Declarative Process Modelling - Solutions Week 7

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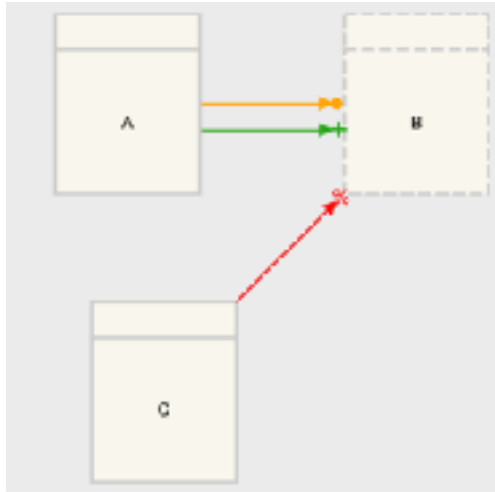
Exercises

Model the following patterns in a DCR-graph (use the simulator to verify if your model is right):
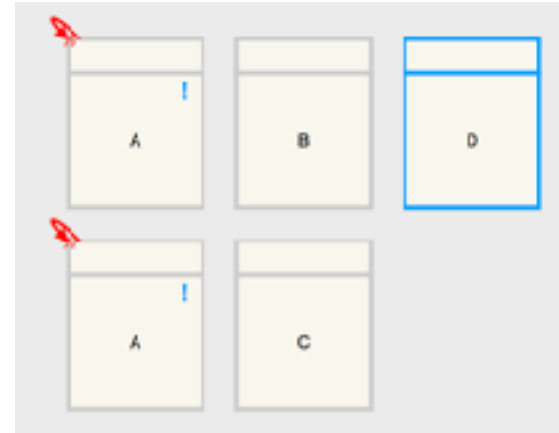
1. **Direct Precedence of a Task**. "Every time B occurs, it should be directly preceded by A." If B occurs without a directly preceding A, the rule is violated. For instance, traces ⟨ACCAAC⟩ and ⟨ABCAAB⟩ comply to the rule, whereas ⟨ABACB⟩ violates the rule.

2. **Direct Precedence or Simultaneous Occurrences of Tasks.** "Task A must always be executed simultaneously or directly before task B." (hint: consider A/B as non-atomic tasks)

3. **Bounded Existence of a Task:** Task A should be executed exactly k times." If A occurs less than or more than k times, the rule is violated. For instance, for k = 2, the trace ⟨BCADBCAD⟩ complies to this rule and ⟨BCADBCAAD⟩ violates the rule.

