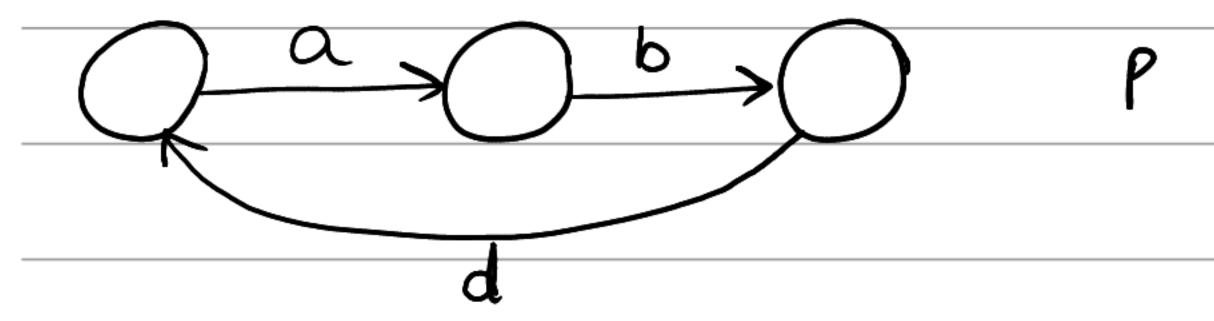
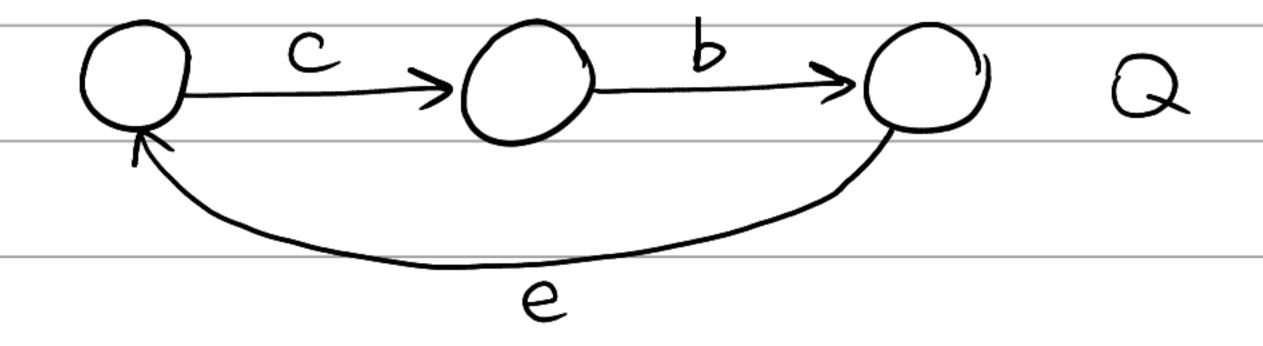
