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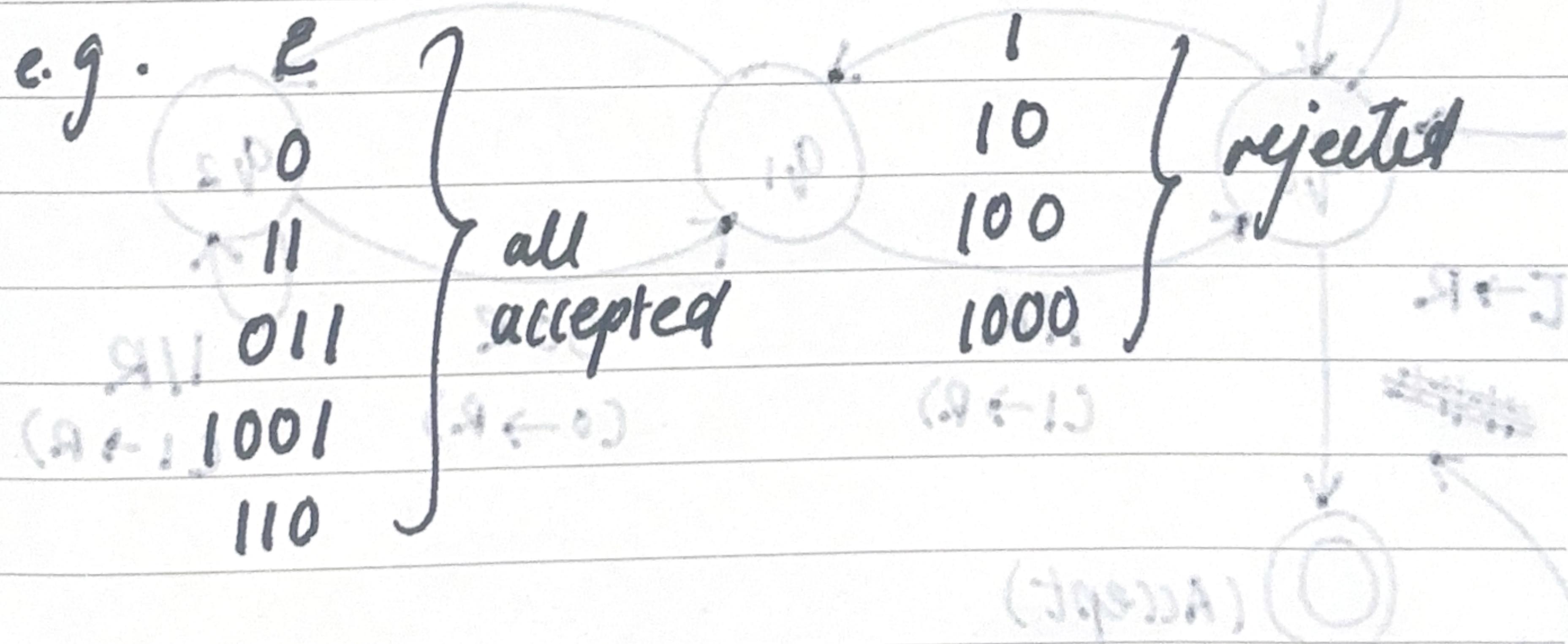
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DATE 11. 11. 2024

## TACD IA2

i). Turing machine that accepts the language of all string over  $\{0,1\}$  divisible by 3.

If something divisible by 3, i.e.,  $\#3k = 0$ .



everytime we add a new digit binary to,  
e.g.  $101_2 \rightarrow$  add 0  $\rightarrow 1010_2$   
 $(5) \rightarrow (10)$  i.e  $\times 2$

$$\downarrow$$

add 1  $\rightarrow 1011 \rightarrow$  i.e  $(5 \times 2) + 1$   
(11)

(2)