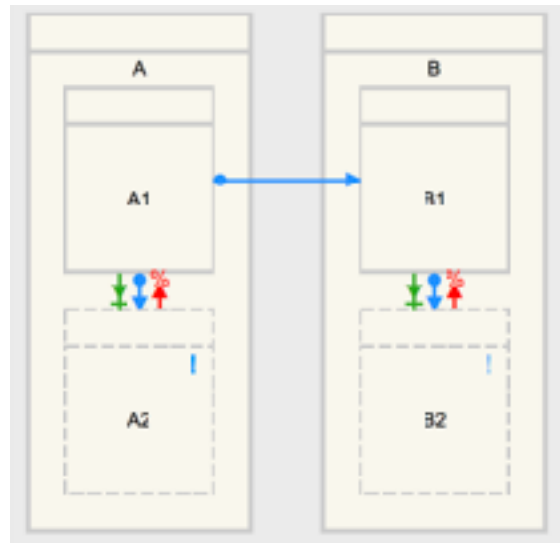4. **Execution in Between.** "Task B should be performed not before task A has been executed, and not later than C."
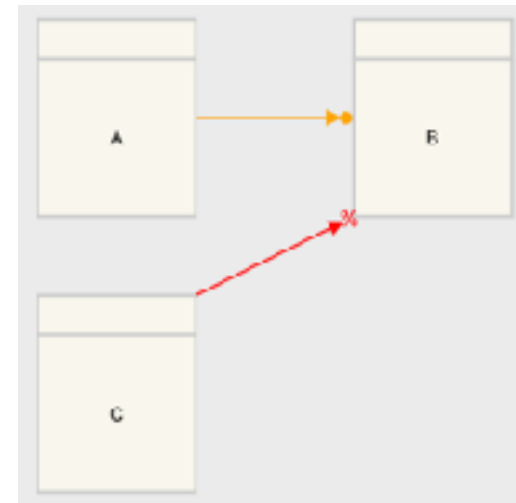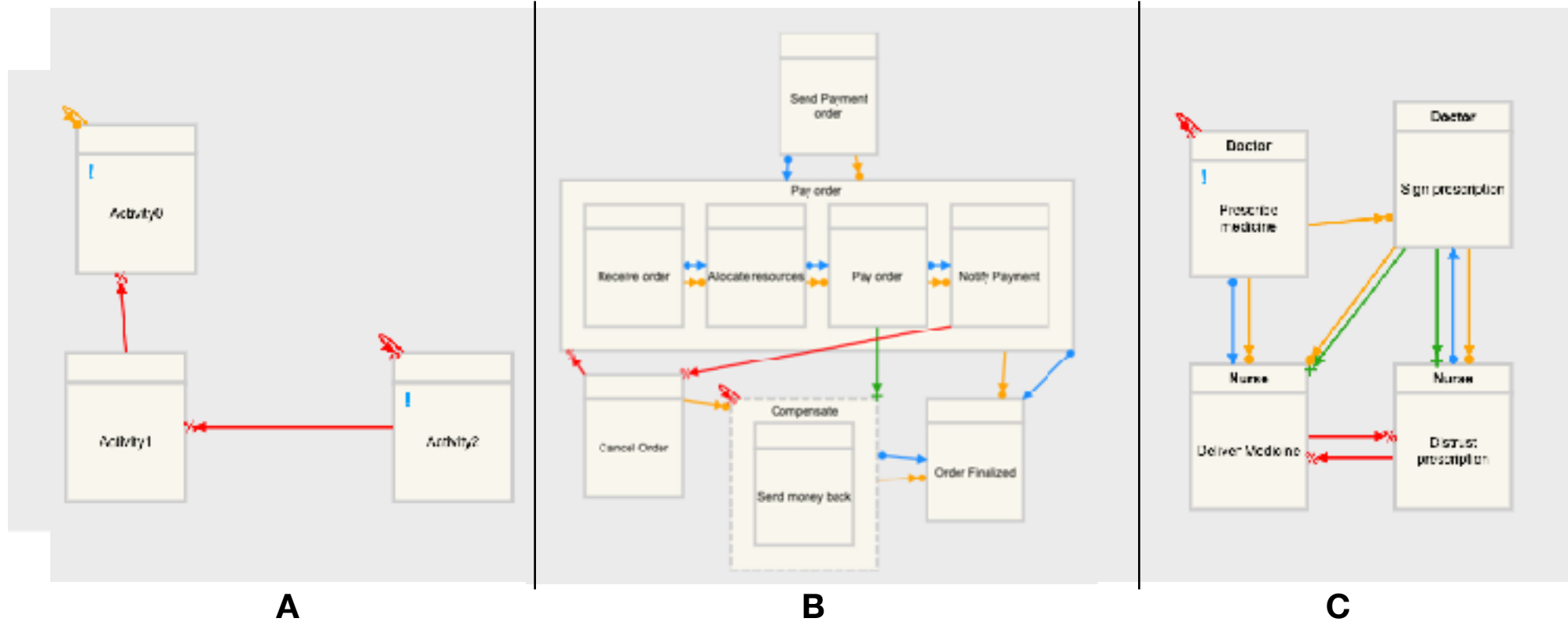
1.

2.

3.

4.

