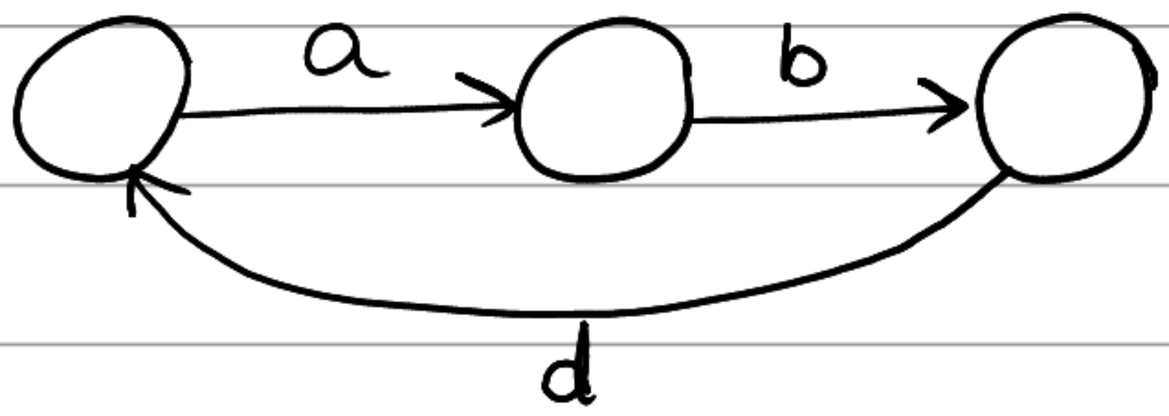
#7

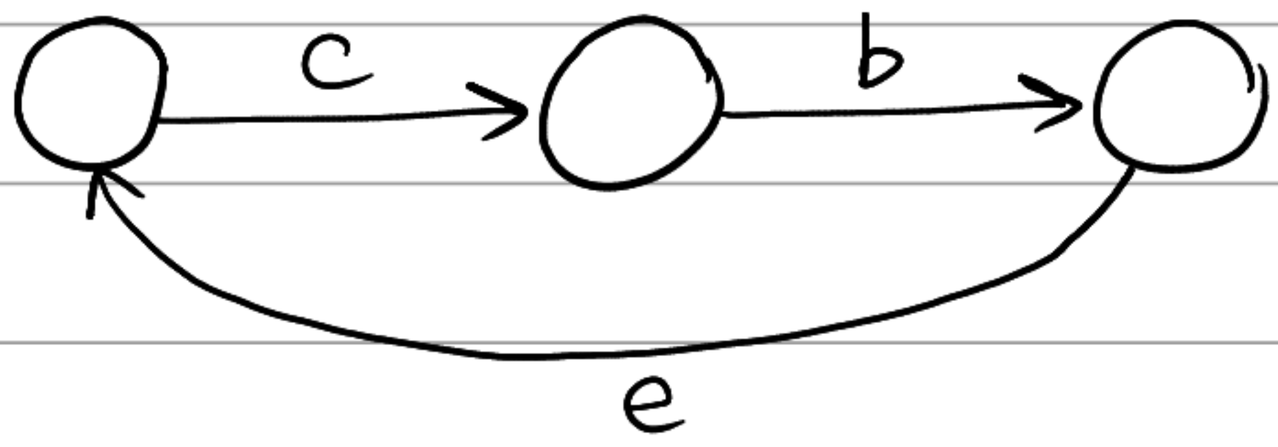
a) $P = (a \rightarrow b \rightarrow d \rightarrow P)$

