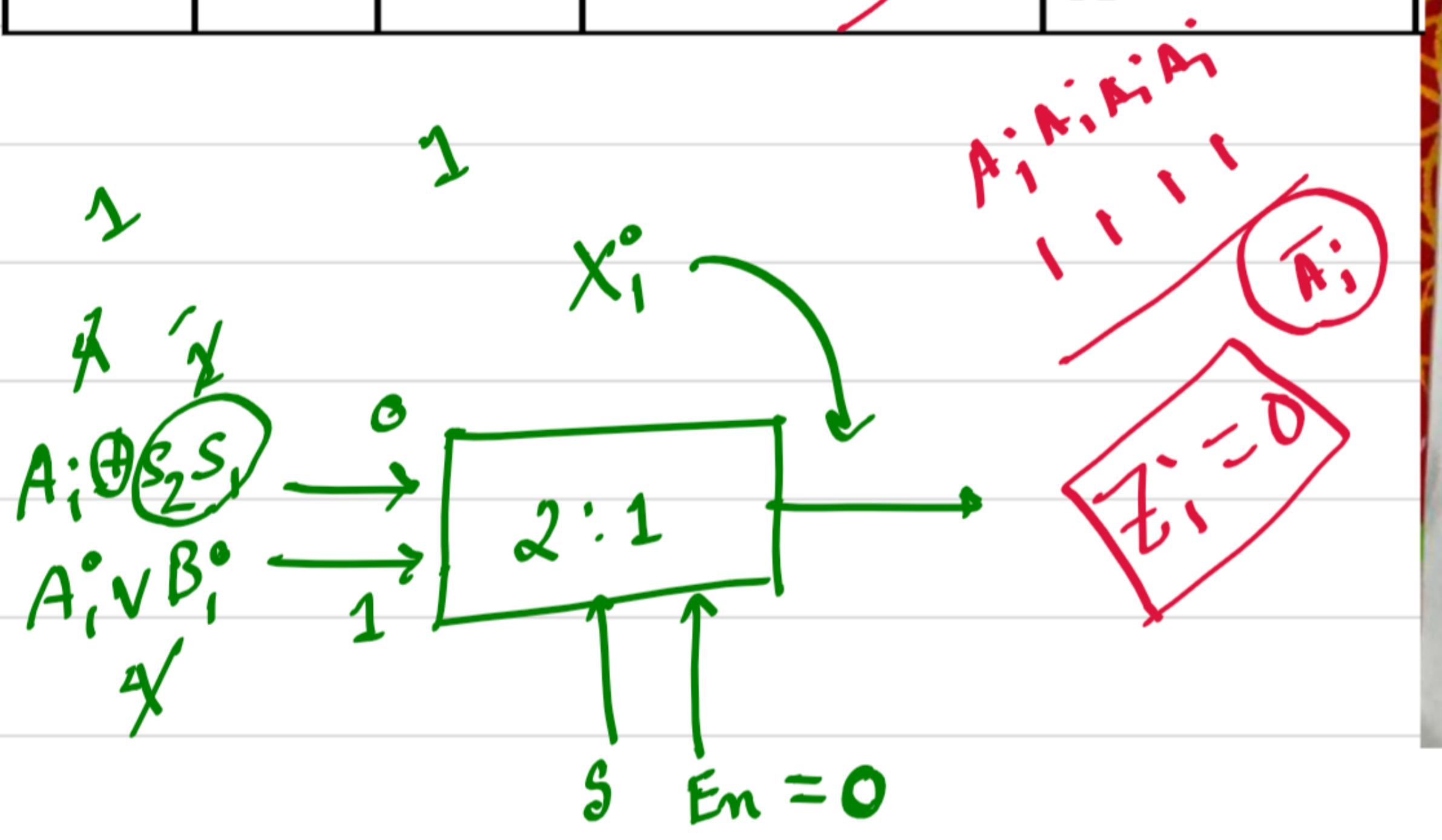


## Control Signals

cs2	cs1	cs0	Group 1	Group 2
0	0	0	Add <i>A + B</i>	Decrement A <u><u><u>A - 1</u></u></u>
0	0	1	Transfer A $A + \overline{B}$	Subtract with borrow $\neq$
0	1	X	Add with carry	Transfer A $=$
1	0	0	Increment A $A + \overline{B}$	Subtract $\neq$
1	0	1	AND	OR $\swarrow$
1	1	X	XOR	Complement A $\swarrow$

