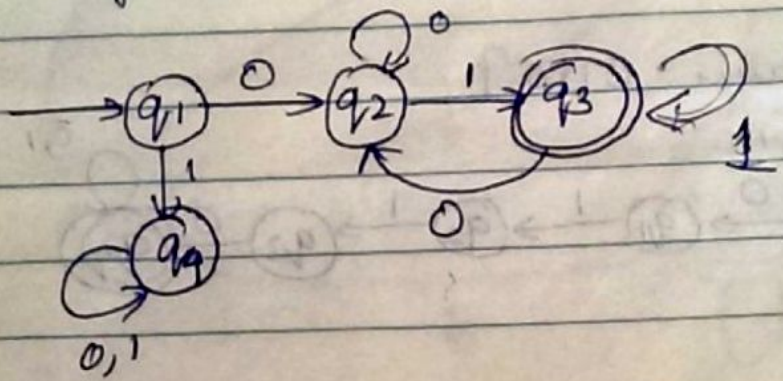
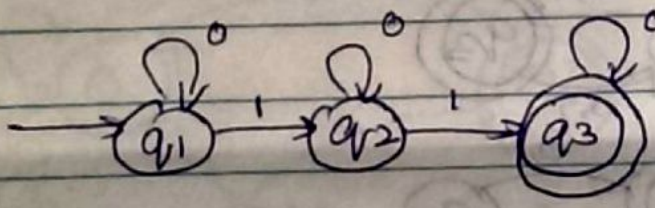
Problem Set 1

um 1) DFA

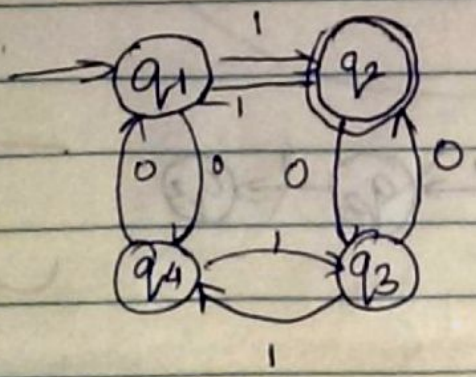
1. {w : w begins with a 0 and end with a 1}



2. {w : w contains at least two 1's}



3. {w : w has an even nos of 0's and an odd nos of 1

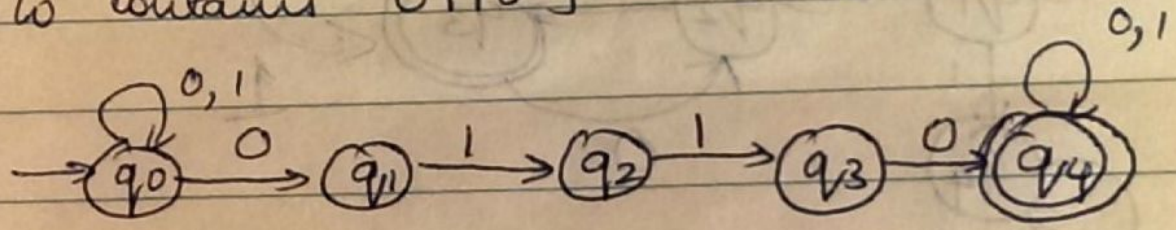


10101111
11010001

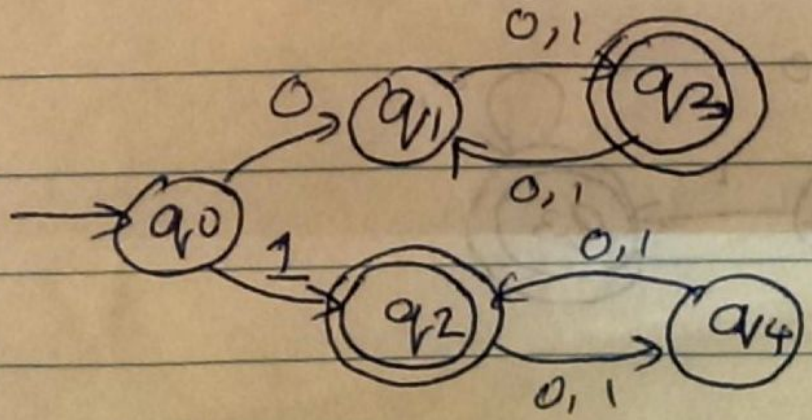
J

Problem 2 :