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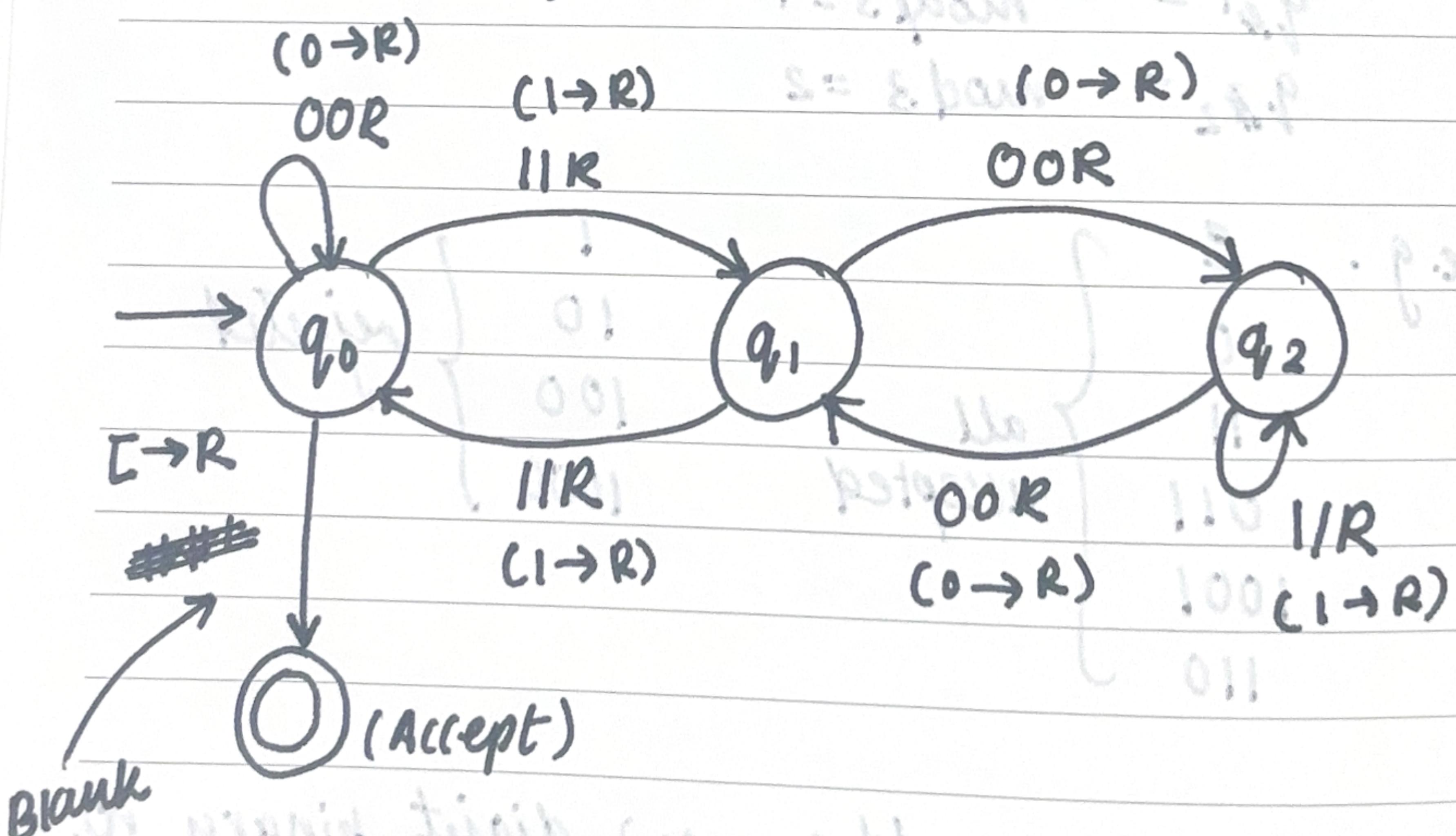
so we can say,