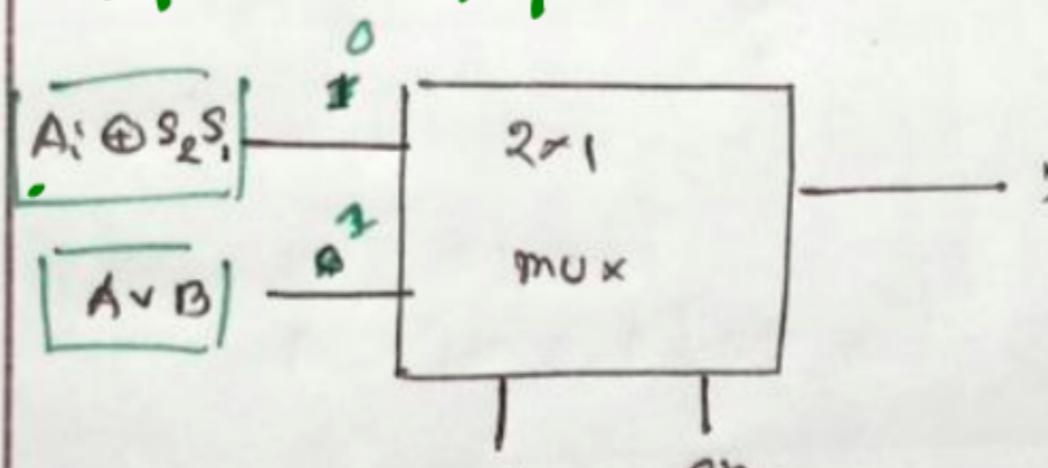


## Truth Tables

$$A - \beta^{-1} C_A \wedge \beta$$

$s_2$	$s_1$	$s_0$	$x_i$	$g_{el_1}$	$y_i$	$\lambda_{el_2}$	$\epsilon_{el_2}$	$c_{in}$
0	0	0		$A_i \rightarrow x^0$	1	01	0	0
0	0	1		$\bar{A}_i \rightarrow x^0$	$\bar{B}_i$	00	0	0
0	1	x		$A_i \rightarrow x^0$	0	x	1	0
1	0	0		$A_i \rightarrow x^0$	$\bar{B}_i$	10	0	1
1	0	1		$A_i \vee \bar{B}_i$	10	0	1	0
$\boxed{1} \quad \boxed{1}$			x	$\boxed{\quad}$		1	$\boxed{\quad}$	

$$A; \Theta \vdash s_2 s_1 \quad A; \Theta \vdash o = A$$



$$\frac{S_2 + S_1 + S_0}{3} \stackrel{=} {S_2}$$

Diagram of a 2x1 MUX:

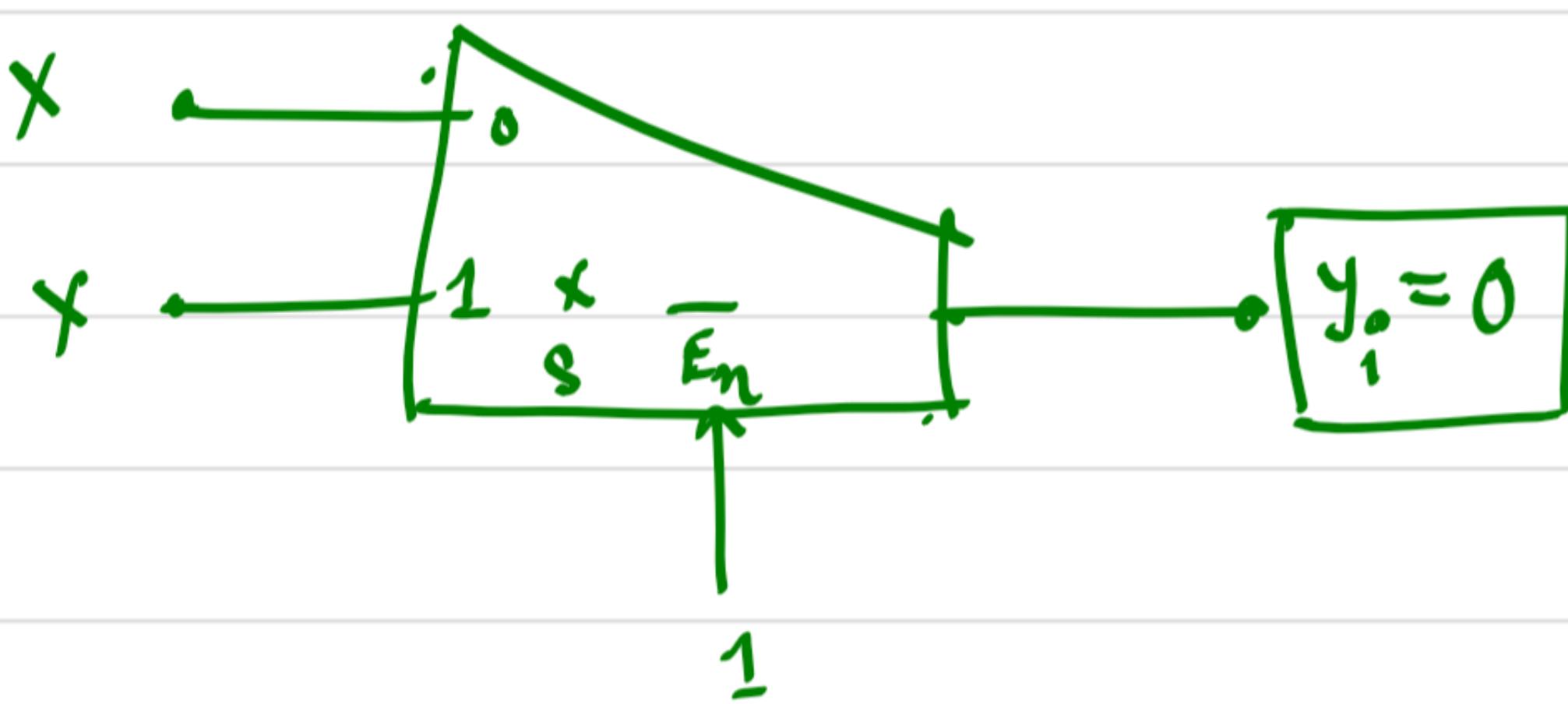
- Inputs:  $B_1$ ,  $B_2$
- Control:  $\text{Sel}_2$
- Output:  $1$
- Label:  $2 \times 1 \text{ mux}$

