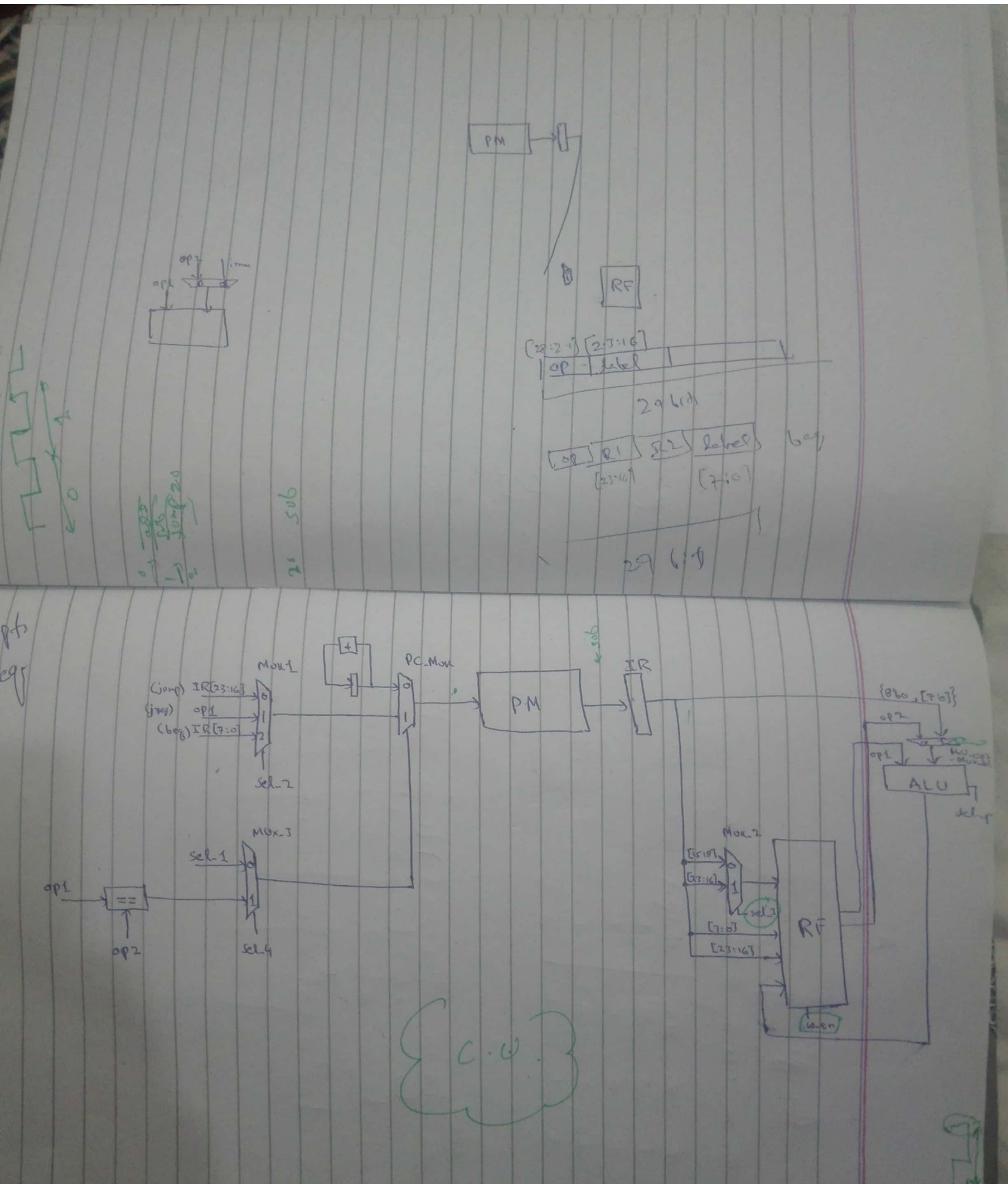
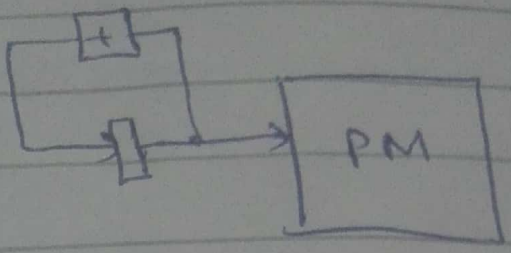
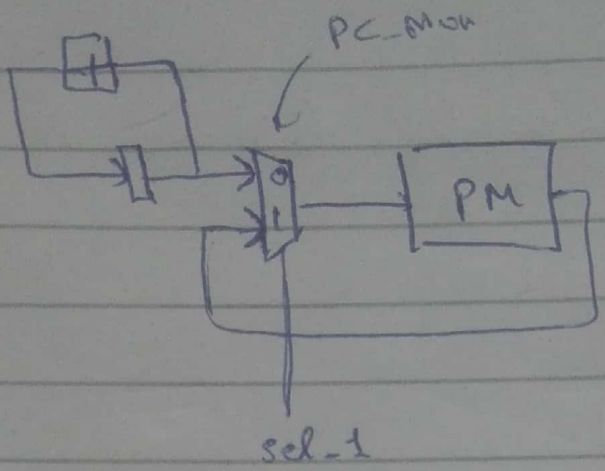

