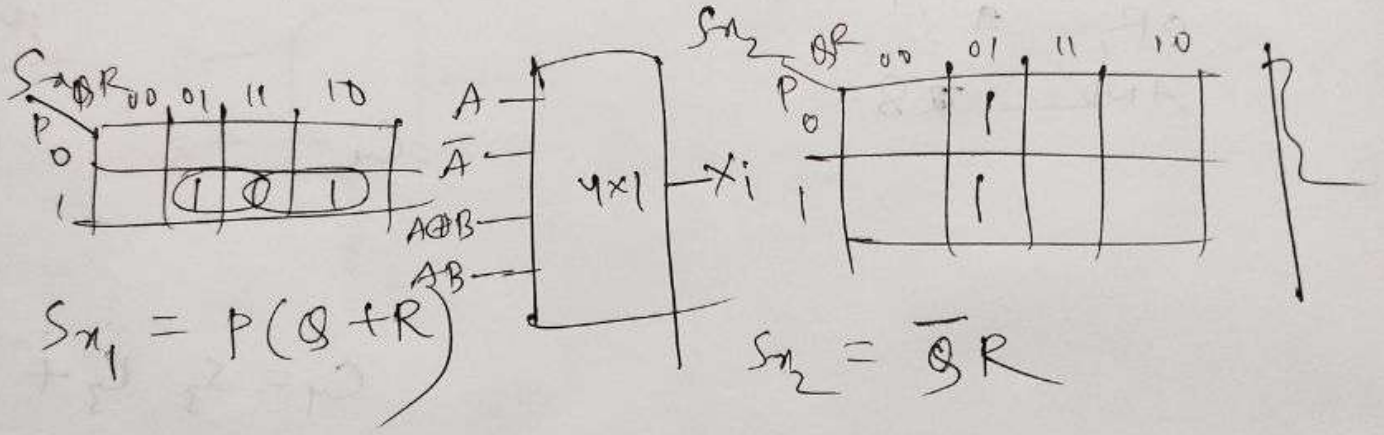
P	S	R	X_i	Y_i	Z_i	C_{in}	F
0	0	0	A	B	C_i	0	A+B
0	0	1	$\overline{A}$	0	C_i	1	$\overline{A}+1$
0	1	0	A	B	C_i	0	A+B
0	1	1	A	B	C_i	1	A+B+1
1	0	0	A	0	C_i	1	A+1
1	0	1	AB	0	C_i	0	AB
1	1	0	$A \oplus B$	0	C_i	0	$A \oplus B$
1	1	1	$A \oplus B$	0	C_i	0	$A \oplus B$

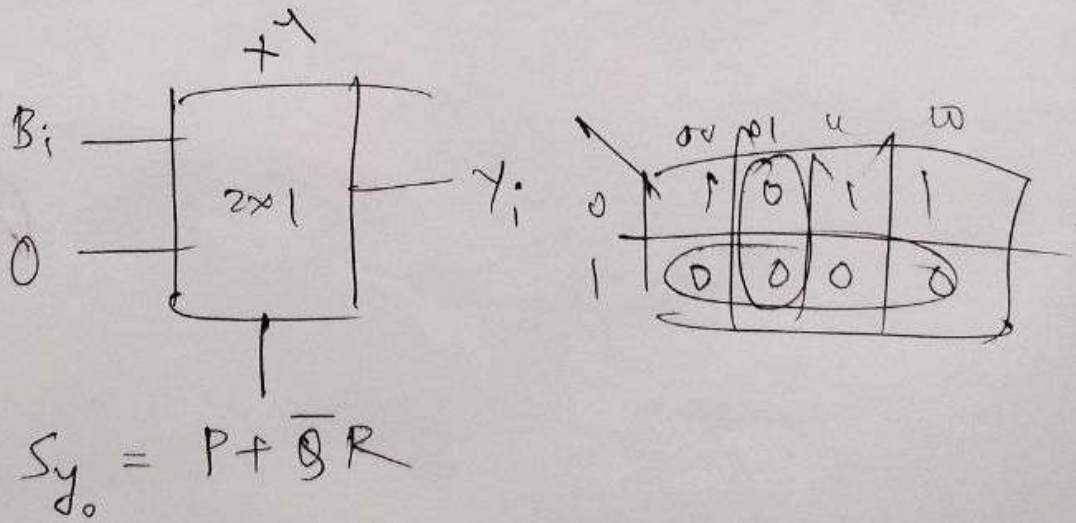
X_i

P	Q	R	X_i	S_{x_1}	S_{x_0}
0	0	0	A	0	0
0	0	1	$\bar{A}$	0	1
0	1	0	A	0	0
0	1	1	A	0	0
1	0	0	A	0	0
1	0	1	AB	1	1
1	1	0	$A \oplus B$	1	0
1	1	1	$A \oplus B$	1	0

