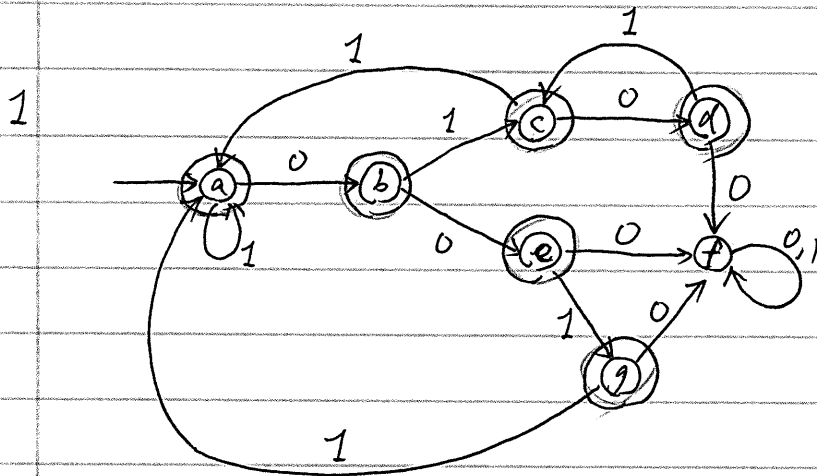Exercise 2

$Q = \{a, b, c, d, e, f, g\}$

$\Sigma = \{0,1\}$

$\delta:$ $\delta(a,1) = a$ $\delta(a,0) = b$ $\delta(b,1) = c$ $\delta(b,0) = e$

$\delta(c,0) = d$ $\delta(c,1) = a$ $\delta(d,0) = f$ $\delta(d,1) = e$

$\delta(e,0) = f$ $\delta(e,1) = g$ $\delta(f,0) = f$ $\delta(f,1) = f$

$\delta(g,0) = f$ $\delta(g,1) = a$

$q_0 = a$

$F = \{a, b, c, d, e, g\}$

2.
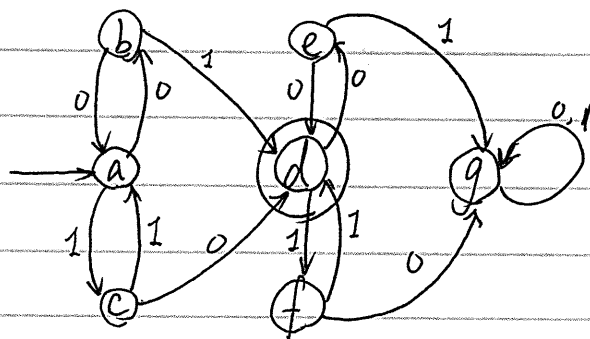
$Q = \{a, b, c, d, e, f, g\}$

$\Sigma = \{0, 1\}$

$\delta:$ $\delta(a, 0) = b$ $\delta(a, 1) = c$ $\delta(b, 0) = a$ $\delta(b, 1) = d$

     $\delta(c, 0) = d$ $\delta(c, 1) = a$ $\delta(d, 1) = f$ $\delta(d, 0) = e$

     $\delta(e, 0) = d$ $\delta(e, 1) = g$ $\delta(f, 0) = g$ $\delta(f, 1) = d$

     $\delta(g, 0) = g$ $\delta(g, 1) = g$

$q_0 = S = a$

$F = \{d\}$

3

$Q = \{a, b, c, d, e, f\}$

$\Sigma = \{0, 1\}$

$\delta:\quad \delta(a, 0) = b \quad \delta(a, 1) = c \quad \delta(b, 0) = d \quad \delta(b, 1) = f$

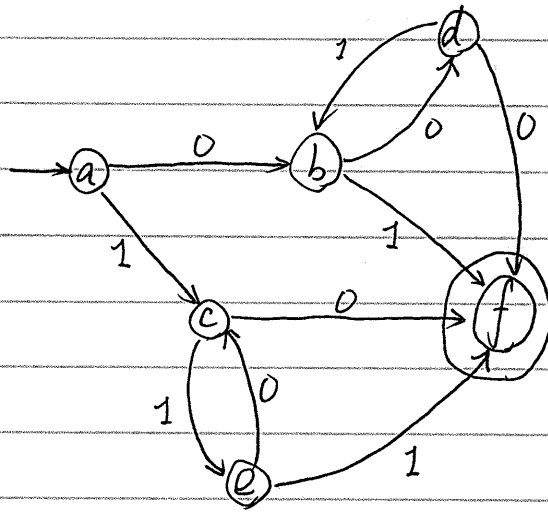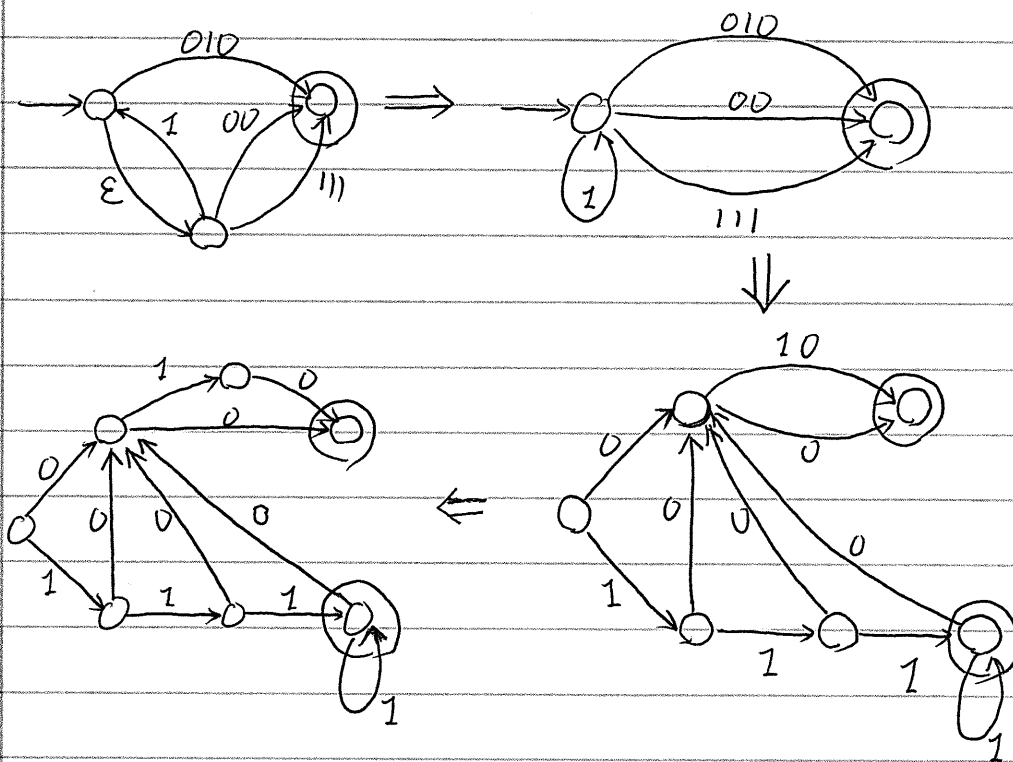$\delta(c, 1) = e \quad \delta(c, 0) = f \quad \delta(d, 0) = f \quad \delta(d, 1) = b$