$Q = (c \rightarrow b \rightarrow e \rightarrow Q)$

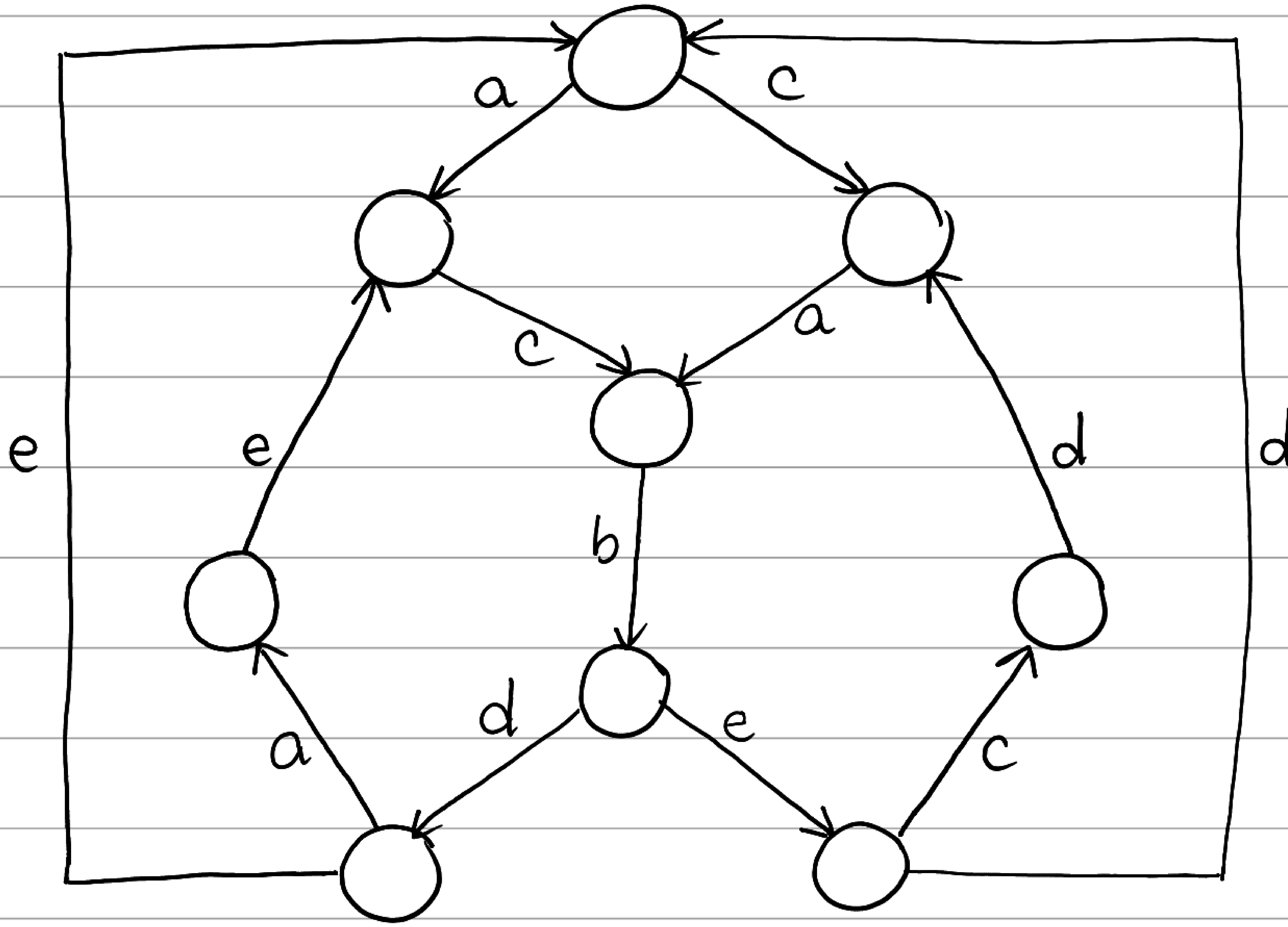
$\|S1 = (P \| Q)$



P



Q



||S1

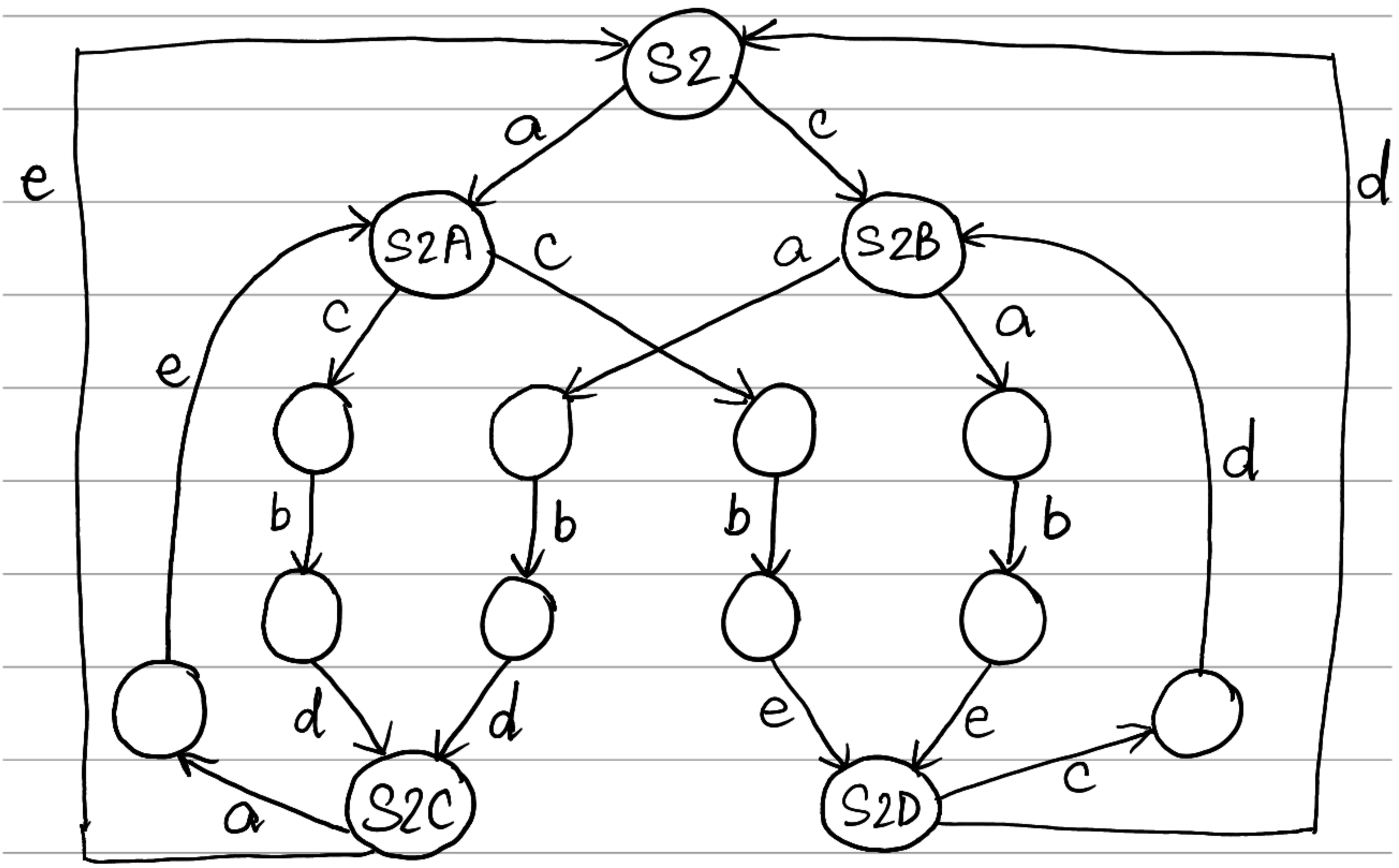
S2 = (a → S2A | c → S2B)

S2A = (c → b → d → S2C
| c → b → e → S2D)

