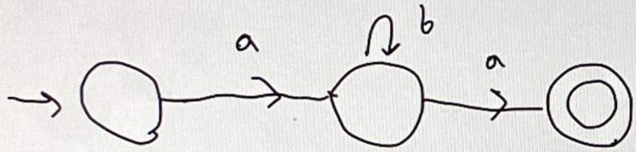
Mark

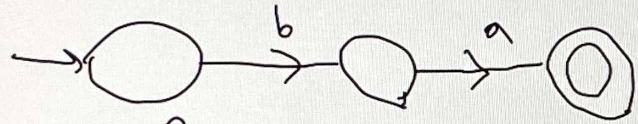
CptS 317

1. Construct a λ-NFA accepting language $((ab^*a+ba)^*+a^*b)^*$

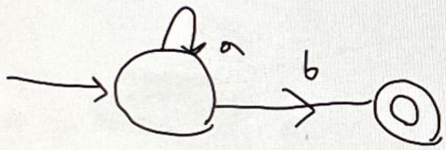
$ab^*a \Rightarrow$



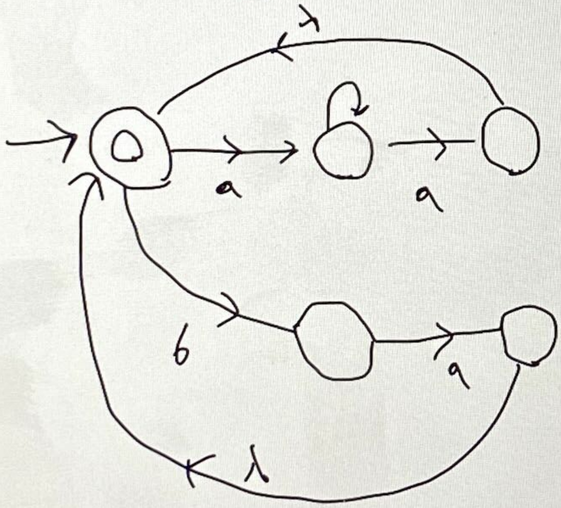
$ba \Rightarrow$



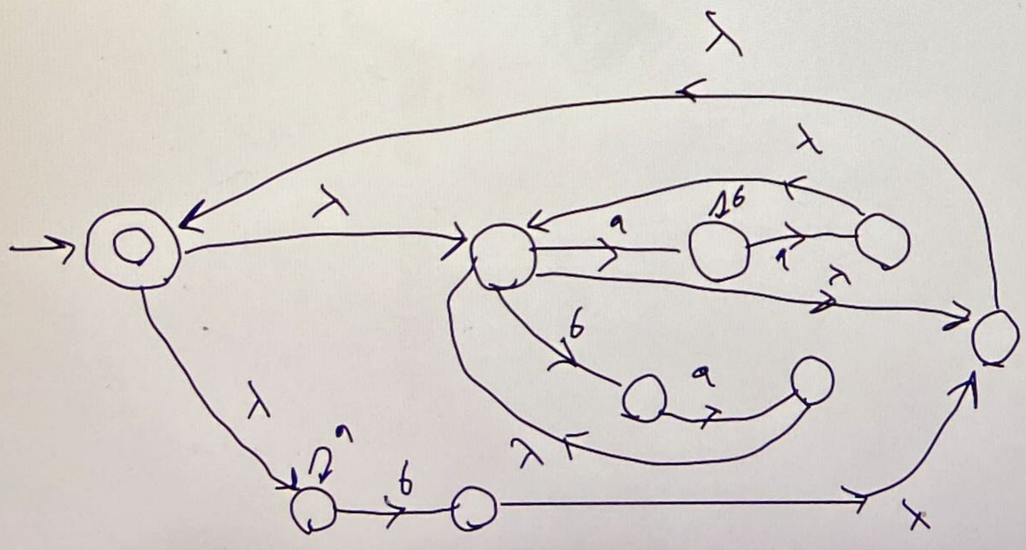
$a^*b \Rightarrow$



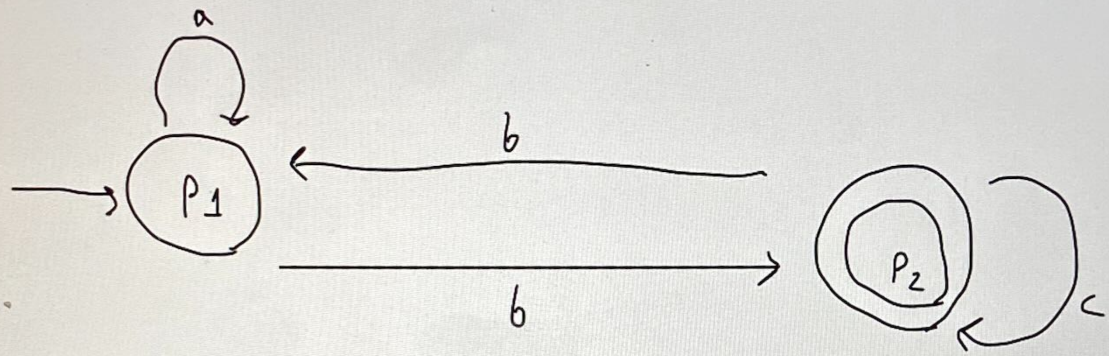
$(ab^*a+ba)^* \Rightarrow$



$((ab^*a+ba)^*+a^*b)^*$



2. According to the proof of the kleens Theorem, find a regular expression for $L(M)$ where M is a DFA given as below:



A Regular expression for $L(M)$ where M is a DFA,

$$a^* b c^* (b a^* b c^*)^*$$

3. Show that $L = \{0^n 1^m : n \ge 1, m \ge 1, n \le m\}$ is not regular.

It is not regular

$|y| \ge 1$

$|xy| \le p$

$xy^i z \in L$ when $i \ge 0$

Suppose $m = kp$, where k is some integer let the string $s = 0^p 1^{kp}$

$s \in L$ and $|s| \ge p$

If (1) and (2) hold then $s = 0^p 1^{kp} = xyz$ with $|xy| \le p$ and $|y| \ge 1$

$v \ge 1$ for $i = 1$

