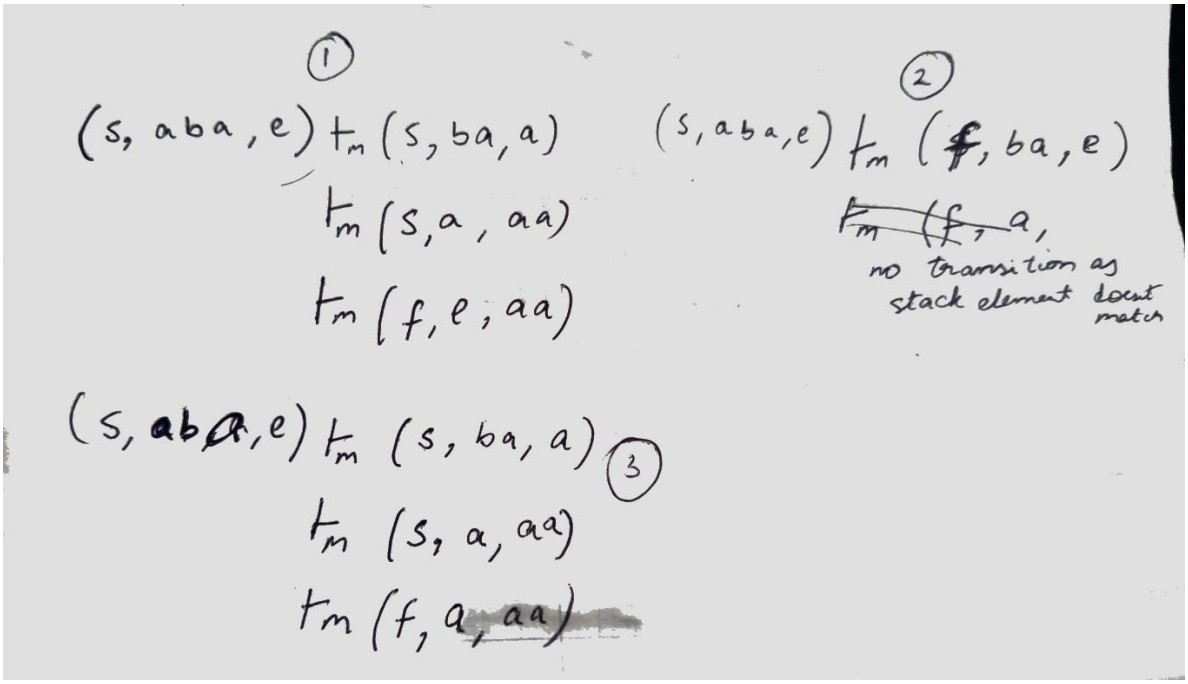
Homework – 6

1. Consider the pushdown automata $M = (K, \Sigma, \Gamma, \Delta, s, F)$, where

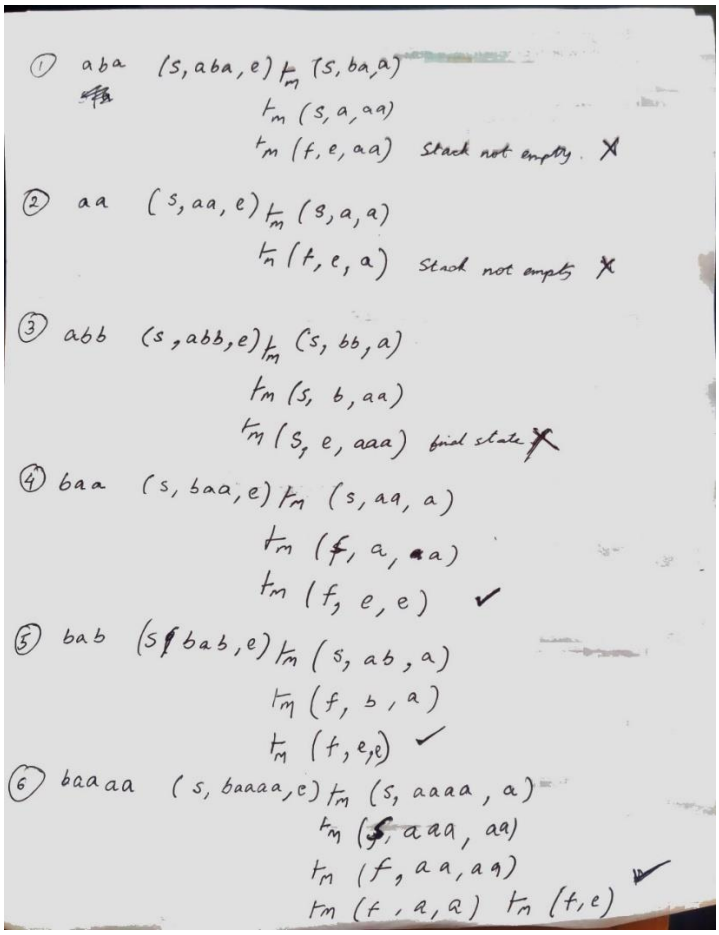
$$K = \{s, f\},$$
$$F = \{f\},$$
$$\Sigma = \{a, b\},$$
$$\Gamma = \{a\},$$
$$\Delta = \{((s,a,e),(s,a)),((s,b,e),(s,a)),((s,a,e),(f,e)),$$
$$((f,a,a),(f,e)),((f,b,a),(f,e))\}.$$

a). Trace all possible sequence of transitions of M on input aba

Ans.

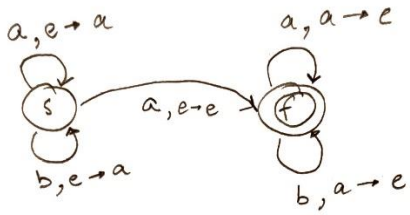


b). Show that $aba, aa, abb \notin L(M)$, but $baa, bab, baaaa \in L(M)$



As shown in the picture above, the $aba, aa, abb \notin L(M)$, but $baa, bab, baaaa \in L(M)$

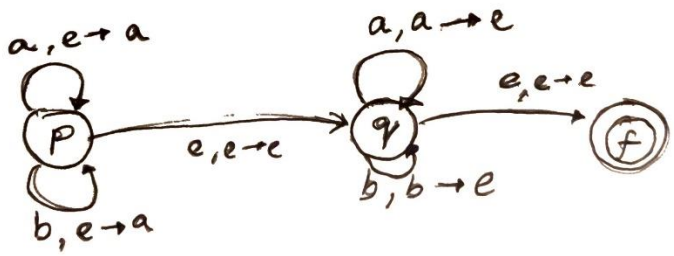
c). Describe $L(M)$ in English



$L = \{ waw', w, w' \in \{a, b\}^*, |w| = |w'| \}$

2. Construct a Pushdown automata that accept each of the followings:

a). The language $\{w \in \{a,b\}^* : w = w^R\}$



b). The language $\{w \in \{a,b\}^* : w \text{ has the same number of } a's \text{ and } b's\}$