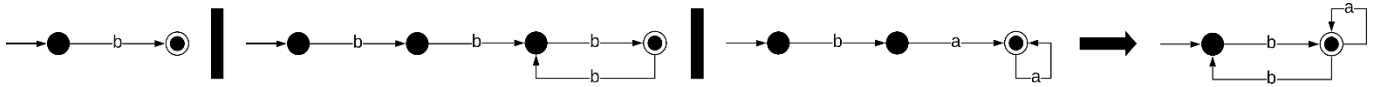


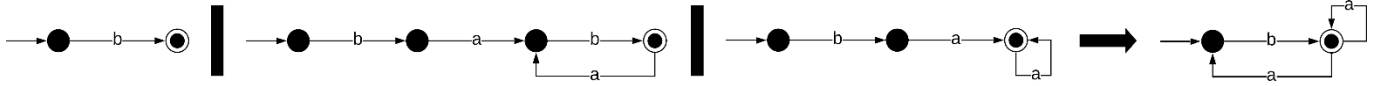
Homework 06

1. Match the automata with the regular expressions

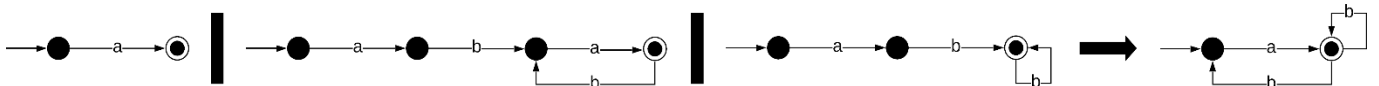
$$b(bb|a)^* \rightarrow b \mid b(bb)^+ \mid ba^+$$



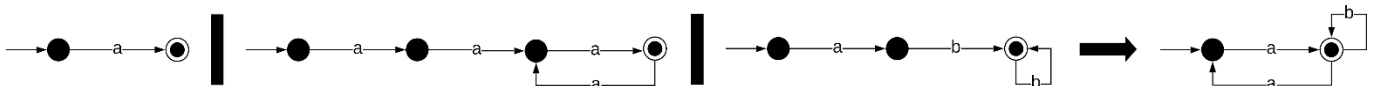
$$b(ab|a)^* \rightarrow b \mid b(ab)^+ \mid ba^+$$



$$a(ba|b)^* \rightarrow a \mid a(ba)^+ \mid ab^+$$



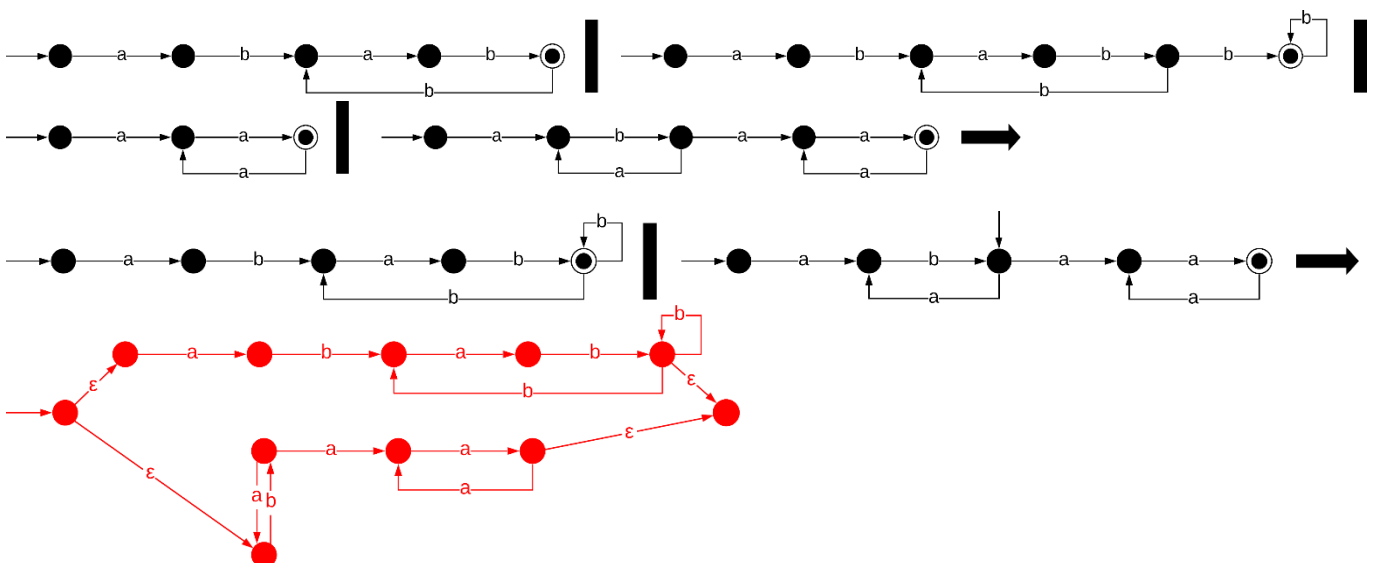
$$a(aa|b)^* \rightarrow a \mid a(aa)^+ \mid ab^+$$



1 → c ; 2 → a ; 3 → d ; 4 → b

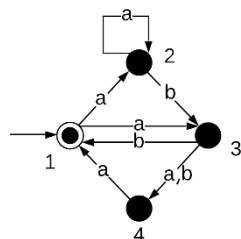
2. Give a finite – state automaton (of any kind) accepting the language described with the pattern:

$$a(bab)^+b^* \mid (ab)^*(aa)^+ \rightarrow a(bab)^+ \mid a(bab)^+b^+ \mid (aa)^+ \mid (ab)^+(aa)^+$$



3. Give a regular expression describing the language accepted by the following non – deterministic automaton:

	a	b
→ F 1	2,4	–
2	2	4
3	1	–
4	3	1,3



Arden's Theorem: $R = Q + RP \rightarrow R = QP^*$

$$q_1 = \varepsilon + q_3a + q_4b$$

$$q_2 = q_1a + q_2a = q_1aa^*$$

$$q_3 = q_4a + q_4b = q_4(a + b)$$

$$q_4 = q_1a + q_2b$$

$$q_1 = \varepsilon + q_4(a+b)a + q_4b = \varepsilon + q_4((a+b)a+b)$$

$$q_4 = q_1a + q_1aa^*b = q_1(a+aa^*b)$$

$$q_1 = \varepsilon + q_1(a+aa^*b)((a+b)a+b) = \varepsilon((a+aa^*b)((a+b)a+b))^* = ((a+aa^*b)((a+b)a+b))^* \rightarrow ((a|aa^*b)((a|b)a|b))^*$$

Another way: $(aa^*baa \mid aa^*bb \mid aa^*bba \mid aaa \mid ab \mid aba)^*$ or $(aa^*b(aa \mid b \mid ba) \mid a(aa \mid b \mid ba))^*$ or $((aa^*b|a)(aa \mid b \mid ba))^*$