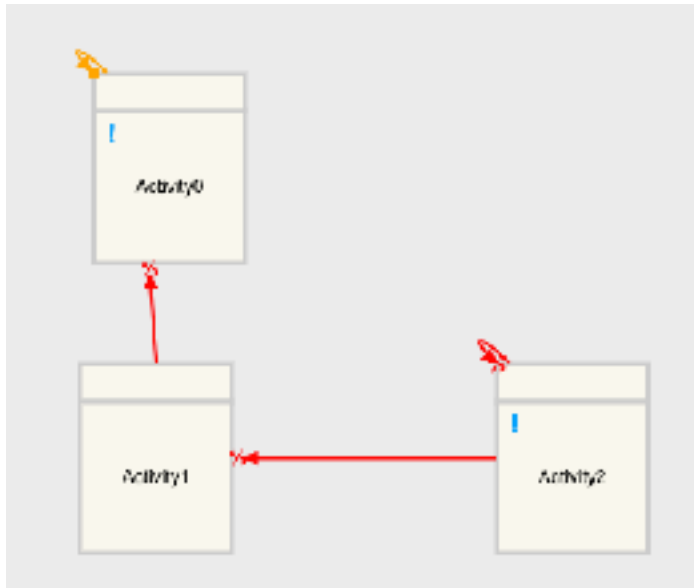# Exercises (Soundness)
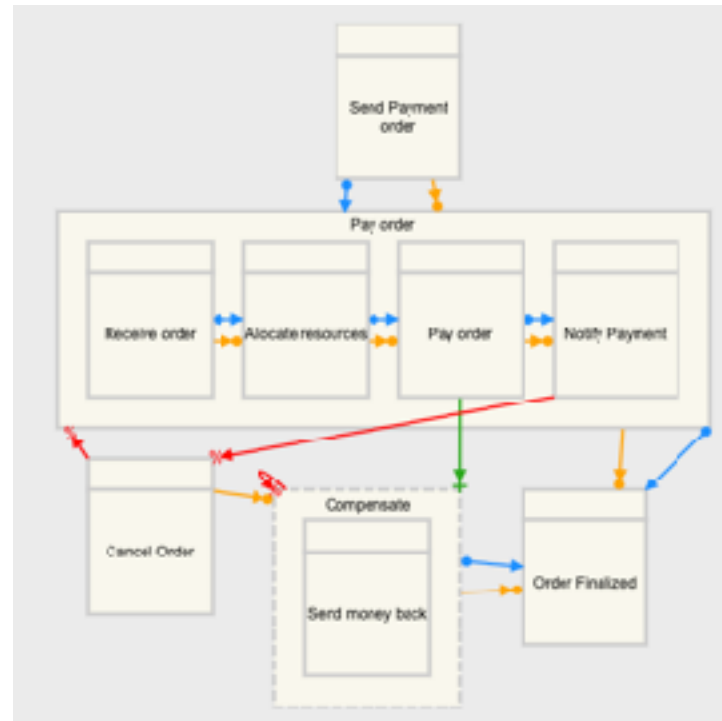
1. Discuss in pairs whether the following processes are sound:

