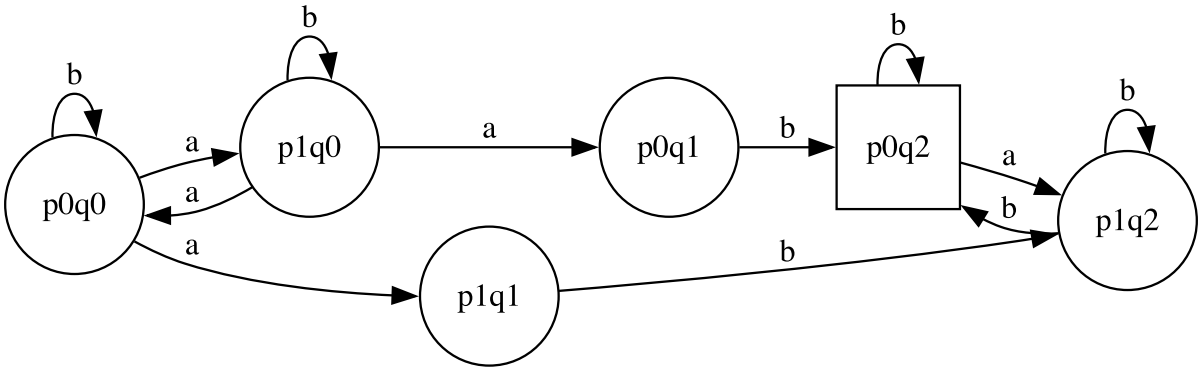
## Exercise 1

- Group 1: a, d, g, i, j, k
- Group 2: b, e, h
- Group 3: c
- Group 4: f

## Exercise 2



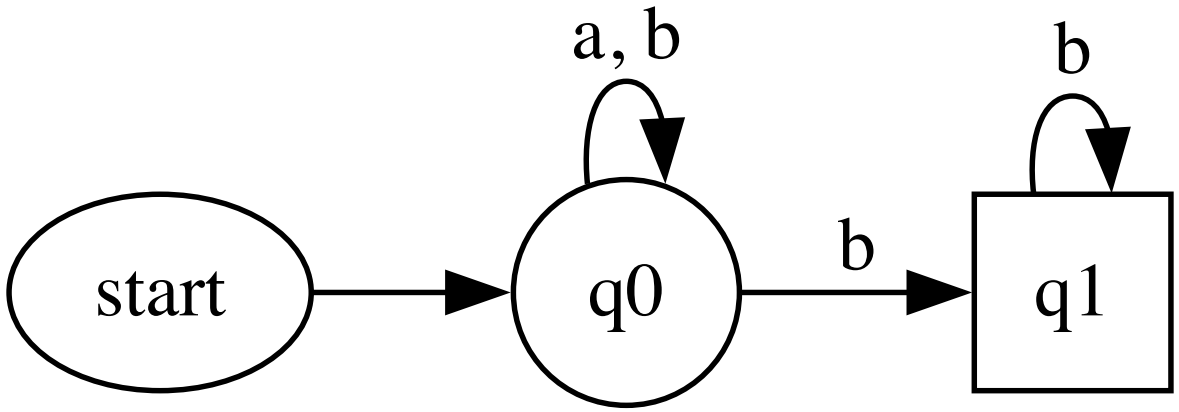

## Exercise 3

### Language $L_1$

#### Part A

$$L_1 = \left\{x_0 x_1 ... \mid \left(\forall i \in N_0 \ . \ x_i \in \sum\right) \wedge (\exists i \in N_0 \ . \ x_i = a)\right\}$$

#### Part B




#### Part C

$$L_1 = \left(Q_1, \sum, \delta_1, Q_1^{\text{init}}, F_1\right)$$

$$Q_1 = \{q_0, q_1\}$$

$$\sum = \{a, b\}$$

$$Q_1^{\text{init}} = \{q_0\}$$

$$F_1 = \{q_1\}$$

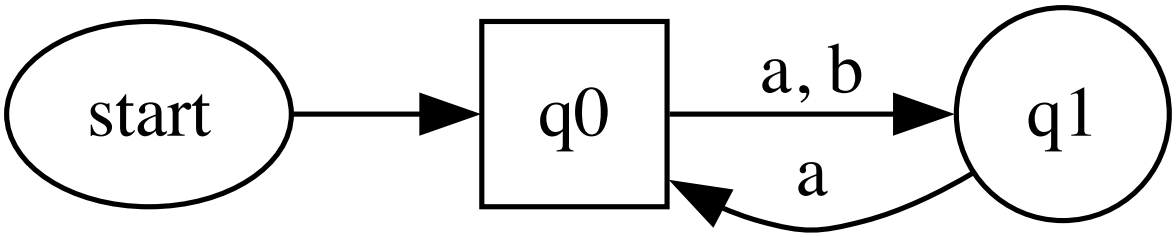
$$\delta_1 = \{(q_0, a, q_0), (q_0, b, q_0), (q_0, b, q_1), (q_1, b, q_1)\}$$

## Language $L_2$

### Part A

$$L_2 = \left\{ x_0 x_1 ... \mid \left( \forall i \in N_0 \ . \ x_i \in \sum \right) \land \left( \forall i \in N_0 \ . \ i \bmod 2 = 1 \ . \ x_i = a \right) \right\}$$

### Part B




### Part C

$$L_2 = \left( Q_2, \sum, \delta_2, Q_2^{\text{init}}, F_2 \right)$$

$$Q_2 = \{q_0, q_1\}$$

$$\sum = \{a, b\}$$

$$Q_2^{\text{init}} = \{q_0\}$$

$$F_2 = \{q_2\}$$

$$\delta_1 = \{(q_0, a, q_1), (q_0, b, q_1), (q_1, b, q_0)\}$$