PM
RF
op
label
29 bits
op
R1
R2
label
beq
[23:16]
[7:0]
29 bits
op2
op1
imm
sub
Mux1
(jump) IR[23:16]
(jreg) op1
(beq) IR[7:0]
sel_2
PC_Mux
PM
IR
{8b0, [7:0]}
op2
op1
ALU
sel_op
Mux_3
sel_1
op1
op2
sel_4
Mux_2
[15:18]
[23:16]
sel_3
[7:0]
[23:16]
RF
wen
C.U

jump

Normal





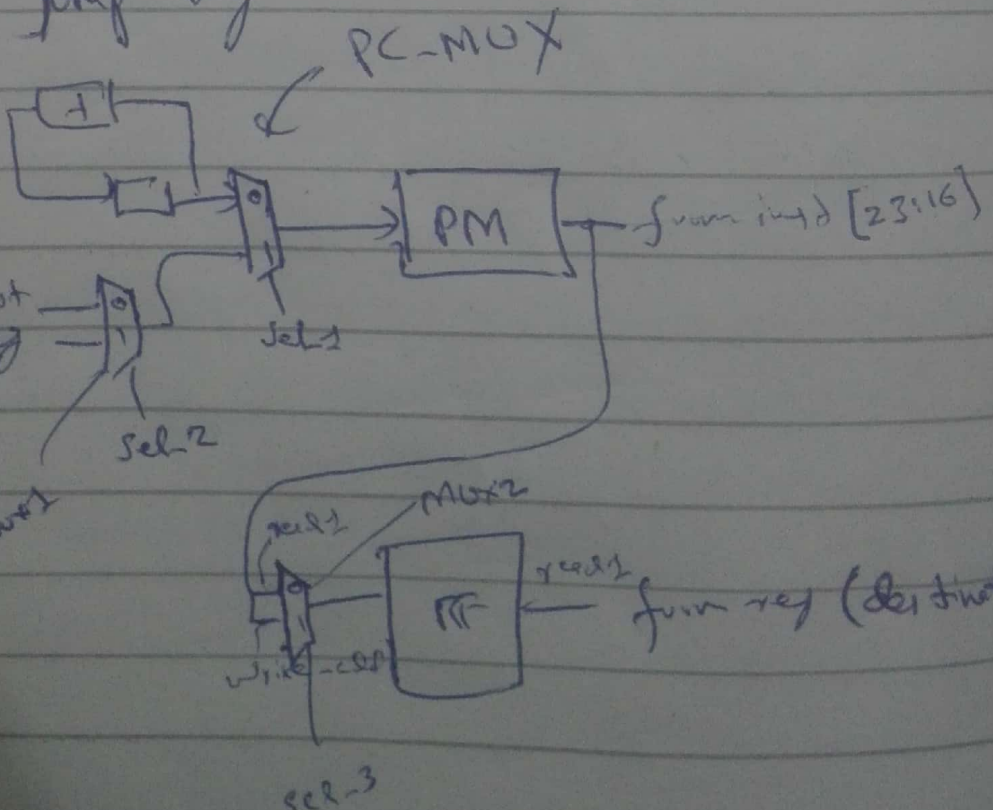
① R2 = 3