A   B   C
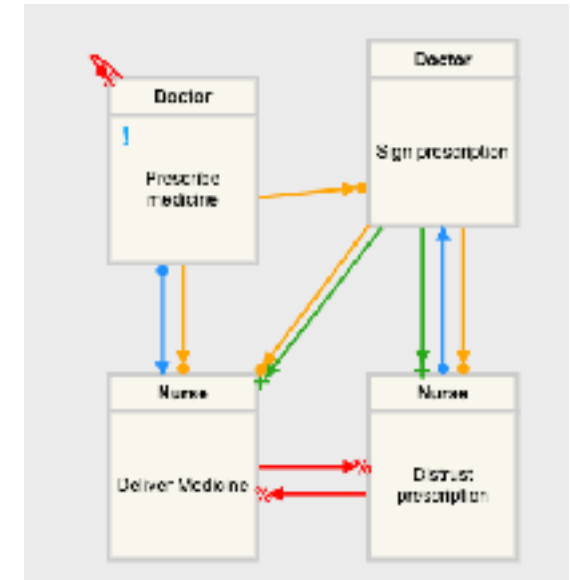
SOLUTIONS

- Sound. The trace *<Activity1, Activity2>* is an accepting trace
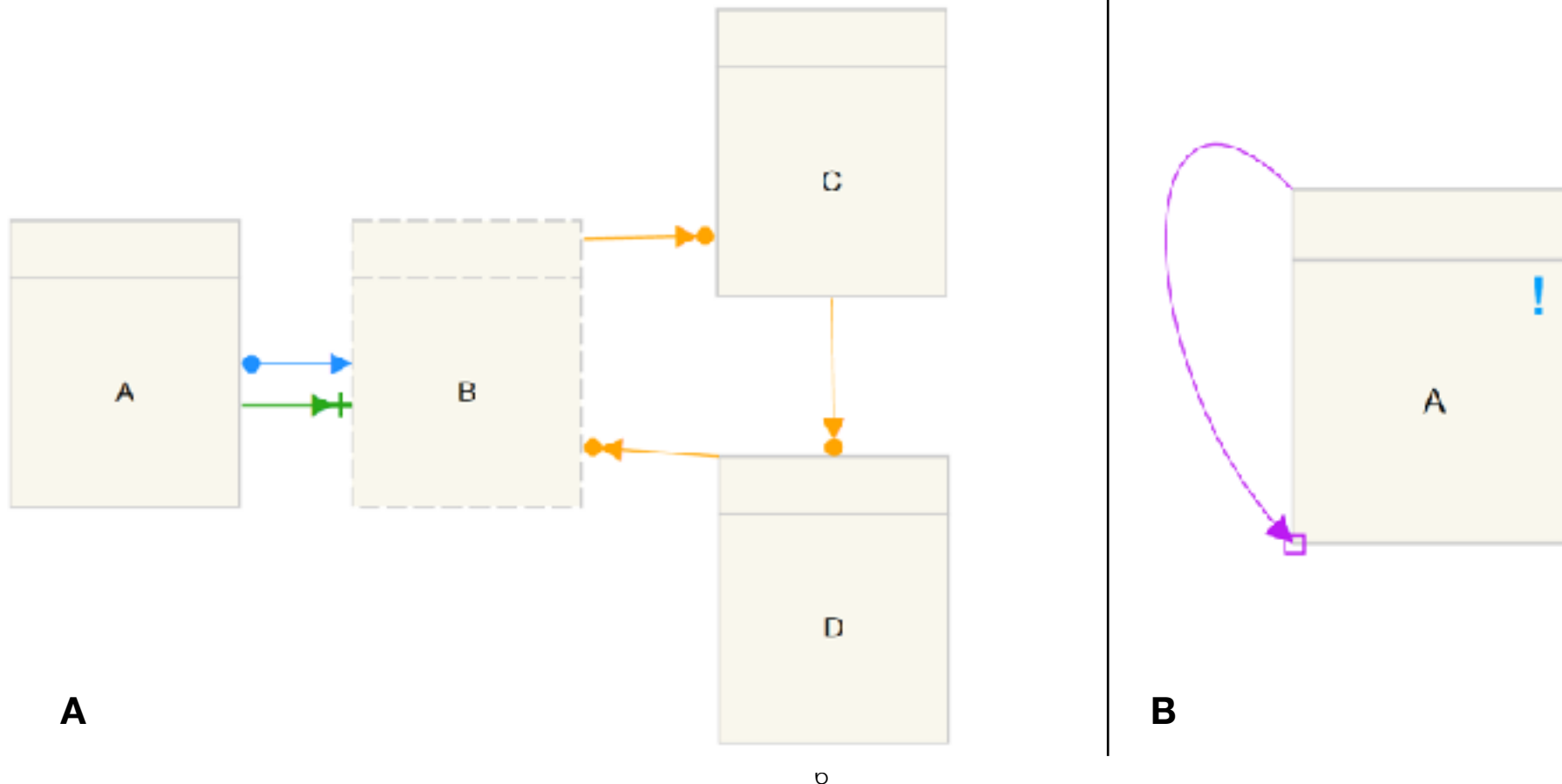
- Sound. The empty trace is valid. Moreover, the execution of *Send Payment* order generates a **finite** chain of responses
