Part 1 (Composition Synthesis)
Given the following the available services $A_1$ and $A_2$ and the target service $T$, prove whether a composition realizing it exists, and, if it does, produce the output relation of orchestrator generator. If not, single out the target state that cannot be (ND-)simulated, and propose a small change to the available services so as to guarantee the composition.

Part 2 (Theoretical Question)
Write the definition of simulation and bisimulation. Then consider the following transition systems.

(a) Does $S$ simulates $T$? If so, write a simulation relation. If not, show where simulation breaks.
(b) Does $T$ simulates $S$? If so, write a simulation relation. If not, show where simulation breaks.
(c) Are they bisimilar? If so, write a bisimulation relation. If not, show where bisimulation breaks.

Please comment each answer appropriately so as to show your line of reasoning.