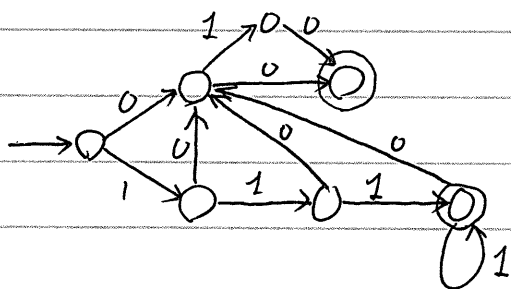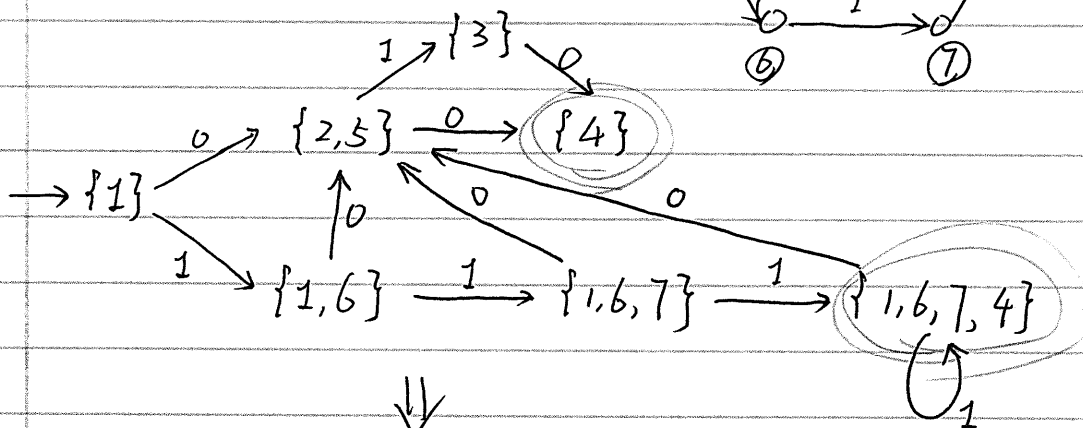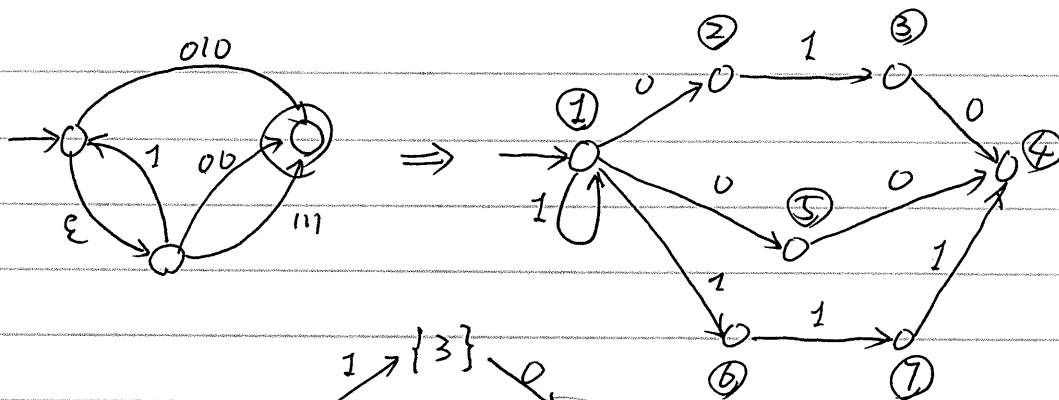$\delta(e, 0) = c \quad \delta(e, 1) = f$

$q_0 = a$

$F = \{f\}$

4 $(aa)^* a (b^*) + (bb)^* b (a^*)$ regular expression

Exercise 3

$L = \{ (1^*)111, (1^*)010, (1^*)00 \}$

$L = (1^*)(111 + 010 + 00)$

$$L = (1^*)(111 + 010 + 00)$$

the same as before