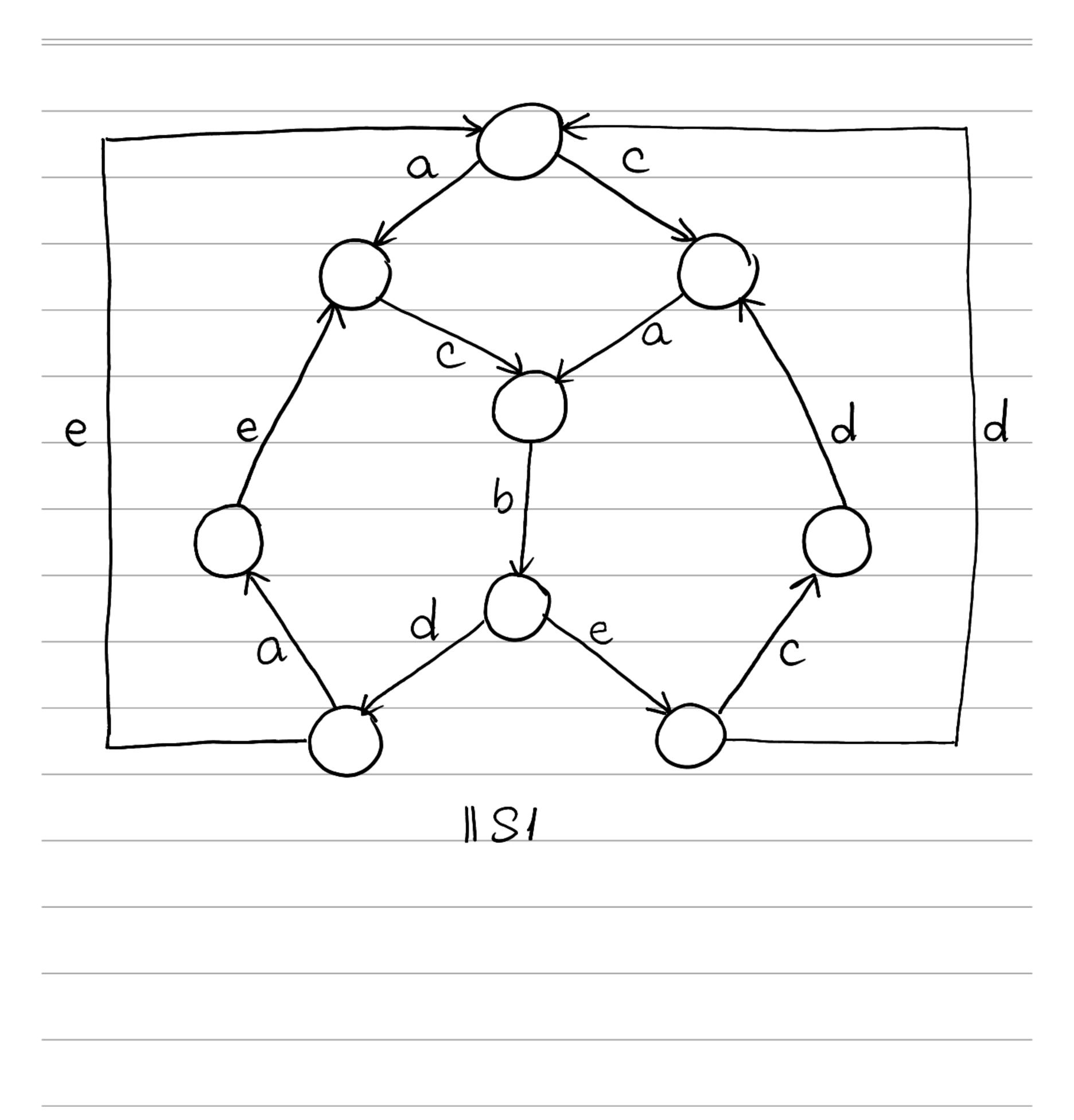


