

a) A fraction is represent in the following way.

$2^1$	$2^0$	0	$2^{-1}$	$2^{-2}$	$2^{-3}$	$2^{-4}$	...
2	1	0	0.5	0.25	0.125	0.0625	...

It is similar to decimal representation, the fraction start from  $2^{-1}$  where it is separate by 0 from decimal the number are sorted in descending orders.

ii)	45	$2^7$	$2^6$	$2^5$	$2^4$	$2^3$	$2^2$	$2^1$	$2^0$
	-32	128	64	32	16	8	4	2	1
	<u>13</u>	0	0	1	0	1	1	0	1
	<del>-8</del>								
	5								

~~+8~~  
~~+16~~  
~~+32~~  
 45

$$2^5 \quad 2^2 \quad 2^1 \quad 2^0$$

$$8 \quad 4 \quad 2 \quad 1$$

$$2$$

$$0 \quad 0 \quad 1 \quad 0$$

$$1 \quad 1 \quad 0 \quad 1$$

$$8 + 4 + 1 = 13 = D$$

9	10	11	12	13
A	B	C	D	

$$45_{10} = 2D \text{ Hexadecimal}$$

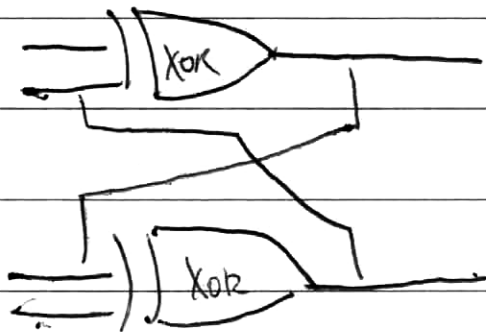


(ii)  $(110 - 011)$ .

$011 = \text{two's complement} = 1001$

$$\begin{array}{r} 110 \\ + 1001 \\ \hline 011 \end{array}$$

b) i) flip-flop serve as memory storage, it will work if both value of positive or both negative. the following is a diagram using XOR logic gate