$s_2$	$s_1, s_0$	00	01	11	10
0	00	1	1	1	1
1	11	0	1	1	1

$$\bar{g}_2 + g_1 + \bar{g}_c$$

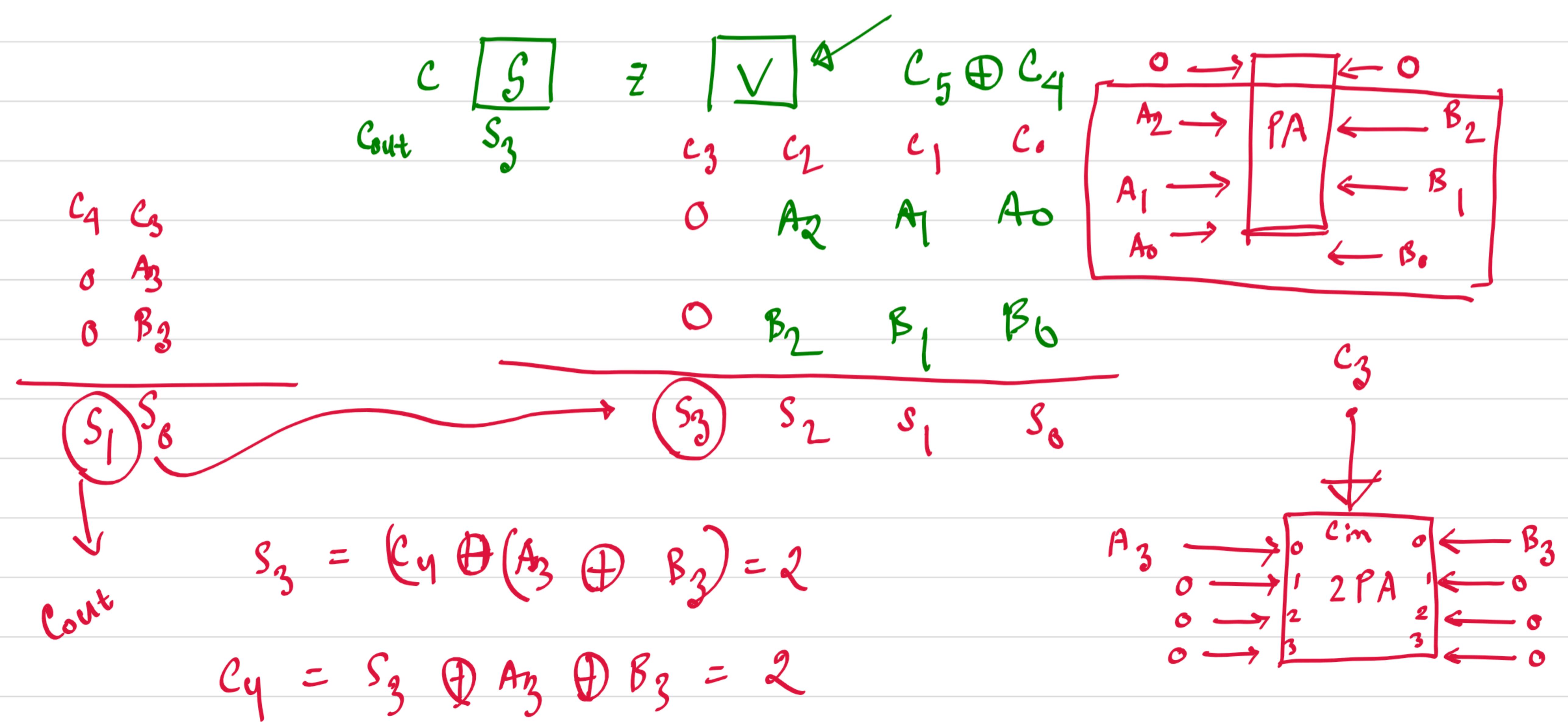
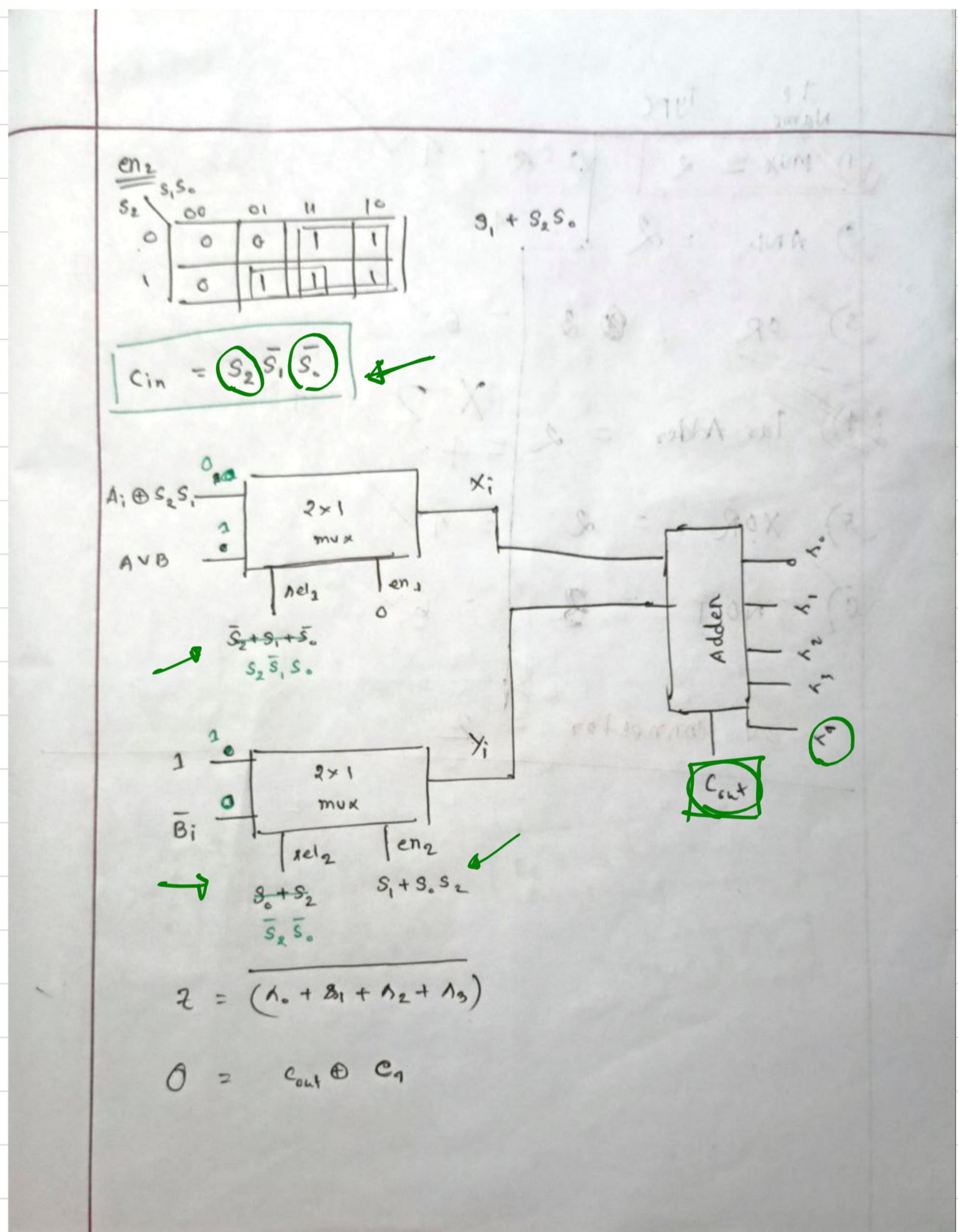
1