a)
$$P = (a \rightarrow b \rightarrow d \rightarrow P)$$

 $Q = (c \rightarrow b \rightarrow e \rightarrow Q)$
 $||S1 = (P || Q)$







$$Sl = (a \rightarrow SlA \mid c \rightarrow SlB)$$

$$SlA = (c \rightarrow b \rightarrow d \rightarrow SlC)$$

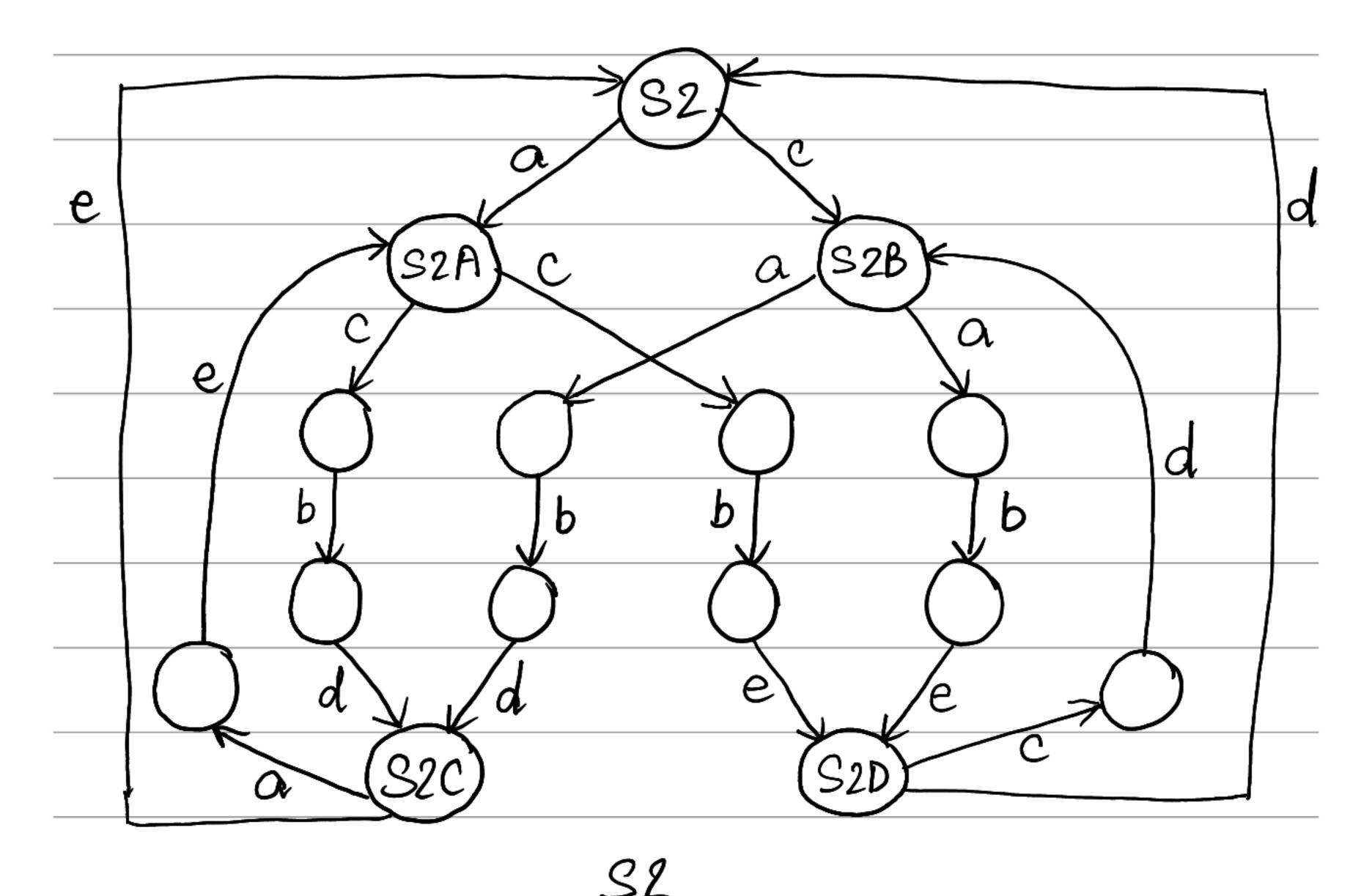