$u + v \le p$ $\quad 0^u 0^v 0^w 1^{kp} = 0^u 0^{2v} 0^w 1^{kp} \notin L$

Since $u + 2v + w \ne kp$

4.

$|y| > 0$

$|xy| <= p$ and $\forall i > 0, tu^i v \in L$

then, $xx^R x = ab(ab)^R ab = ab^p b^p aab^p$

Lets say $t = ab^p$, $u = b^p a$, $v = ab^p$

and

a) $|u| > 0 \Rightarrow |b^p a| > 0 \rightarrow$ This is true

b) $|tu| <= p \Rightarrow |ab^p b^p a| > p \rightarrow$ This is false

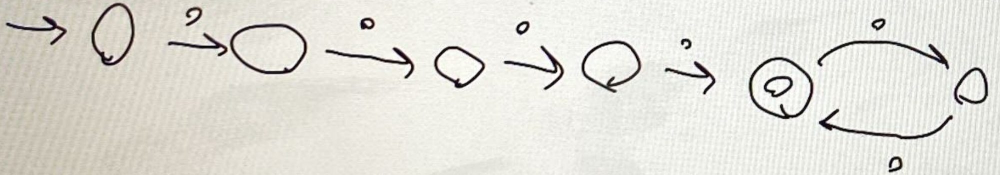
$\therefore$ L is not a regular language

5. 1) $\{0^m 1^n 0^{m+n} : m \ge 1, n \ge 1\}$

This is not regular. Regular language does not support Memorization. we have to memorize any number of 0 and 1, so it ends with zeros.

2) $\{0^m 0^n 0^{m+n} : m \ge 1, n \ge 1\}$

- This is regular because it takes initially 4 0's and than it takes any even number of 0's



3) $\{x w x^R : x \in (0+1)^*, w \in (0+1)^*\}$

It is not regular because in this langrage memorization is required

4) $\{0^n 1^m : n \ge 1, m \ge 1, n > m\}$

is not a regular langrage because in this langgage We have to check number of 1s must be greater than number of 0's