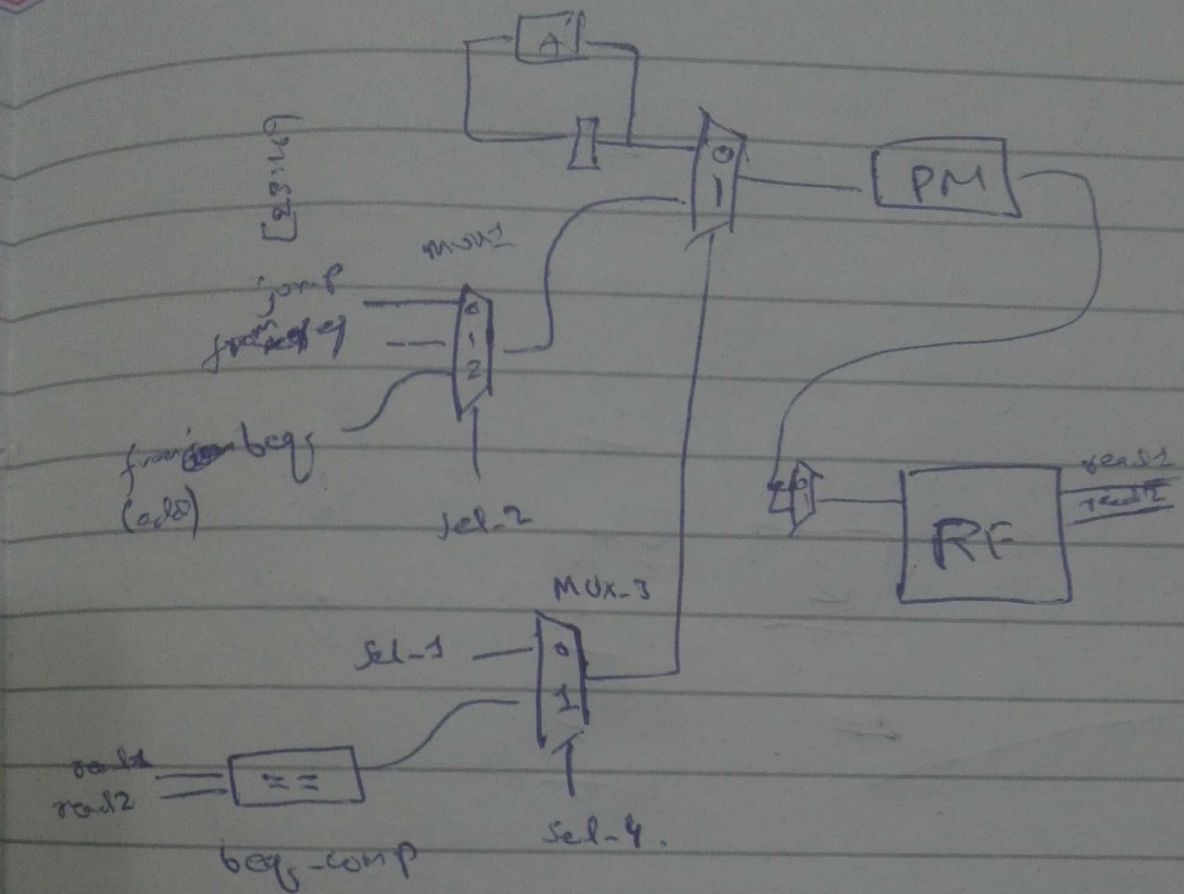
② R3 = 11

③ R4 = 9

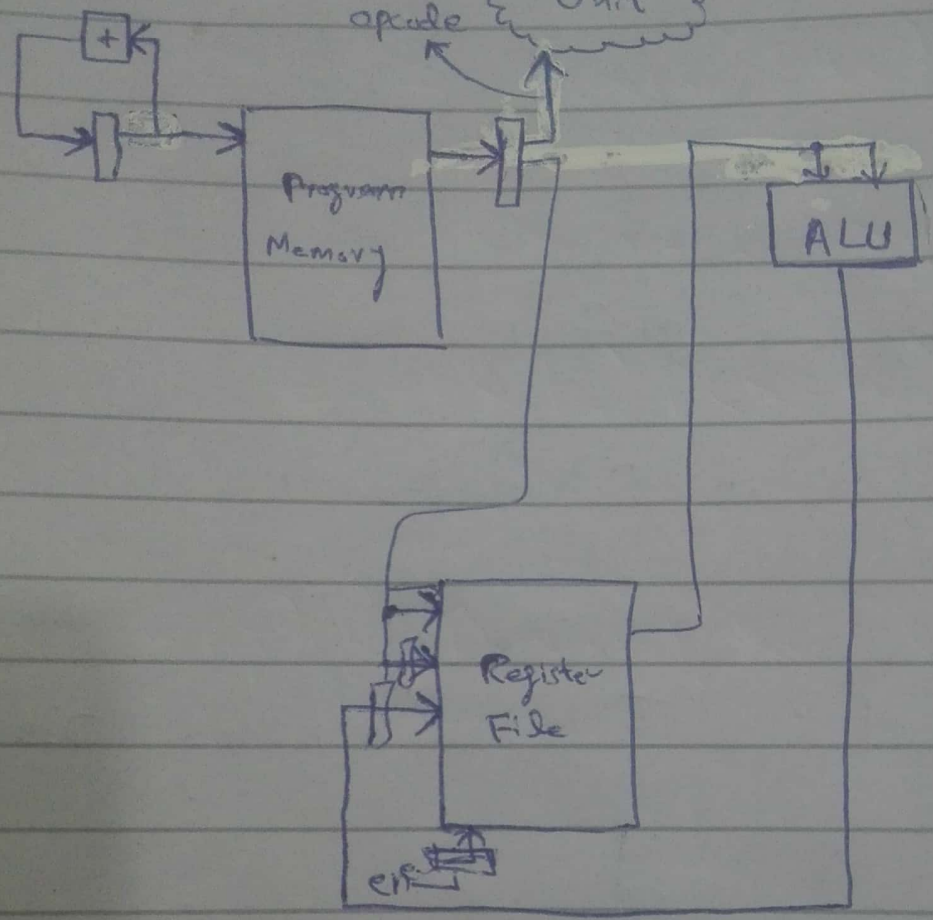
④ 1

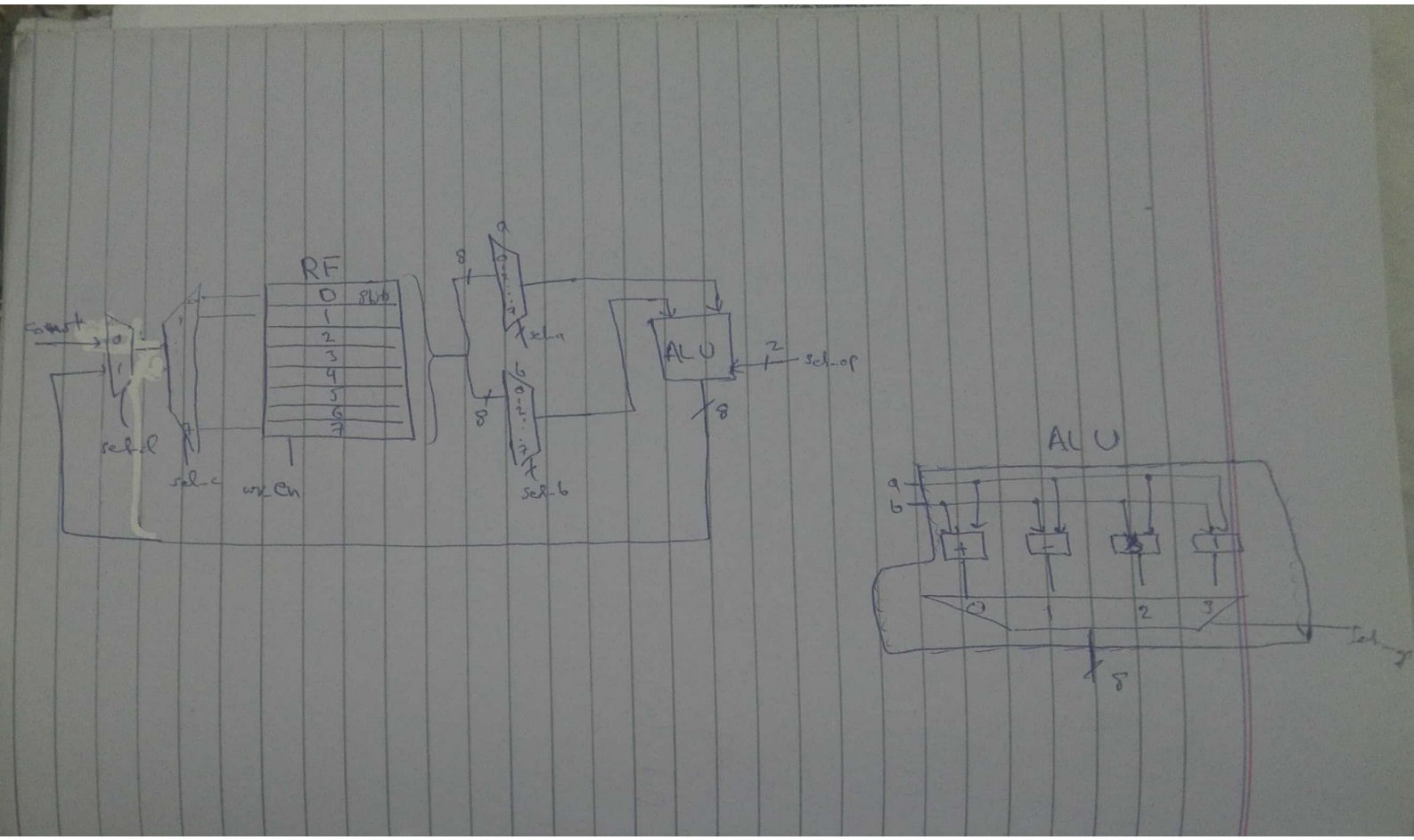
jump reg



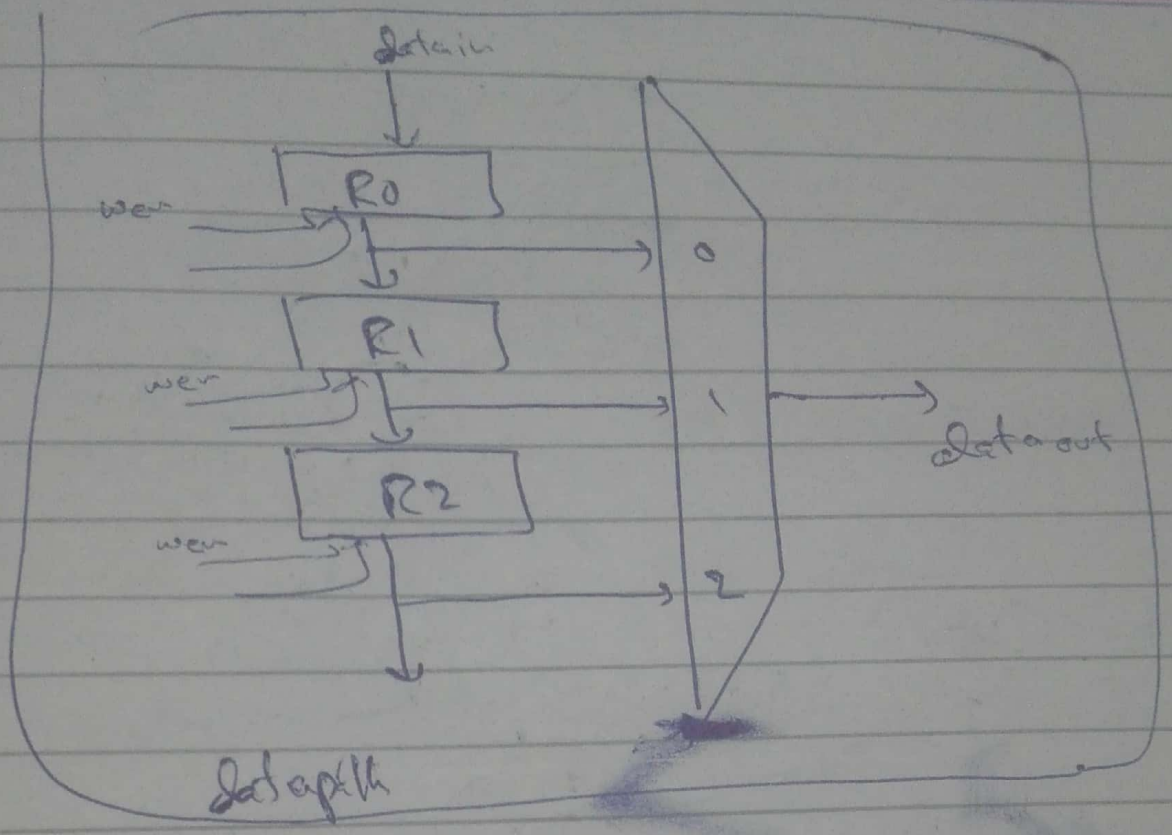