S2B = (a → b → d → S2C
| a → b → e → S2D)

S2C = (e → S2 | a → e → S2A)

S2D = (d → S2 | c → d → S2B)



S2

Notice that the graphs for ||S1 and S2 are isomorphic. Thus, LTS(||S1) = LTS(S2)

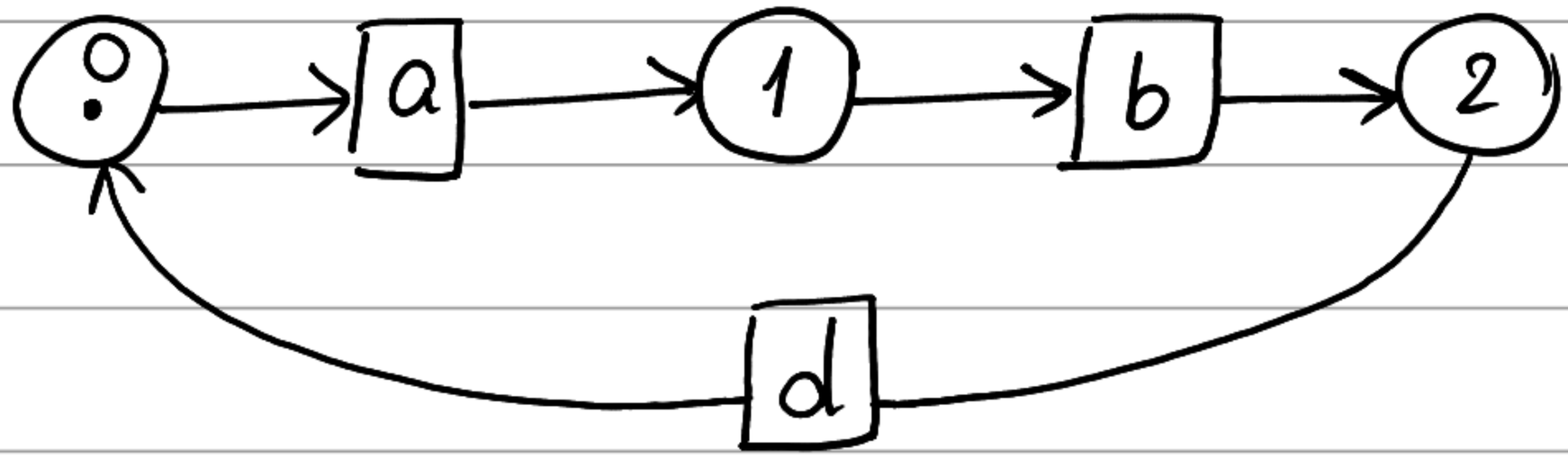
b)