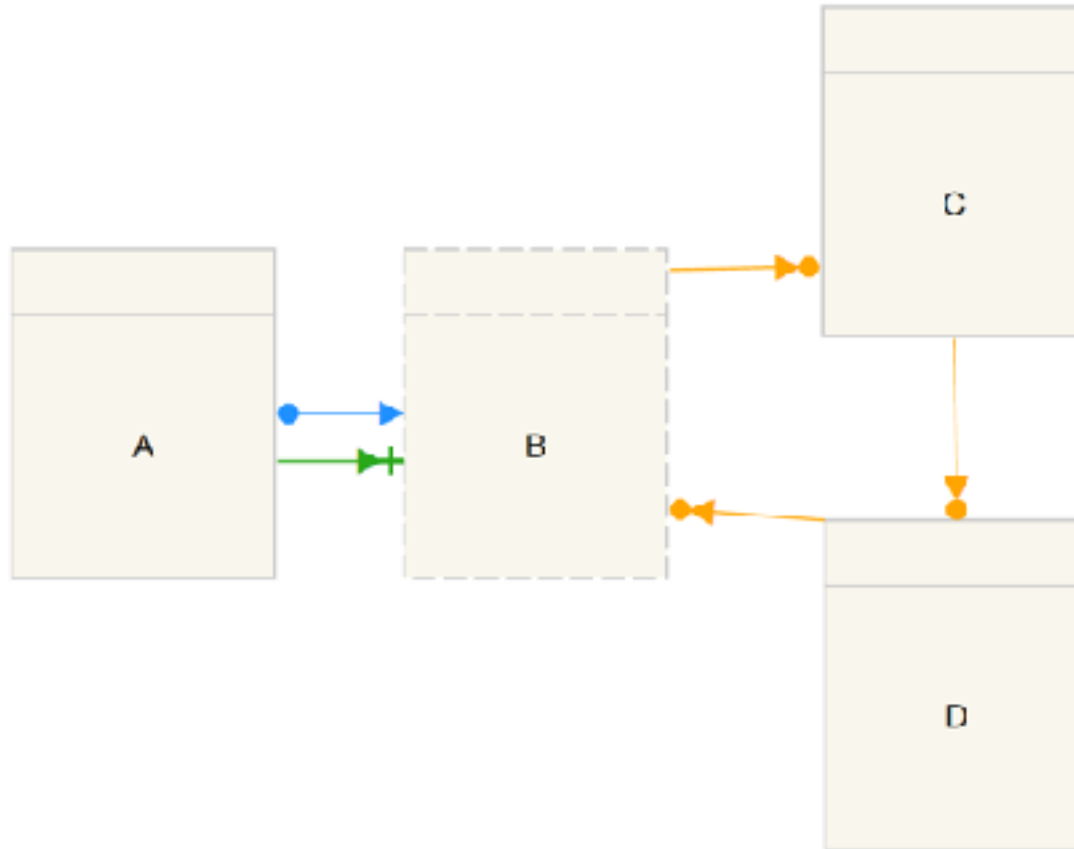
- Sound: The empty trace is not accepting, but executing *<Prescribe Medicine, Sign Prescription, Deliver Medicine>* will generate an accepting trace.
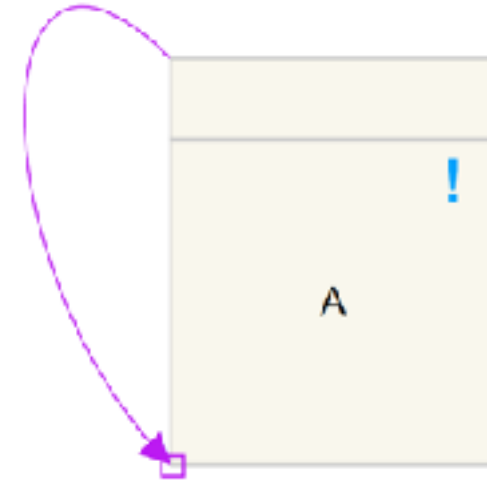
Exercise:

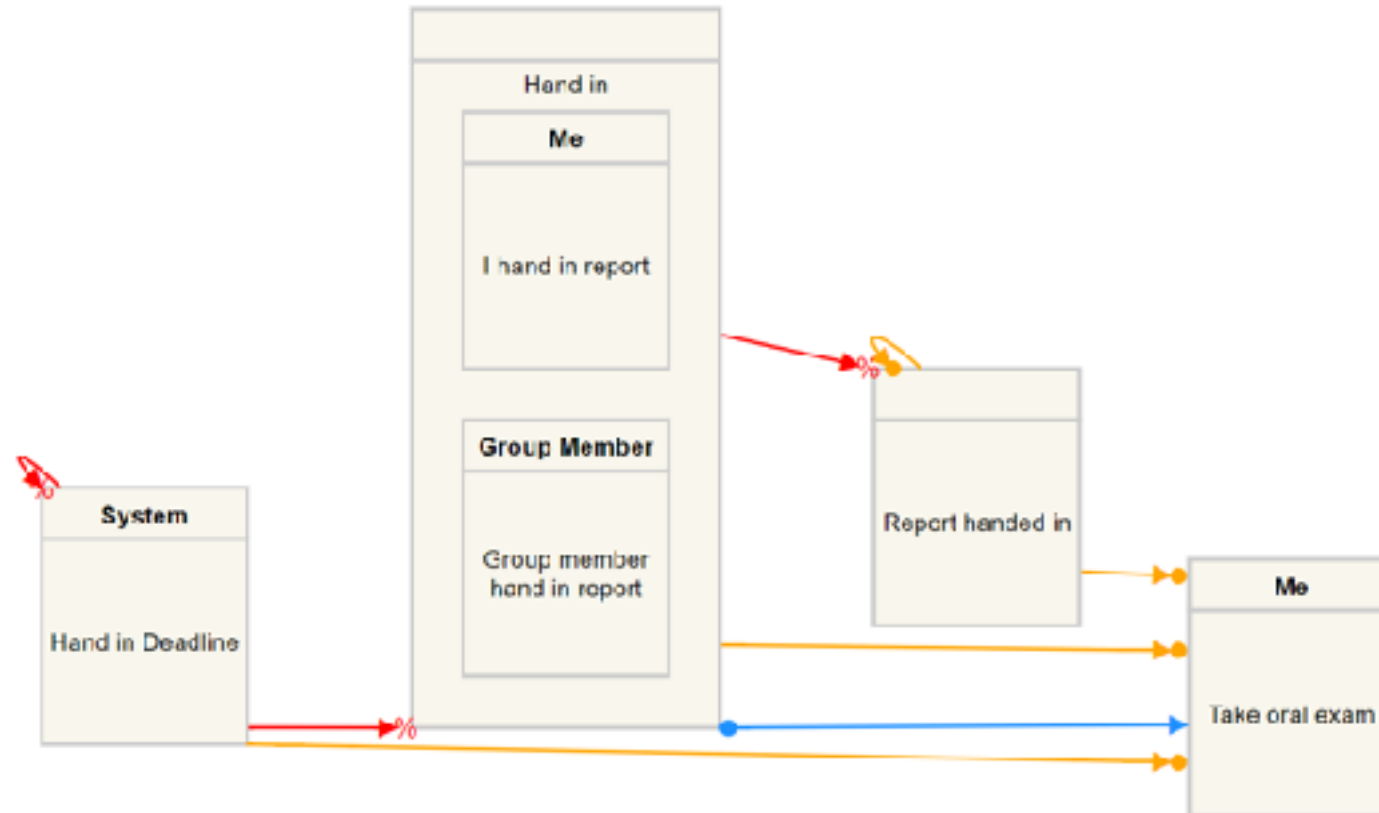2.Argument whether the following processes are sound:

A

B

6

Solutions

- Sound: if you execute *C* first, you can generate an accepting trace.
  But, if you were to start with *A*, you will generate a deadlocked process
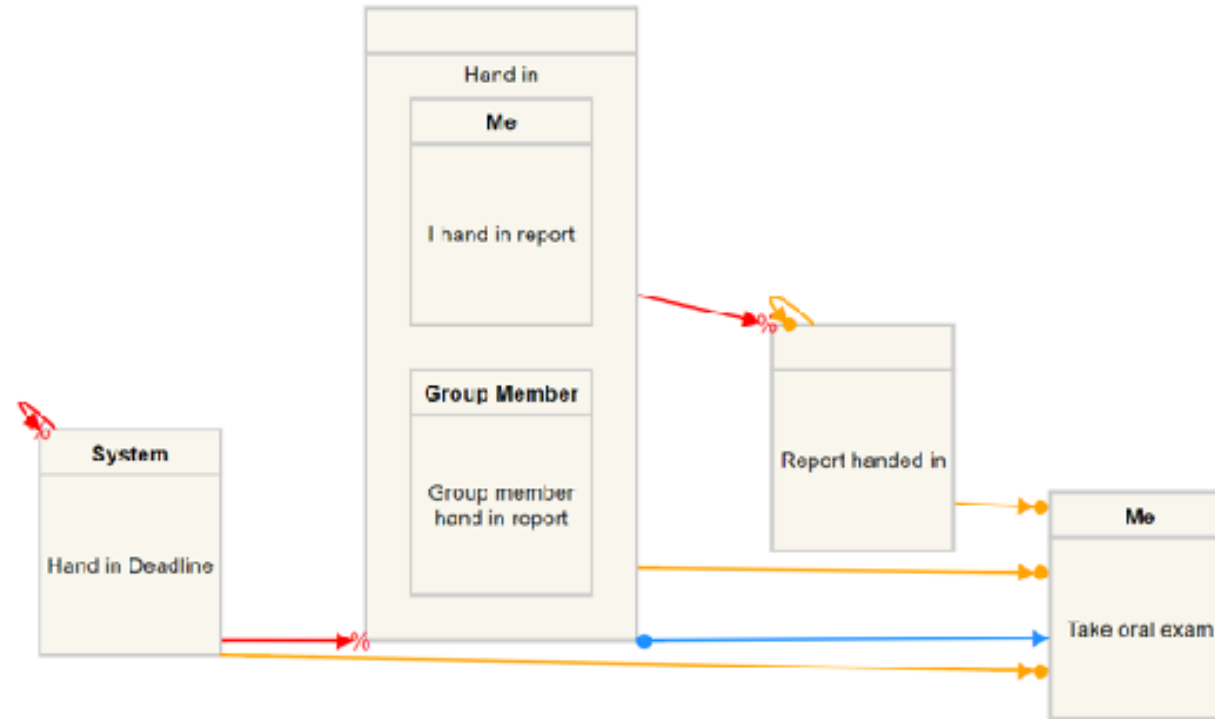
- Unsound: *A* can only be executed if the source of the milestone (*A* itself) is not pending, which is not the case.

Exercise

3.Argument whether this process is sound:

Solution

The process is sound: even if you have *Report handed in* with a cyclic dependency blocking *take oral exam*, this does not block the execution as any execution of the activities in the nesting *hand in* will exclude it.