← Custom codes for distinct outputs (for MUX)



Y_i



Cin

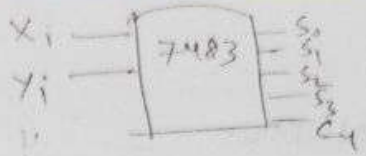
P \ QR	00	01	11	10
0	0	1	1	0
1	1	0	0	0

$$Cin = \bar{P}R + P\bar{Q}\bar{R}$$
$$= \bar{P}R + P(\overline{Q+R})$$

P Q R A_i B_i

1,3,5,9 (from 3 towards 0)

2,4,6,8



OF Flags

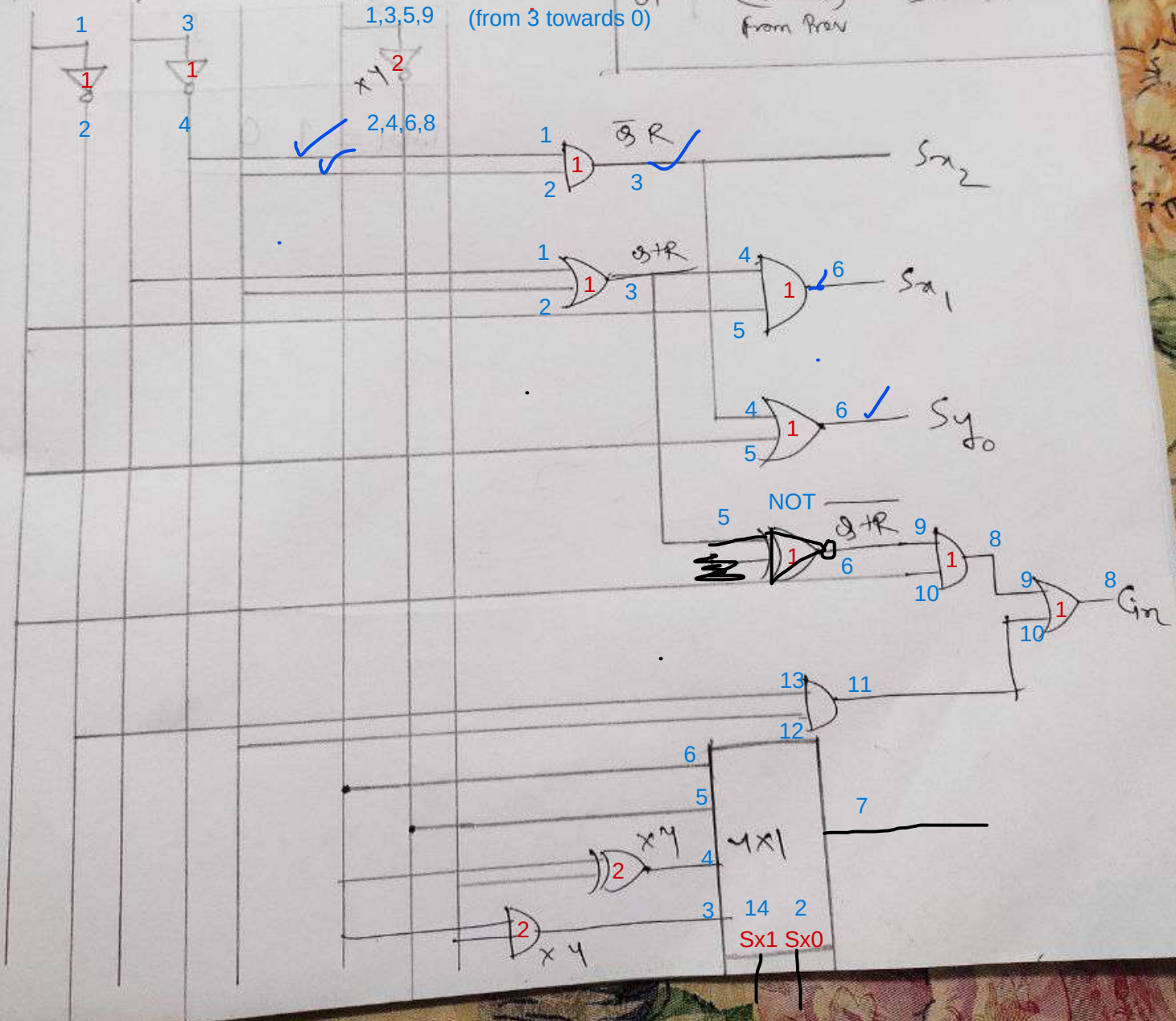
$SF = S_3$

ZF

$C = C_4$

$OF = (A_3 \oplus B_3) \oplus S_3 \oplus C_4$

From Prev



1

4X1 MUX	— 4	—	2
2X1 MUX	— 4	—	1
AND	— 4 + 4 = 8 (Xi / other)	—	2
OR	— 3 + 3 = 6	—	2
NOT	— 6	—	1
XOR	— 1 + 2 + 1 = 4	—	1
Adder	— 1	—	1