		Y <sub>i</sub>				
		00	01	11	10	
S <sub>2</sub>		0	0	1	X	X
0	0	1	X	X	X	X
1	1	X	X	X	X	X



$$X_j^o = F_j^o(s_2, s_1, s_0) + s_2 \bar{s}_1 s_0 B_j^o$$

$\rightarrow$  ét<sub>a</sub> + SI



1) Subtraction:  $\Rightarrow$  Unsigned :  $A > B$ , result (+),  $C_{out} = 1$

$A < B$ , result (-),  $C_{out} = 0$

$\Rightarrow$  Signed :  $S, V$

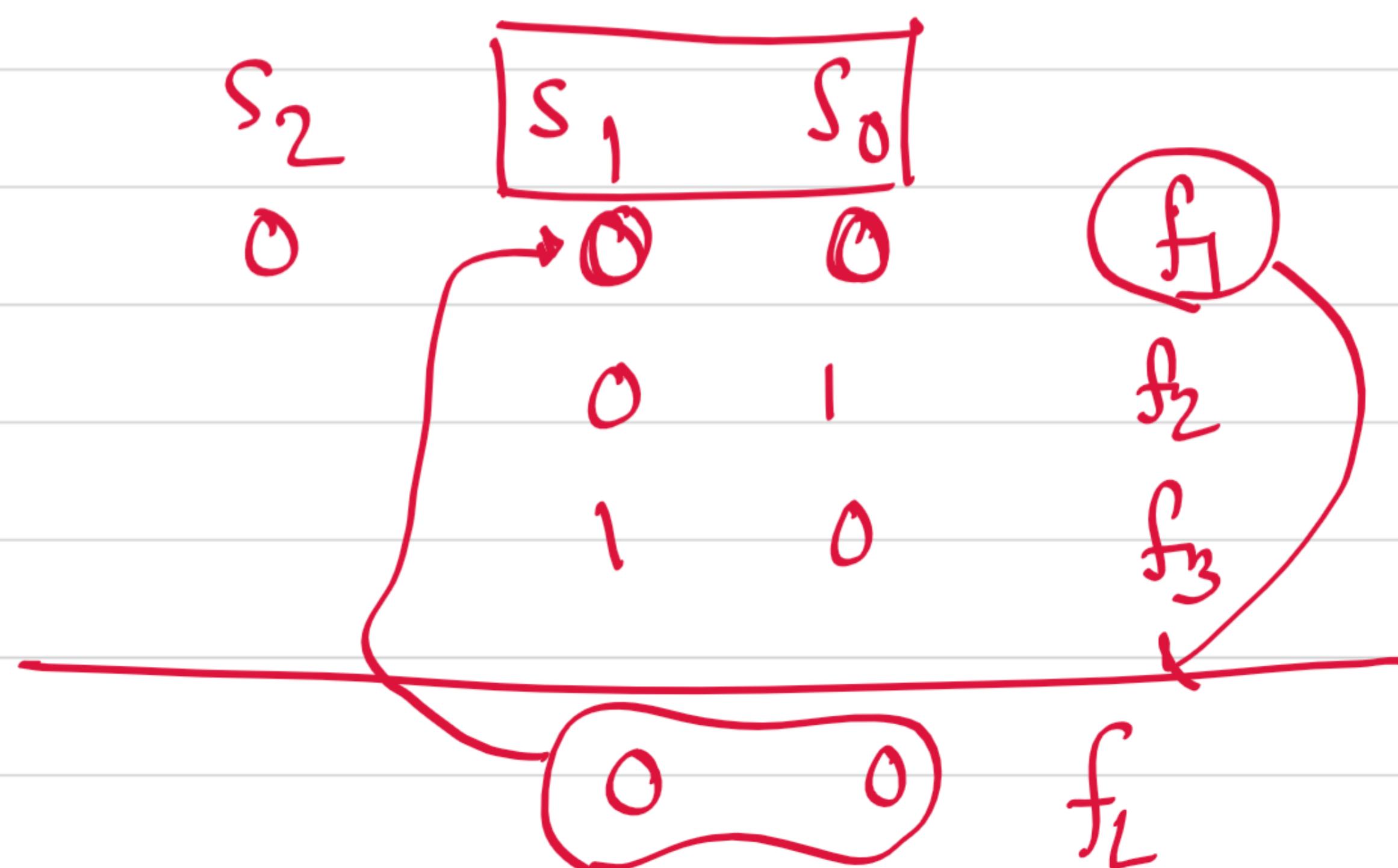
$\Rightarrow$  if  $(S == V \text{ } \& \& \text{ } Z! = 1)$  :-  
then  $A > B$

$\Rightarrow$  else  $(S! = V)$  :-

then  $A < B$

	<u>c</u>	<u>s</u>	<u>z</u>	<u>v</u>	<u>Result</u>	<u>Actual Result</u>
$\Rightarrow$ <u>Uns.</u>	1	x	x	x	(+)	<u>Ignore C<sub>out</sub></u>
<u>Un:</u>	0	x	x	x	(-)	2's complement
<u>Sgn:</u>	0	0	0	0	(+)	-8 4 2 1
	1	0	0	0	(-)	1 1 1 1
	0	1	1	1	(-)	
	1	1	1	1	(+)	

Arithmatic



→ Combinational CKt :- 37, 35

→ Adder CKt :- 37

$$\left. \begin{array}{l} X_i := 45, 55, 36, 35 \\ Y_i := 45, 37, 36 \end{array} \right\}$$

$$\text{Adder} := 45, 37, 55, 36$$

$$\text{Flag} := 45, 37, 55, 36$$

$$\left. \begin{array}{l} \text{Report} : \\ \quad 35 \end{array} \right\}$$