S.A) QAT

$x \cdot 3$	$(2x) \cdot 3$	$(2x+1) \cdot 3$
0	0	1
1	2	0
2	1	2

Q = {0, 1, 2} &amp; final states

∴ The Turing machine for divisible by 3 is,



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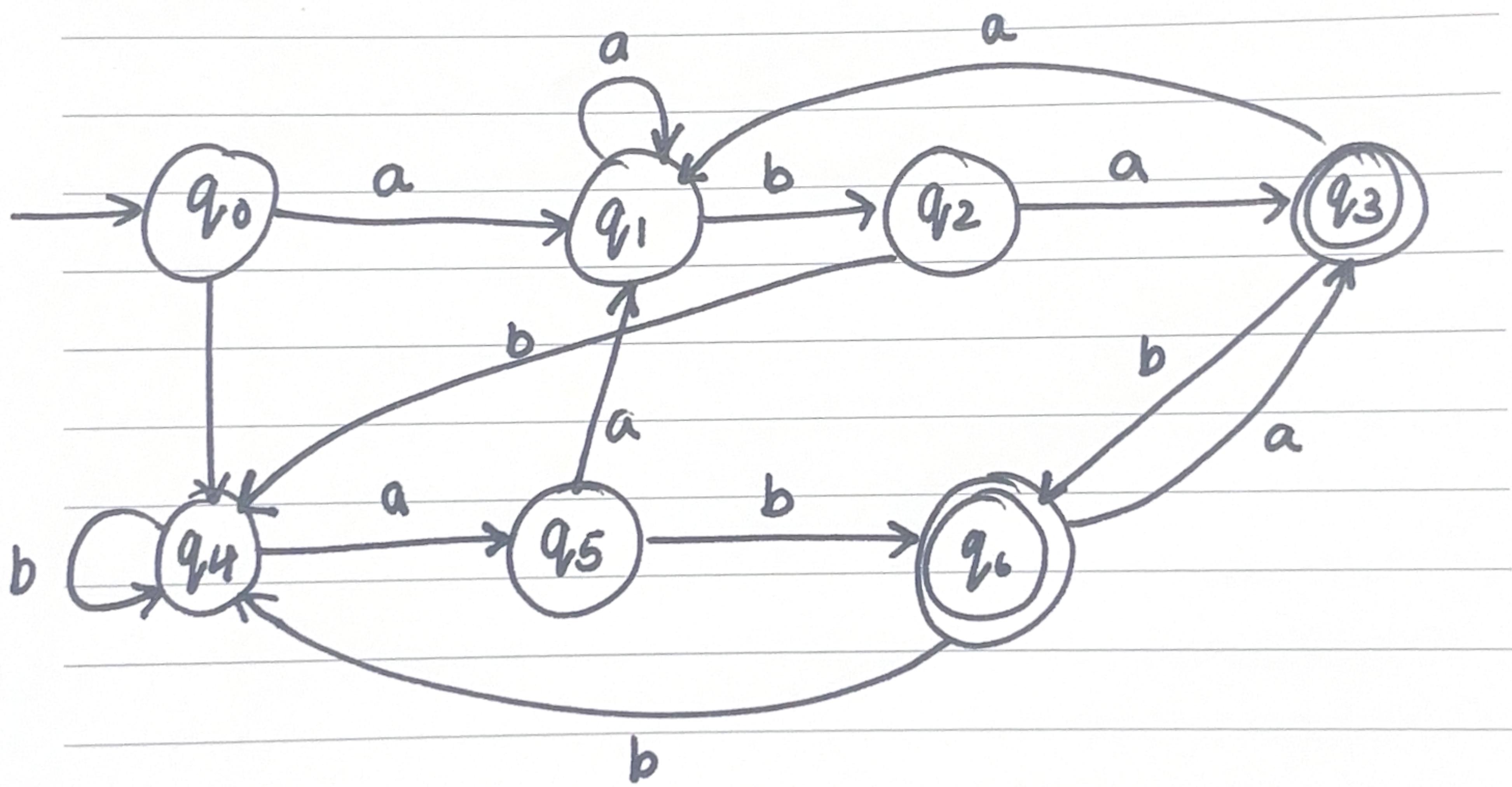
→ print this with a lot of mistakes  
 0 011 → 011 → 100 → 100  
 Lx3 (011) → 100 → 100  
 (011) → 100 → 100

1 + (x+2) > 1 ← 101 ← 100  
 (11)

(3)

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2). Design NFA that recognizes language of all strings over  $\{a, b\}$  that contains an odd no. of occurrences of substrings 'aba' or 'bab'.



NFA that only ~~\*\*\*~~ recognizes  
odd no. of occurrences of 'aba' or  
'bab'.