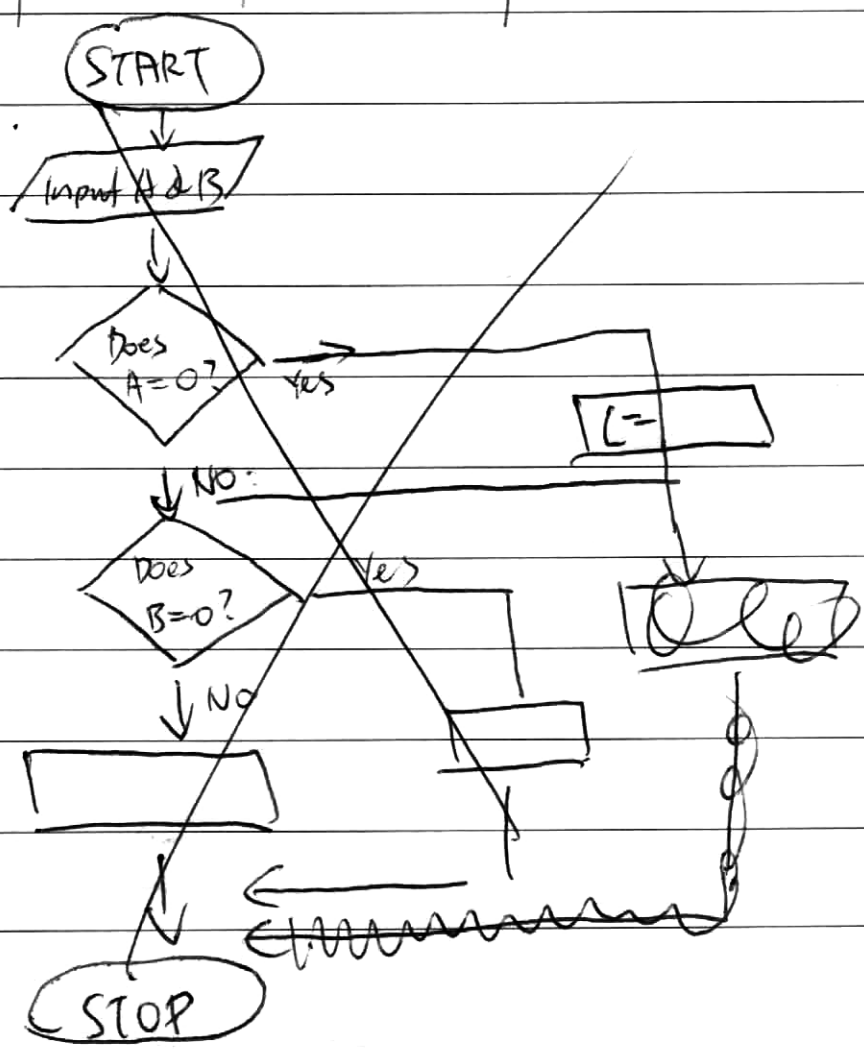
ii) Truth table

A	B	C
0	0	0
1	0	0
1	1	1

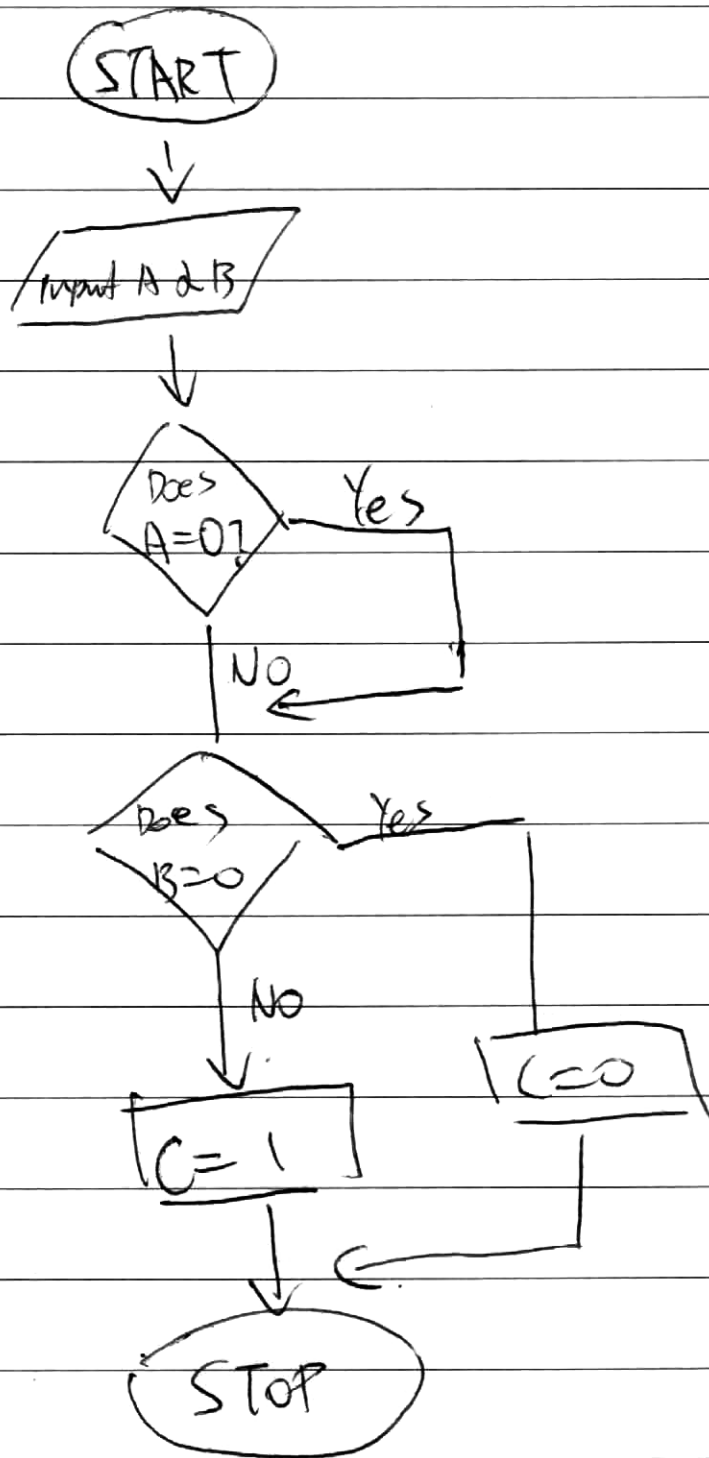
A	B	C
0	0	0
1	0	1
0	1	1
1	1	1

OR GATE

iii)



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Data Stream send to central computer from scanner will be image. It will run through the database try to get a match for the image. It's header information will be Ridges / valleys, it's data character would be integer ~~black and white~~ and it's ~~trailer~~ trailer information would be the slope of the finger print.

Data stream send from central ~~comp~~ computer to the door will be, it's header information can be ~~Access~~ Access granted or Access denied, data character is Boolean and trailer information will be set of record from the data base