1. $\{w : w$ contains $0110\}$

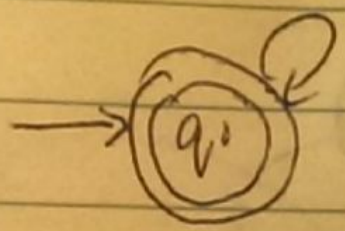


2. $\{w : w$ starts with 0 has even length or starts with 1 has odd length$\}$



Q2.

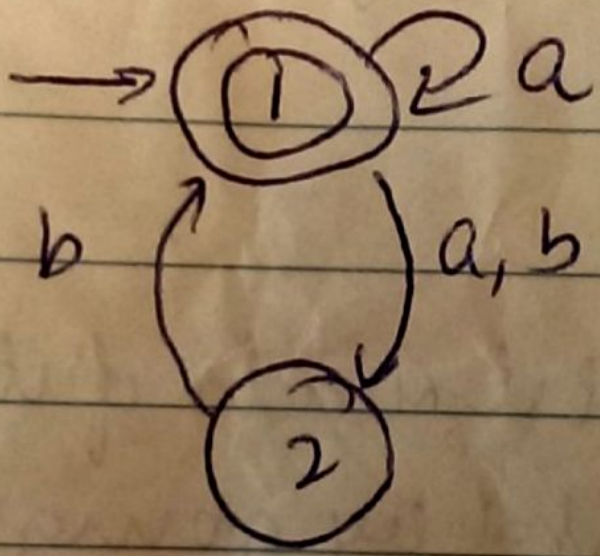
(c)