$$|c \rightarrow b \rightarrow e \rightarrow SlD)$$

$$SlB = (a \rightarrow b \rightarrow d \rightarrow SlC)$$

$$|a \rightarrow b \rightarrow e \rightarrow SlD)$$

$$SlB = (e \rightarrow Sl \mid a \rightarrow e \rightarrow SlD)$$

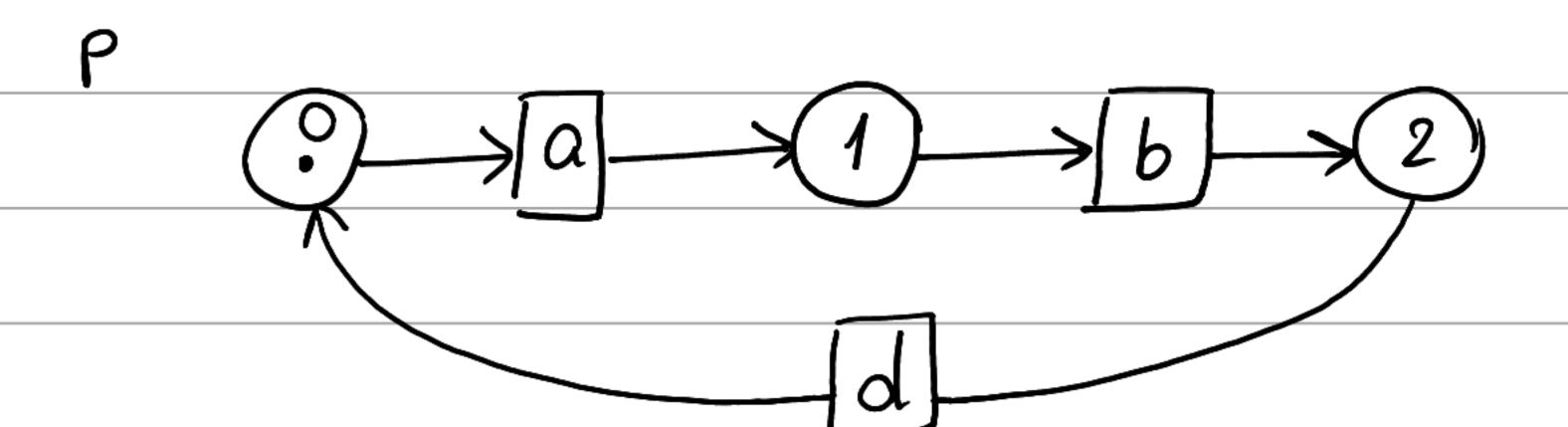
$$SlB = (d \rightarrow Sl \mid c \rightarrow d \rightarrow SlB)$$