A'
PM
MUX-1
jump
from beq
(add)
sel-2
MUX-3
sel-1
sel-4.
==
beq-comp
RF

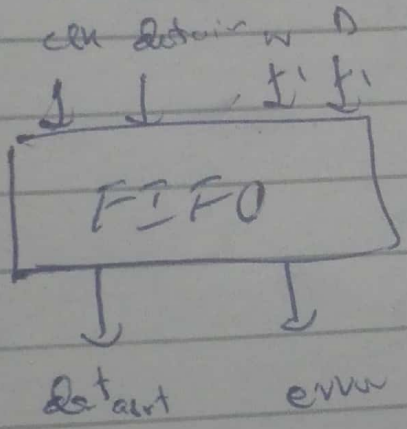
add R1, op1, op2

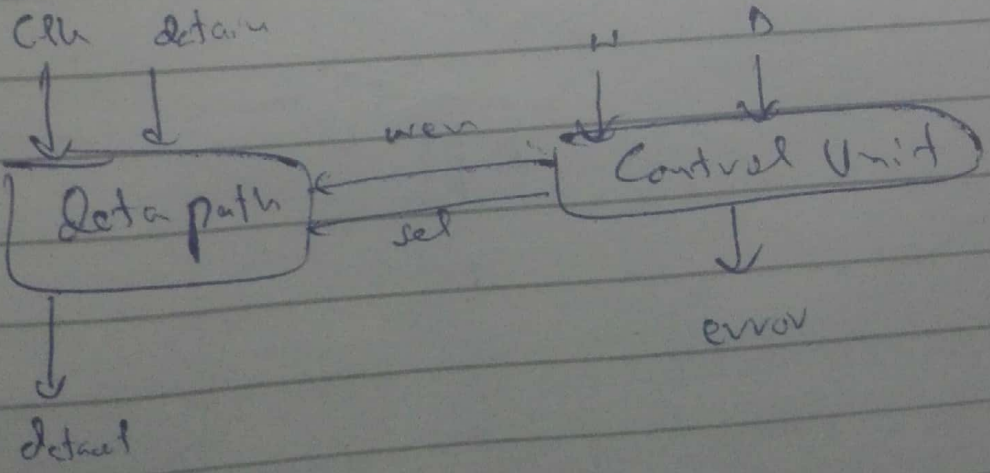


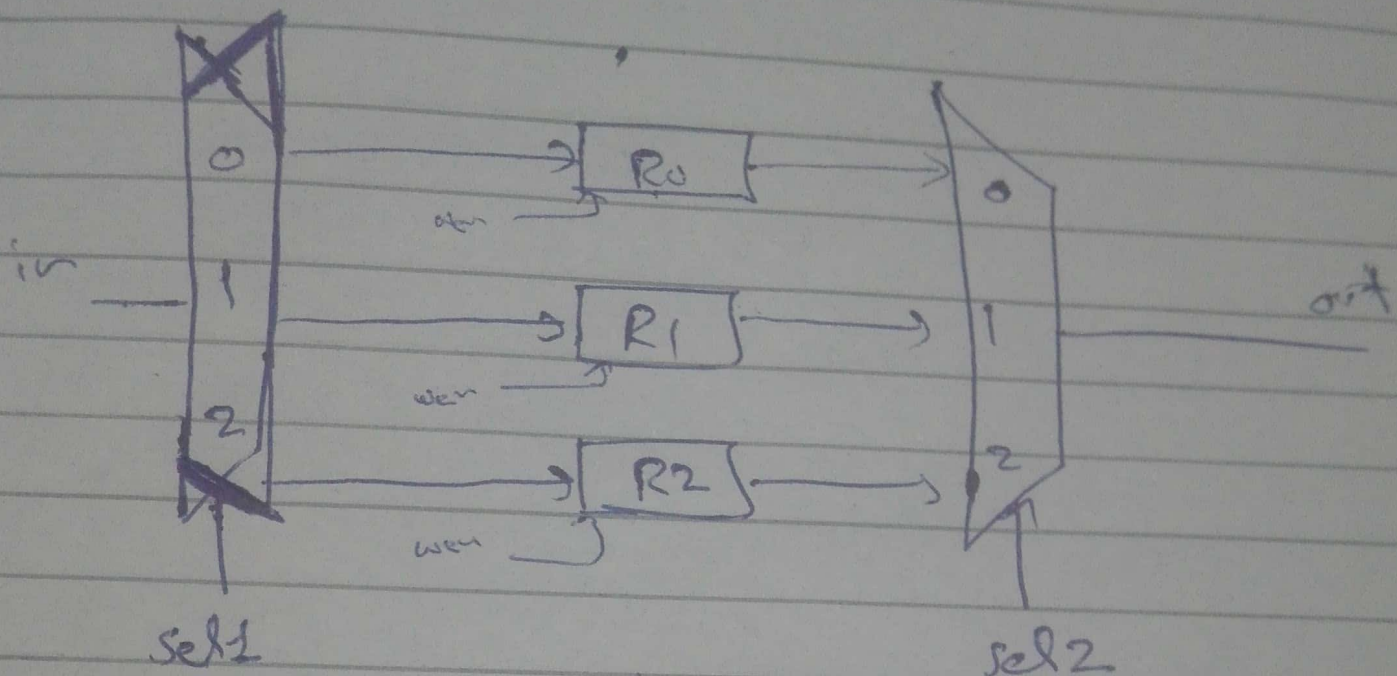

RF
0
1
2
3
4
5
6
7
8
8
8
a
b
sel_a
sel_b
sel_c
sel_d
wr_en
const
ALU
2
sel_op
8
ALU
a
b
+
-
0
1
2
3
8