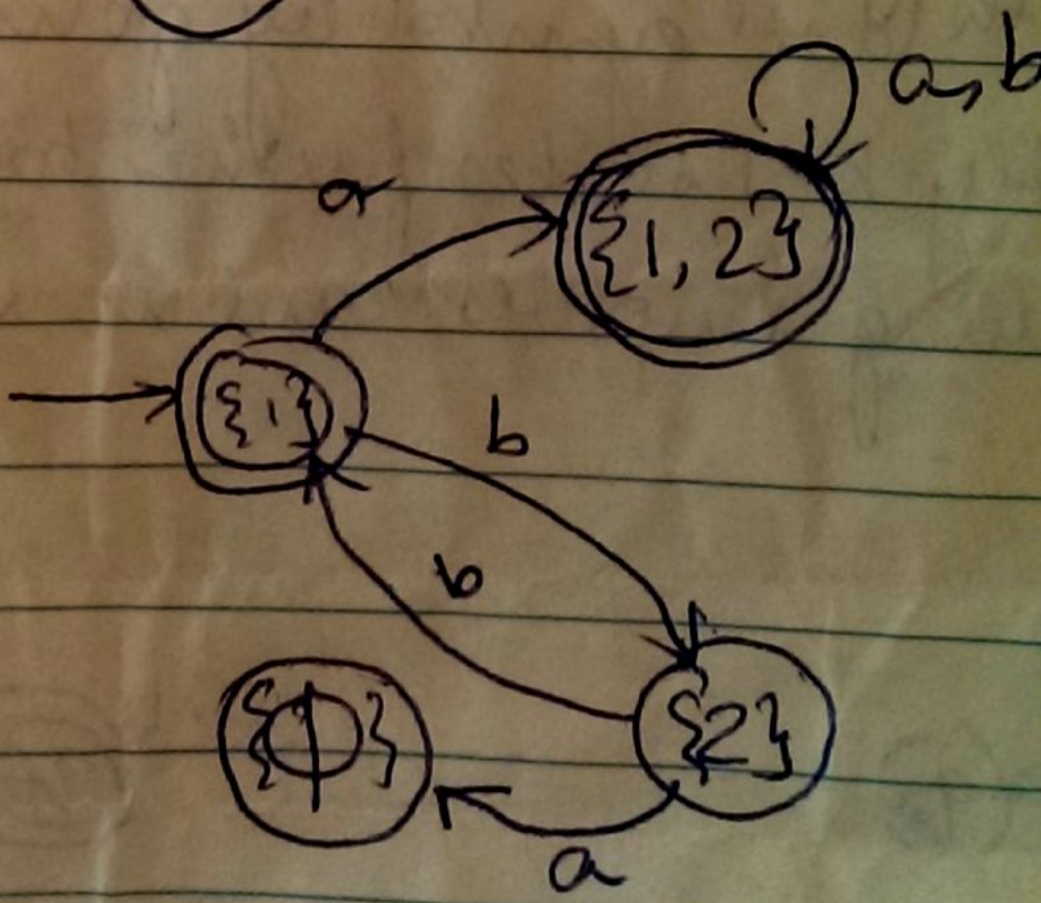


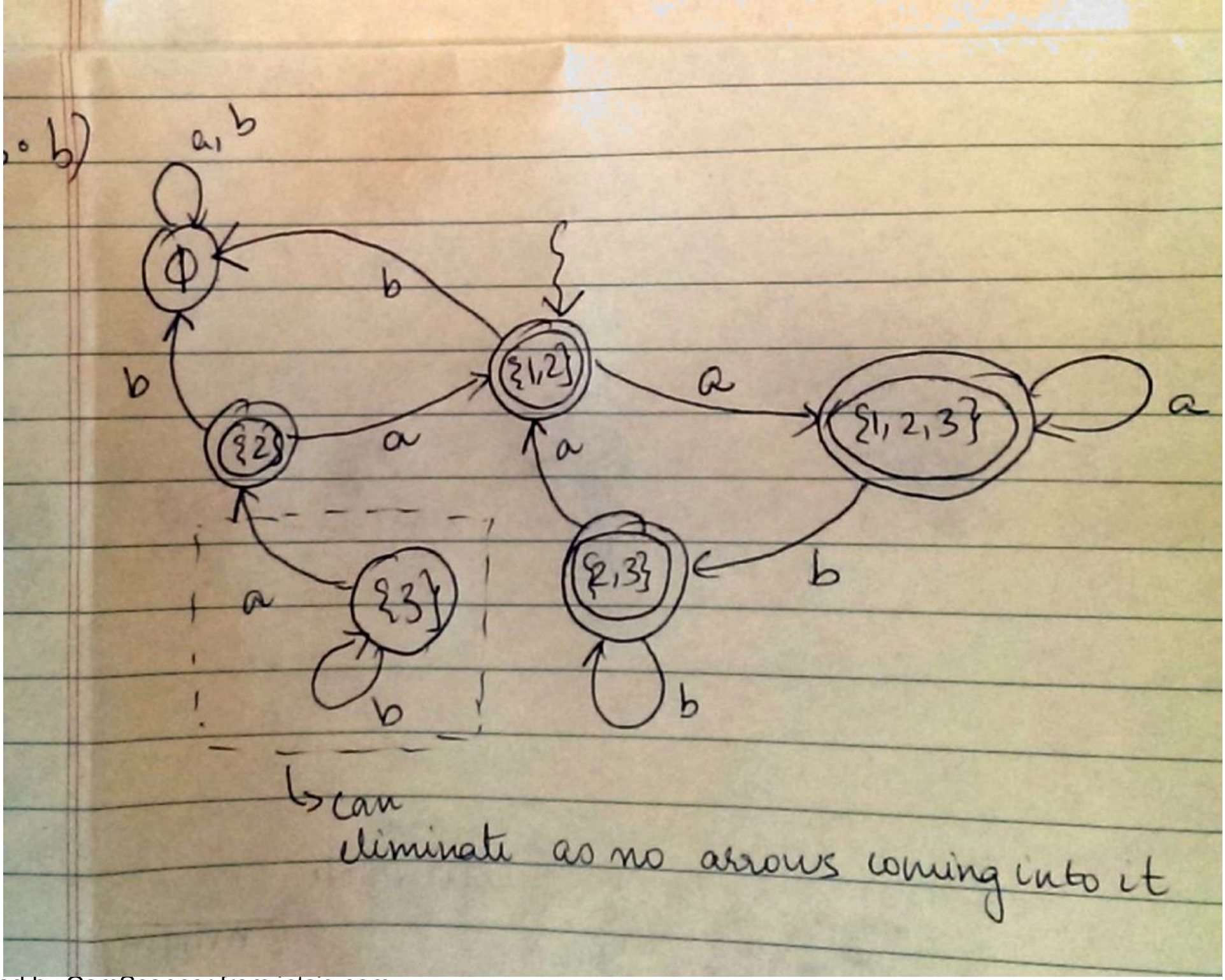
Essentially even though strings 11, 111 are not present but they get included as they are $\{1\}^*$.
Therefore it basically includes all strings with 0 & 1