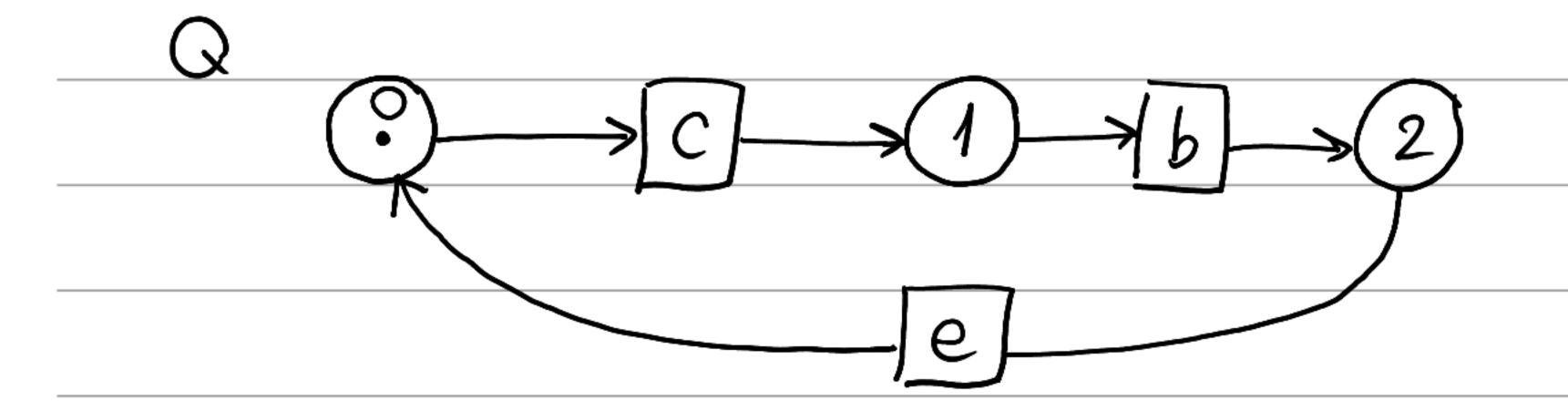


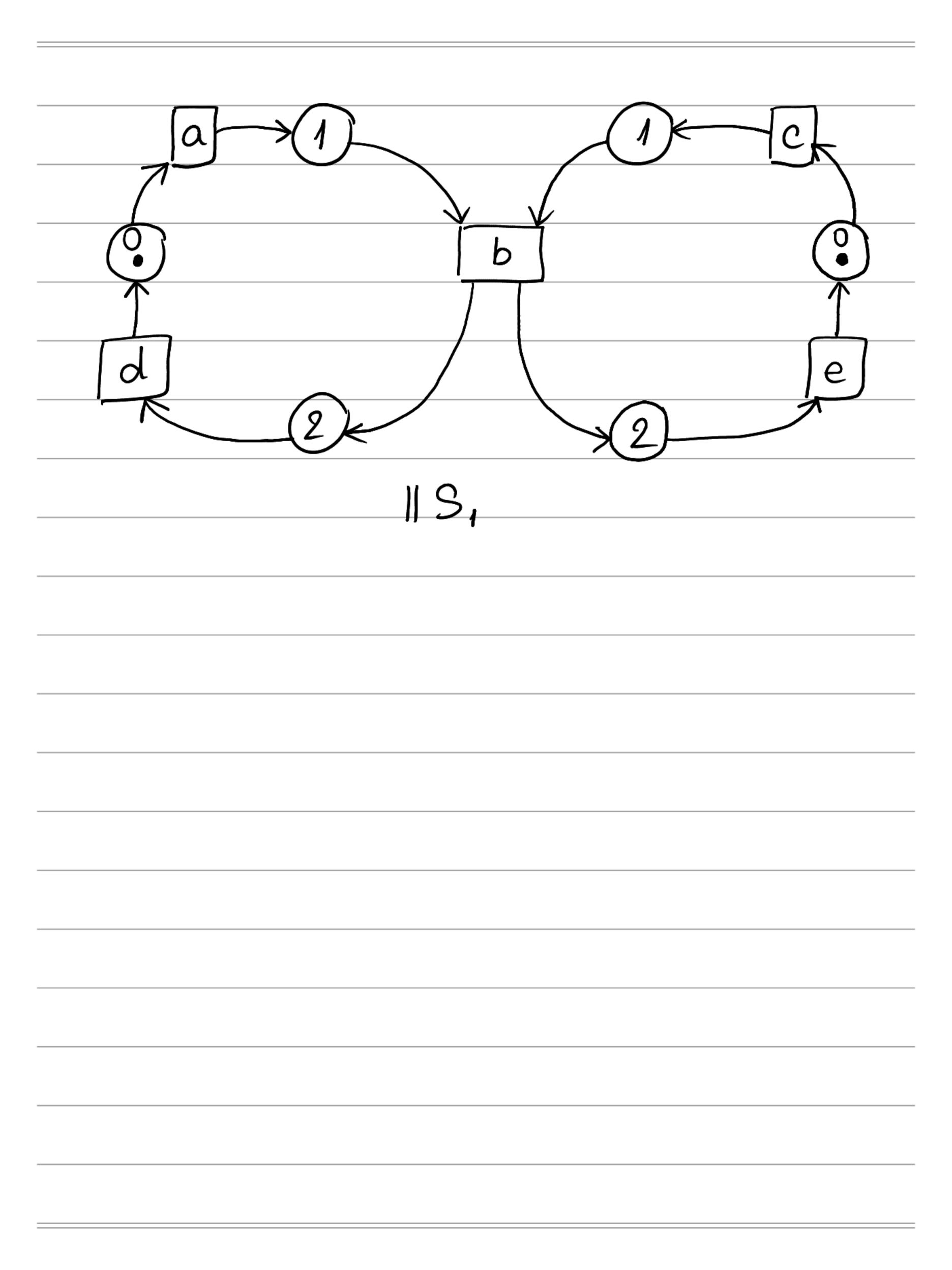
Notice that the graphs for 11S1 and S2 are isomorphic. Thus, LTS(11S1) = LTS(S2)
and S2 are isomorphic. Thus, LTS(11S1)
-15(82)

