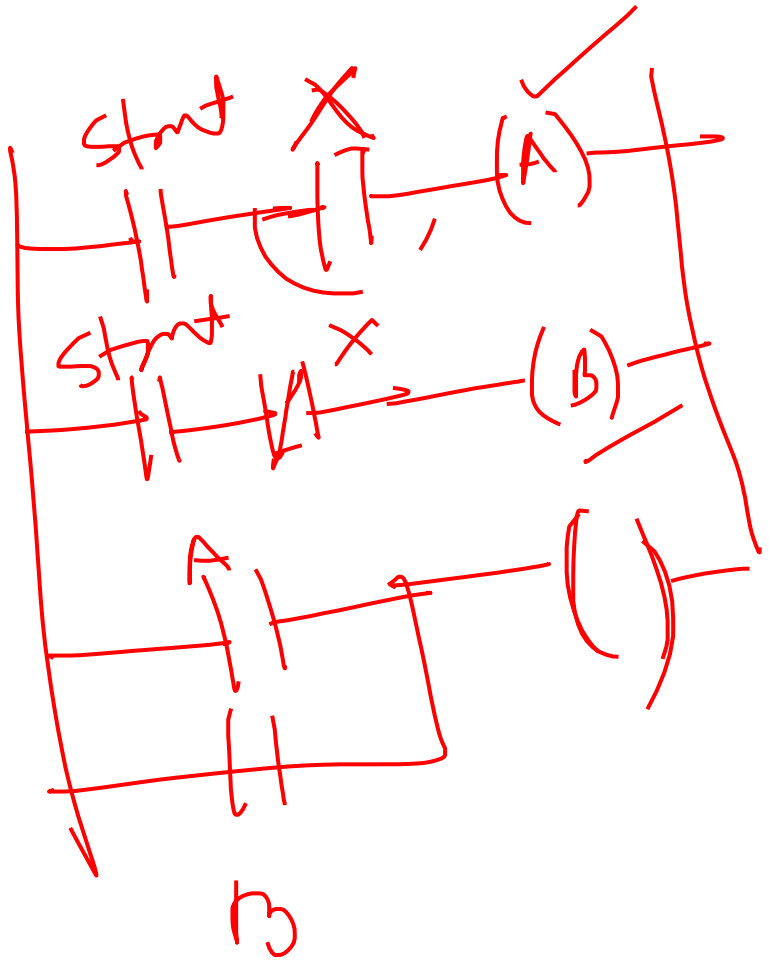




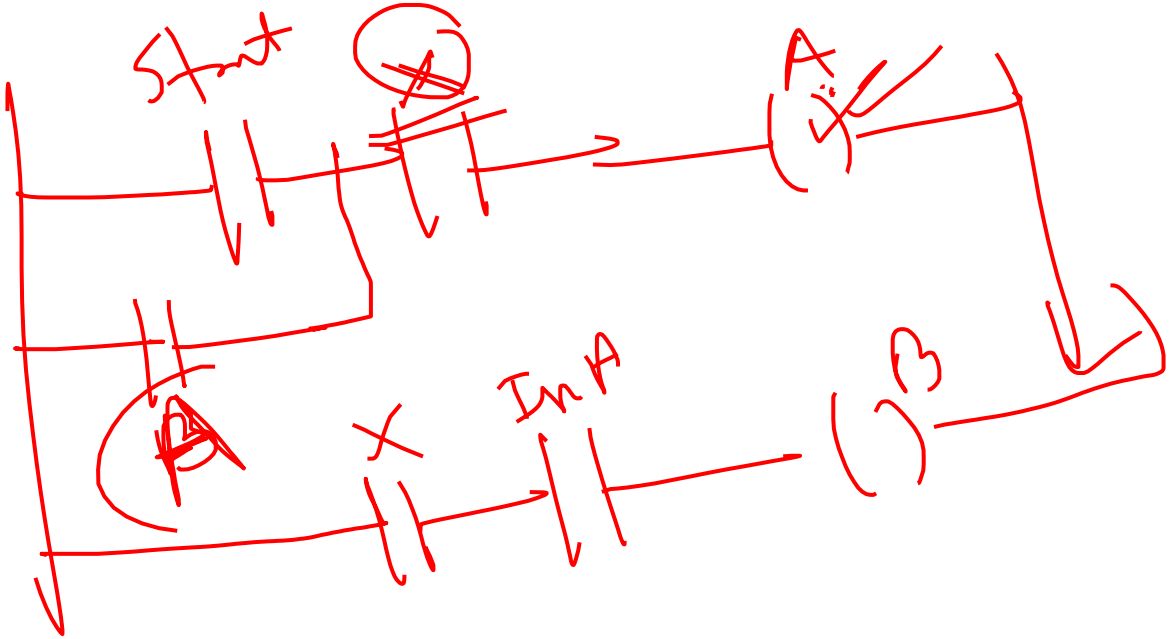

Start
A
B
Start
output A
output A
output B
Pseudo code
BEGIN A
DO A
END A
BEGIN B
DO B
END B