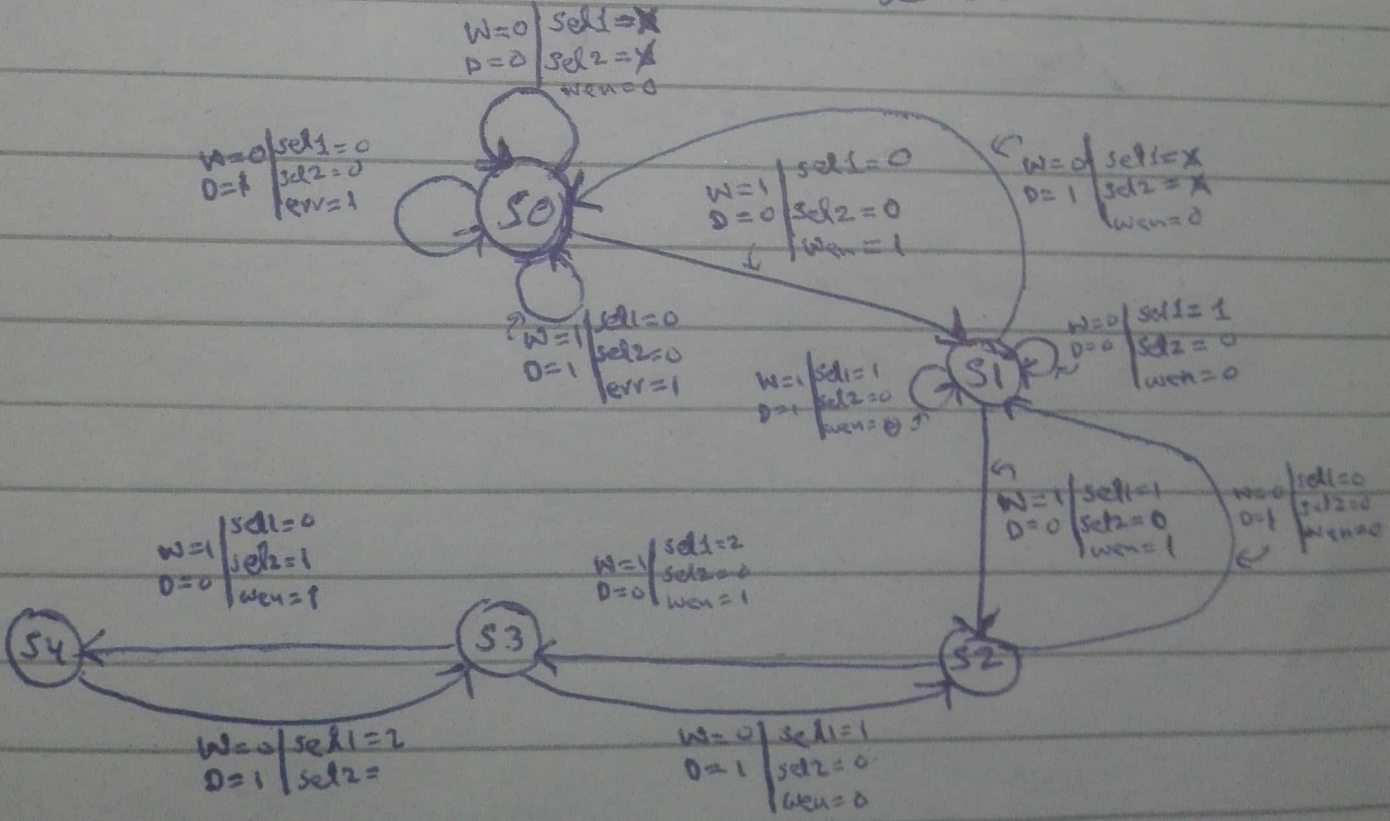
DSD


datain
R0
wen
0
R1
wen
1
data out
R2
wen
2
datapath

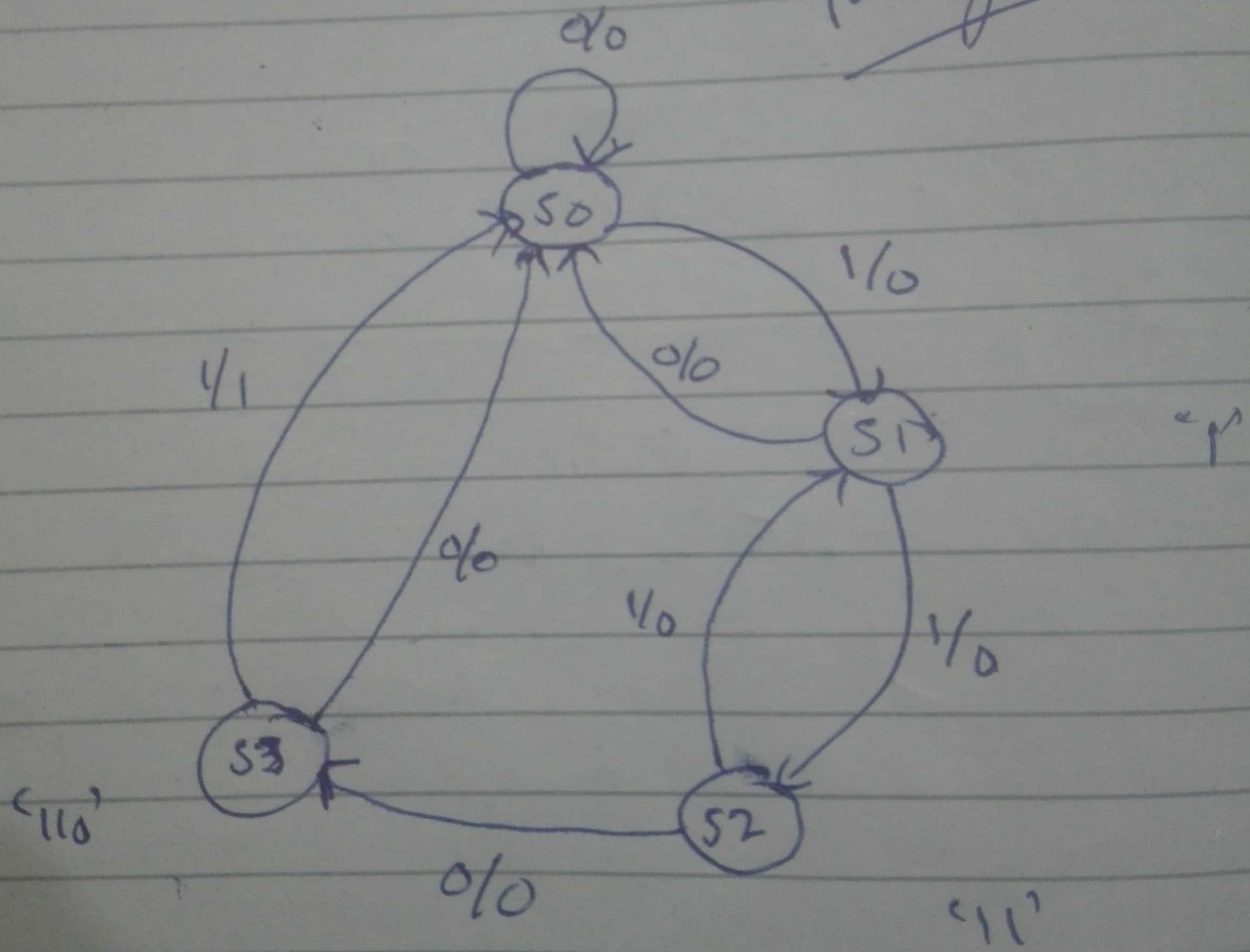

clk datain w r
FIFO
dataout
error


clk
datain
w
r
wen
set
Control Unit
datapath
error
dataout


0
1
2
is
R0
R1
R2
wen
wen
wen
0
1
2
out
sel1
sel2


W=0 D=0 | sel1=X sel2=X wen=0
W=0 D=1 | sel1=0 sel2=0 err=1
W=1 D=0 | sel1=0 sel2=0 wen=1
W=0 D=1 | sel1=X sel2=X wen=0
W=1 D=1 | sel1=0 sel2=0 err=1
W=0 D=0 | sel1=1 sel2=0 wen=0
W=1 D=1 | sel1=1 sel2=0 wen=0
W=1 D=0 | sel1=1 sel2=0 wen=1
W=0 D=1 | sel1=0 sel2=0 wen=0
W=1 D=0 | sel1=0 sel2=1 wen=1
W=1 D=0 | sel1=2 sel2=0 wen=1
S0
S1
S2
S3
S4
W=0 D=1 | sel1=2 sel2=
W=0 D=1 | sel1=1 sel2=0 wen=0

Exercise 9.1

Detect 1101 consecutively

Mealy