3.

a)

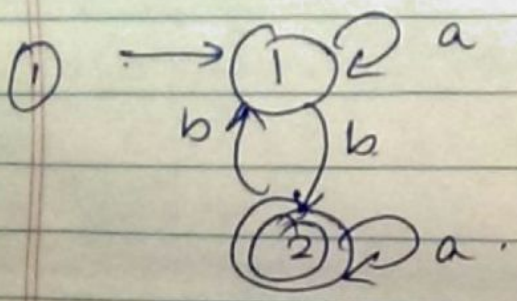




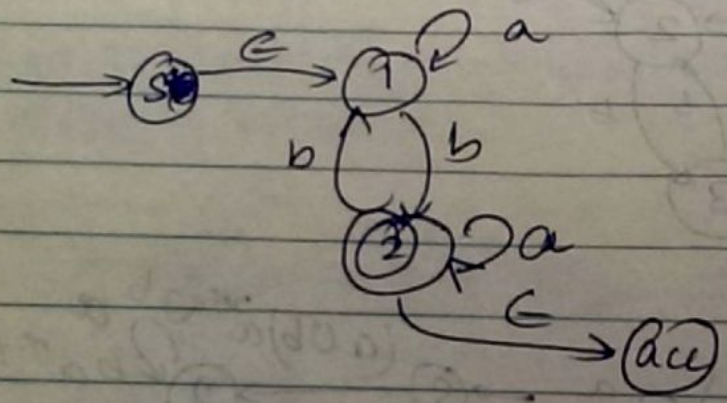


b can eliminate as no arrows coming into it

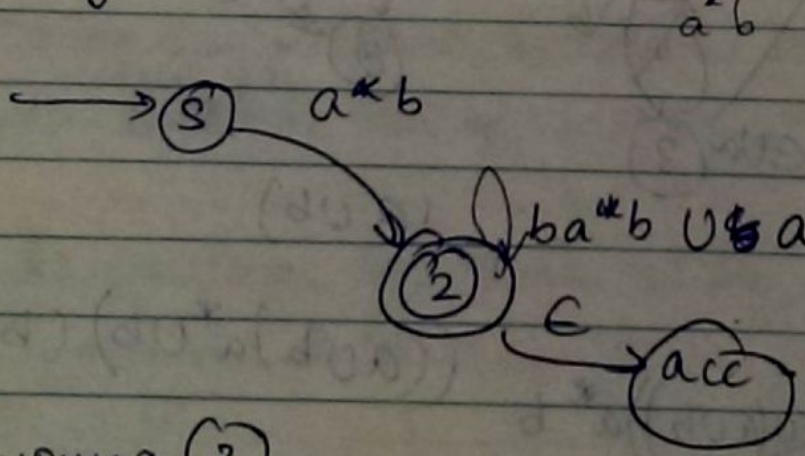
Problem 5



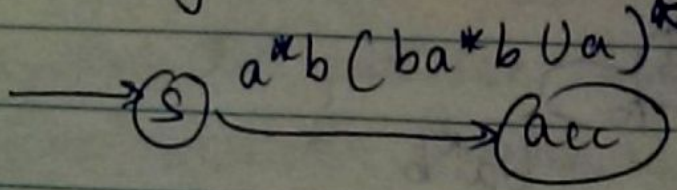
Convert to GNFA



Removing state 1

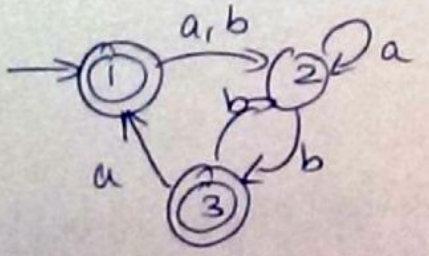


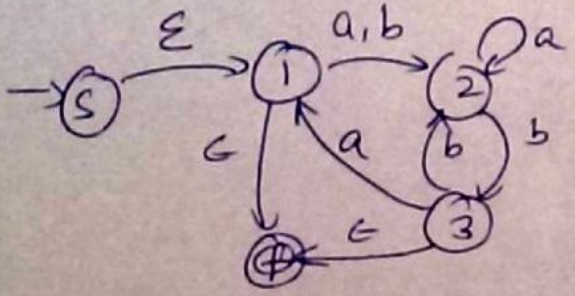
Removing (2)

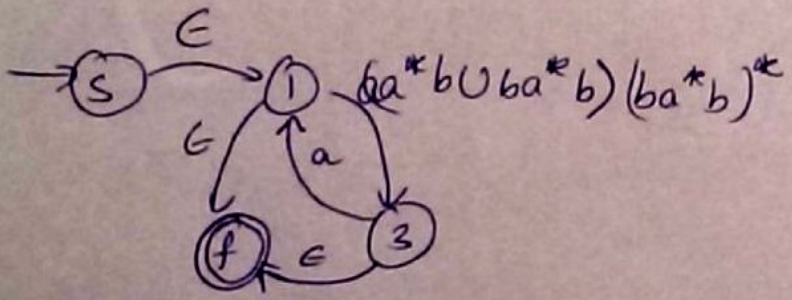


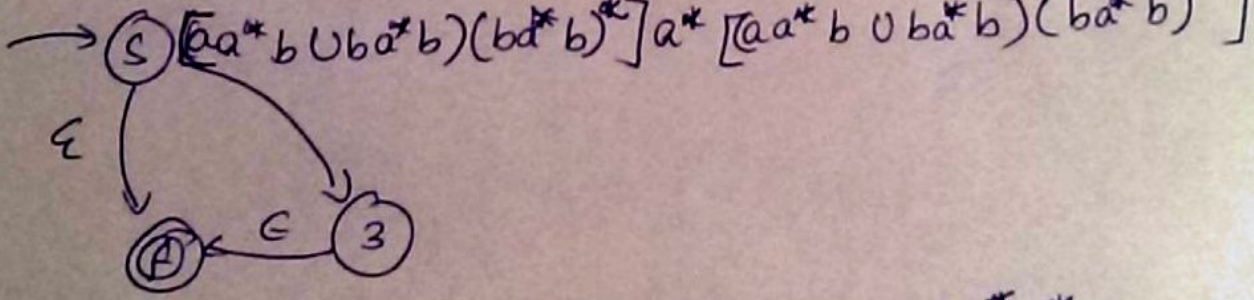
Regular expression = $a^*b(ba^*b \cup a)^*$

5.b.









$$\Rightarrow \varepsilon \cup [(aa^*b \cup ba^*b)(ba^*b)^* a^* (aa^*b \cup ba^*b)(ba^*b)^*]$$