1. Construct the global state graph $P || [B] || Q$, when

a) 
\[
P : \quad \rightarrow P_1 \xrightarrow{a} P_2 \xrightarrow{b} P_3 \xrightarrow{c} P_4,
\]
\[
Q : \quad \rightarrow Q_1 \xrightarrow{a} Q_2 \xrightarrow{\tau} Q_3 \xrightarrow{b} Q_4 \xrightarrow{\tau} Q_5 \xrightarrow{c} Q_6,
\]
\[
B = \{a, b, c\};
\]

b) $P$ and $Q$ as in a), but $B = \{b\};$

2. Consider the following client/server system with 2 clients. Form the global state graph of the whole system. All communication is synchronous (tightly coupled).

3. Give an example of a situation where the parallel operator is not associative.

4. Consider the following version of the AB protocol (with a channel and a separate timer):
Let us change the protocol in such a way that $R$ first sends $a_0$ and only then makes the transition `give`. The same with $a_1$. Draw $R$ and the whole global state graph.

Further assume that the communication is synchronous and there is no channel. Is the modified protocol working properly?

5. Show that

$$P|[B]|(Q|[B]|R) \equiv (P|[B]|Q)|[B]|R$$

for all action sets $B$. Here $\equiv$ means that the graphs are the same with the exception of the names of the states.