$P = (a \rightarrow b \rightarrow d \rightarrow P)$

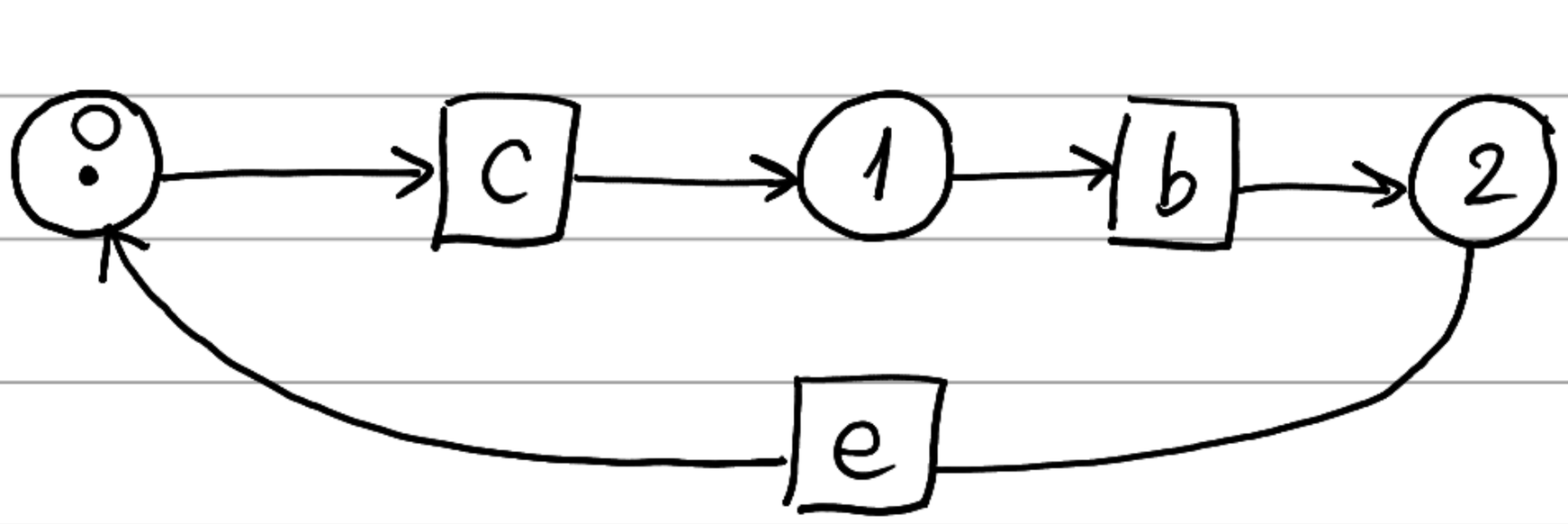
$Q = (c \rightarrow b \rightarrow e \rightarrow Q)$