Total = 10

Flags Calculation:

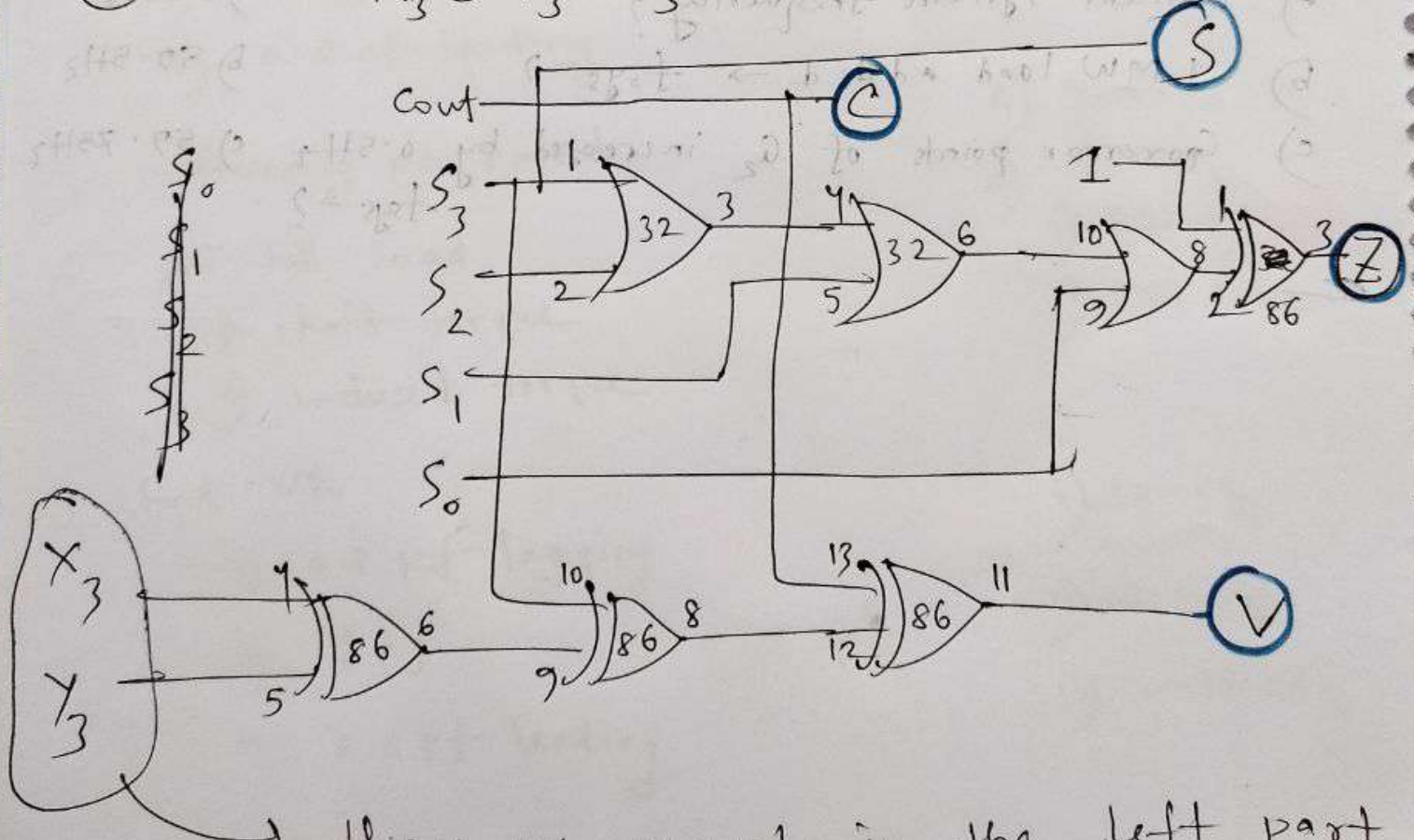
C, Z, S, V

(i) $S = S_3$

(ii) $C = \overline{C_{out}}$

(iii) $Z = \overline{S_0 + S_1 + S_2 + S_3}$ (Implement this NOT with XOR, with 1)

(iv) $V = X_3 \oplus Y_3 \oplus S_3 \oplus C_{out}$



→ these are present in the left part at output of 'input_preprocessor'