IF X
THEN
BEGIN A
DO A
END A
ELSE
BEGIN B
DO B
END B
END IF X



Looping :



Temperature Control

Heater → ON

Heater → OFF

temp > 29°C

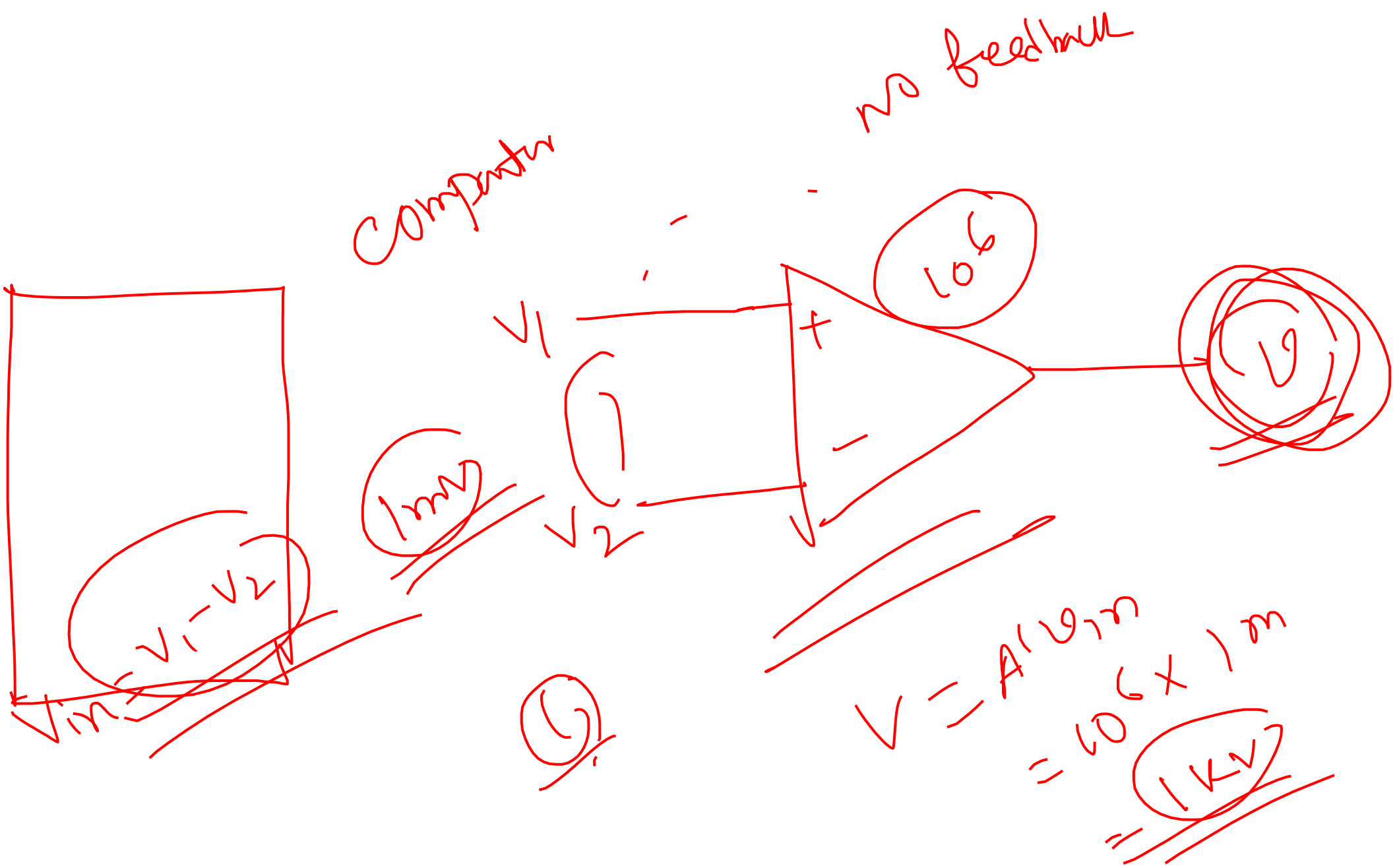
Algorithm:

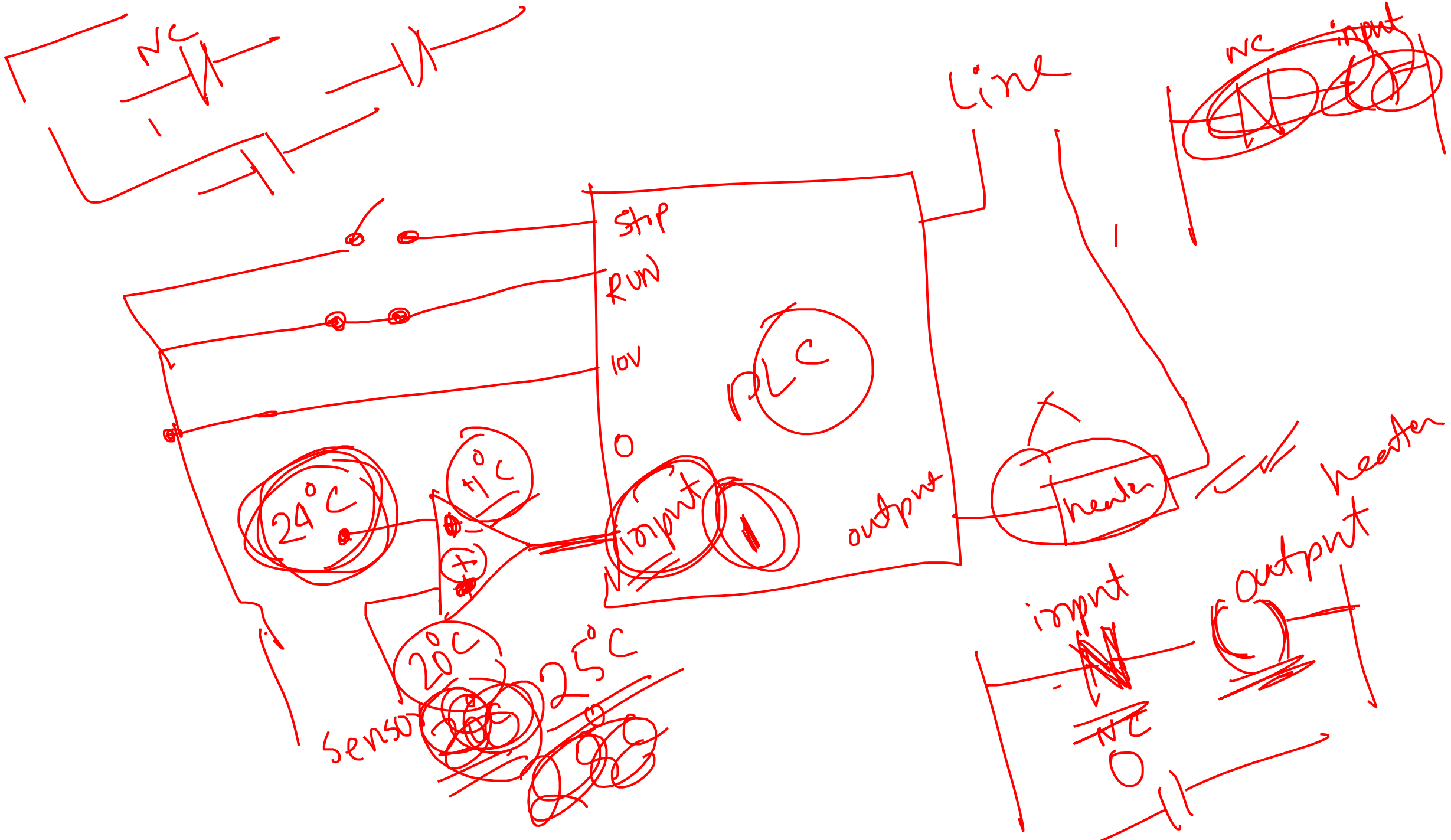
IF temp below set_value

THEN DO Switch on heater

ELSE DO switch off heater

ENDIF


no feedback
Comparator
V_1
V_2
1mV
$V_1 - V_2$
V_{in}
+
−
10^6
V
$V = A(V_1 - V_2)$
$= 10^6 \times 1m$
1KV


NC
Line
NC
input
Stp
RUN
10V
0
PLC
24°C
±1°C
input
output
heater
Sensor
20°C
25°C
input
output
NC
0