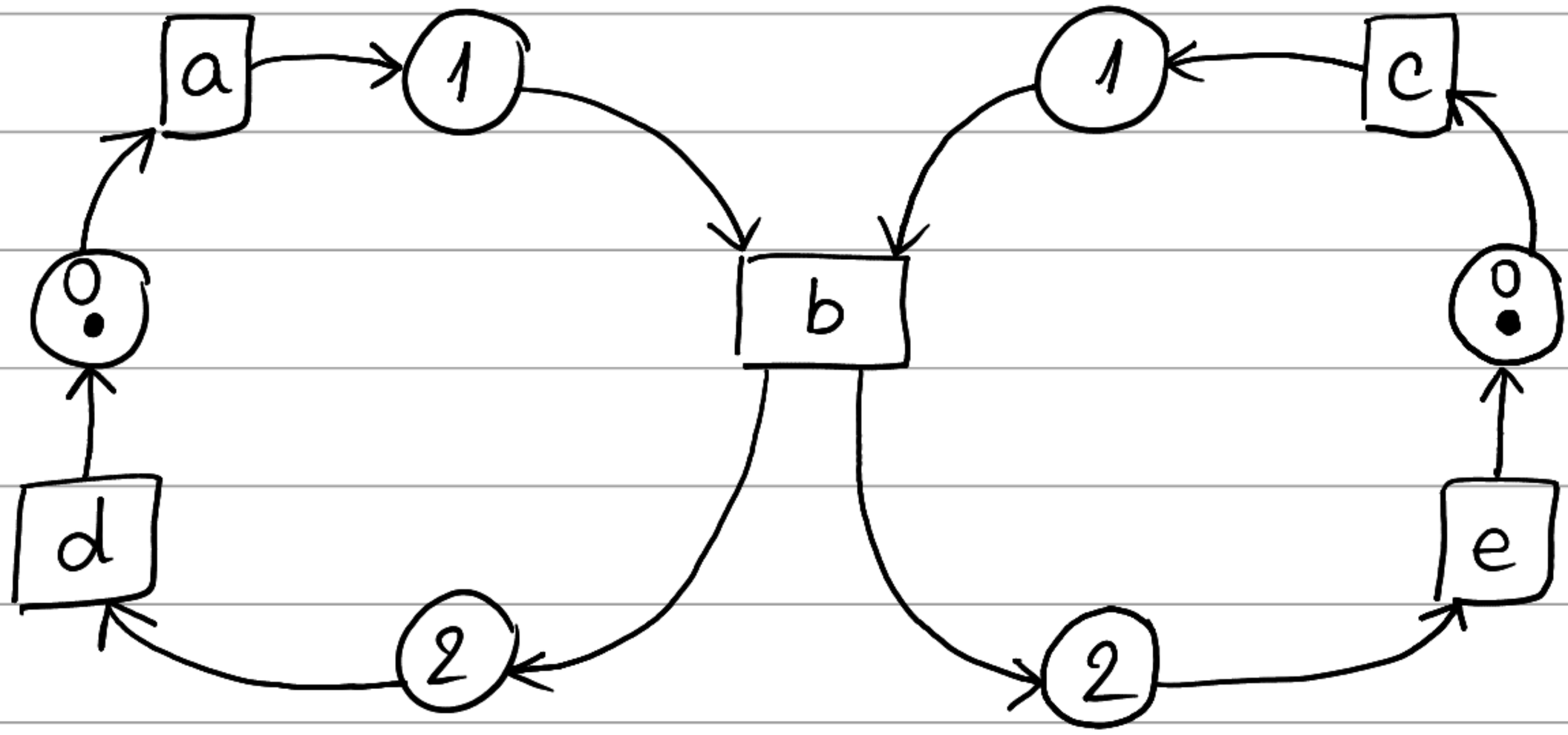
$\| S1 = (P \| Q)$

P



Q





$\| S_1$

$S2 = (a \to S2A \mid c \to S2B)$

$S2A = (c \to b \to d \to S2C$

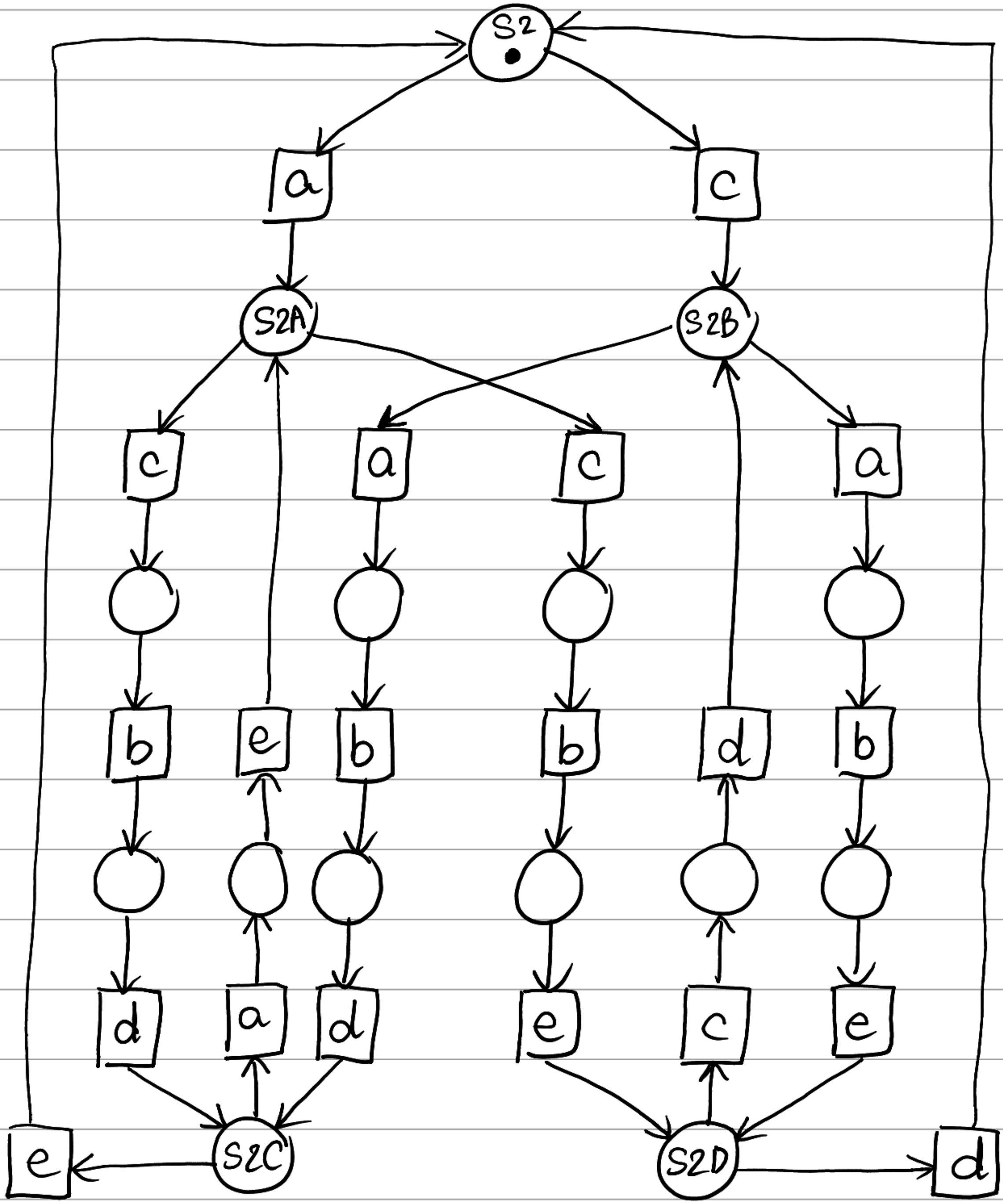
$\mid c \to b \to e \to S2D)$

$S2B = (a \to b \to d \to S2C$

$\mid a \to b \to e \to S2D)$

$S2C = (e \to S2 \mid a \to e \to S2A)$

$S2D = (d \to S2 \mid c \to d \to S2B)$



S2

. The petri nets for ||S1 and S2 are different.

. If simultaneity is observed, the net ||S1 generates traces like $\{a, c\} \rightarrow b \rightarrow \{d, e\} \rightarrow a \rightarrow c \rightarrow b \rightarrow d \rightarrow a \rightarrow e \rightarrow c \rightarrow b \rightarrow \ldots$, while S2 can only generates traces like $a \rightarrow c \rightarrow b \rightarrow d \rightarrow e \rightarrow a \rightarrow \ldots$ or $c \rightarrow a \rightarrow b \rightarrow d \rightarrow e \rightarrow a \rightarrow \ldots$ or $a \rightarrow c \rightarrow b \rightarrow d \rightarrow a \rightarrow e \rightarrow a \rightarrow \ldots$ or $c \rightarrow a \rightarrow b \rightarrow d \rightarrow a \rightarrow e \rightarrow a \rightarrow \ldots$

. Therefore, only ||S1 allows simultaneity