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

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







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

$$S2A = (c \rightarrow b \rightarrow d \rightarrow S2C)$$

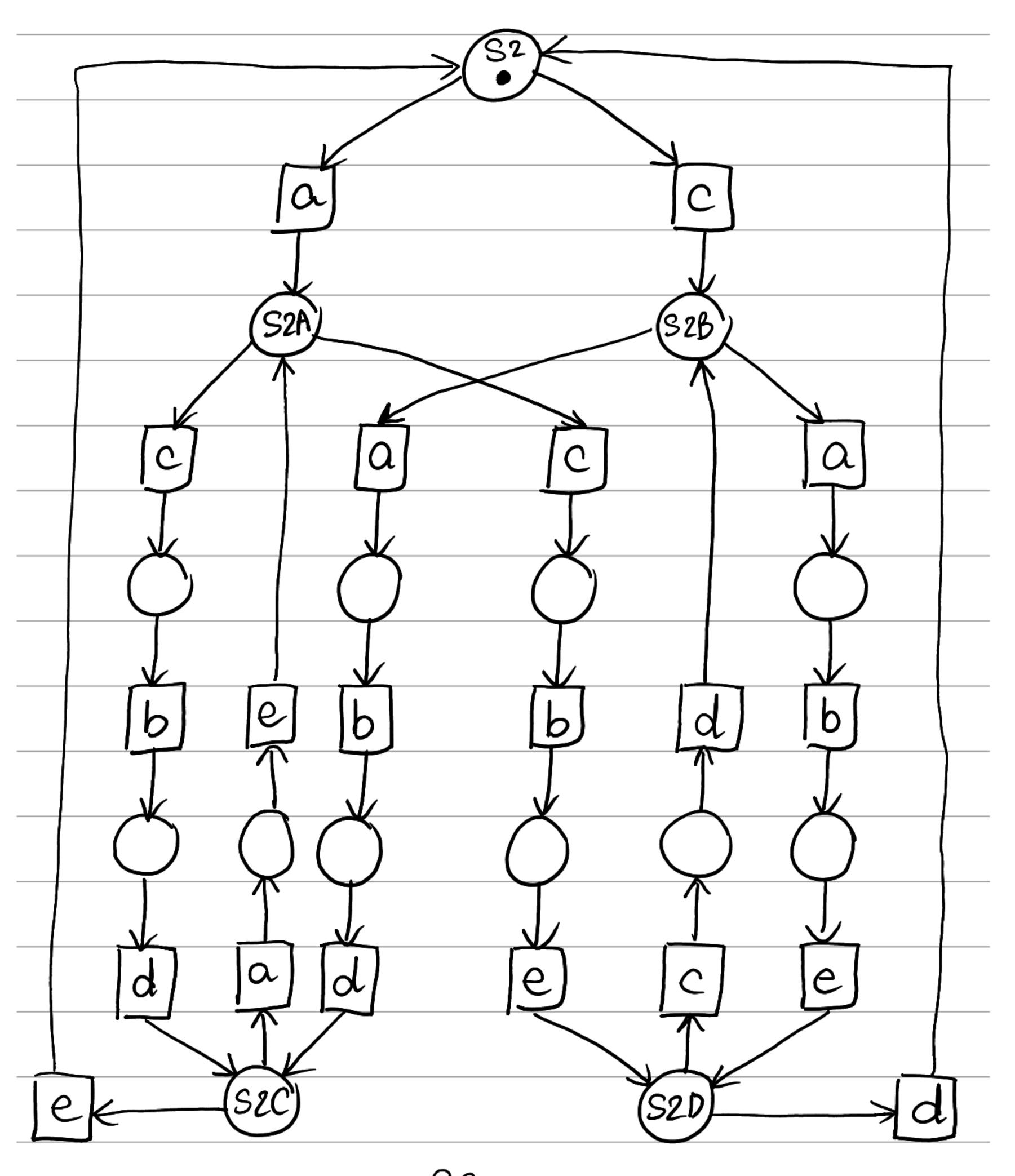
$$|c \rightarrow b \rightarrow e \rightarrow S2D)$$

$$S2B = (a \rightarrow b \rightarrow d \rightarrow S2C)$$

$$|a \rightarrow b \rightarrow e \rightarrow S2D)$$

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

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



. The petri nets for 11S1 and S2 are
<u>different</u> .
. If simultaneity is observed, the net
. If simultaneity is observed, the net $ SI $ generates traces like $\{a,c\} \rightarrow b$ $\rightarrow \{d,e\} \rightarrow a \rightarrow c \rightarrow b \rightarrow d \rightarrow a$
$\rightarrow \{d, e\} \rightarrow a \rightarrow c \rightarrow b \rightarrow d \rightarrow a$
$\rightarrow e \rightarrow c \rightarrow b \rightarrow$, while S2 can
only generates traces like $a \rightarrow c \rightarrow b \rightarrow d \rightarrow e \rightarrow a \rightarrow$ or $c \rightarrow a \rightarrow b \rightarrow$
$d \rightarrow e \rightarrow a \rightarrow \text{ or } a \rightarrow c \rightarrow b \rightarrow$
$d \rightarrow a \rightarrow e \rightarrow a \rightarrow$ or $c \rightarrow a \rightarrow$
$b \rightarrow d \rightarrow a \rightarrow e \rightarrow a \rightarrow$
. Therefore, only 11S1 allows simultaneity