This homework assignment has 3 problems, for a total of 56 points.

1. (8 points) Problems on dependencies and events (here ⌈ and ⌋ are delimiters)
   A. The guard produced by ⌈ e ∨ f ⌋ · e on f is ⌊ e ⌋
   B. Given exactly two dependencies that produce guards on event f of ⌈ e ⌉ and ⌊ e ⌋, respectively, we know
      that f may happen anytime
   C. If a service exposes a (significant) event, that means we can delay such an event in order to ensure that
      any stated dependencies are satisfied
   D. If a service’s event is marked as inevitable, the event must occur whether the service likes it or not

2. (30 points) Problems on collaboration
   A. A technical requirement resulting from exception handling is that the information provided by a business
      service may be tentative and subject to revisions
   B. A technical requirement resulting from supporting services that can make revisions to their results is
      that the consumers of such services be sufficiently long-lived
   C. In ontology terms, a service can fulfill a need if its input and output classes respectively subsume the
      input and output classes of the needed service
   D. Given OWL-S models for services, a valid service composition would try to invoke a service only in a
      state where its preconditions would be satisfied, possibly due to a previous service invocation
   E. Using rules we can carry out computations that are impossible to carry out using Java
   F. Ensuring the local consistency of participating agents is not adequate for supporting successful collabora-
      tion when the agents have nontrivial shared data
   G. The Distributed TMS requires that if two agents share a fact f₁, and each agent uses f₁ to justify another
      fact f₂, then the two agents also share f₂
   H. The Distributed TMS requires that if two agents share a fact f₁, and one of them justifies f₁ based on
      another fact f₀, then the two agents also share f₀
   I. Commitments are a useful basis for modeling agents in open settings because autonomous agents violate
      their commitments only if there is a physical exception such as an earthquake
   J. If you offer someone to buy their pencil for $1 and they give you their pencil, then you become uncon-
      ditionally committed to paying them $1
   K. A (conditional) commitment is discharged when its consequent becomes true
   L. A (conditional) commitment is delegated when its consequent becomes true
   M. The rejection of an offer corresponds to the release of the corresponding commitment
   N. Once a hose seller agrees to provide some hoses for a specified price, it can change the hoses but cannot
      increase the price; this means the hose seller has the disability to change the price
   O. If Amitai may permit or deny Batalagundu access to the inventory database, then Amitai has immunity
      from Batalagundu with respect to the inventory database

3. (18 points) Problems on communications
   A. A web services conversation specifies the allowed orderings of the interactions that a service and its
      client can carry out
B. A choreography describes an interaction from the local view of each participant.

C. Communications are an important class of interactions because they support the autonomy of the parties involved.

D. The three elements of a communicative act are locution, illocution, and perlocution.

E. Unlike traditional settings, perlocutions provide the right basis for communicative acts in open, service-oriented settings.

F. Unlike in a traditional finite state machine, the states of a commitment machine are specified using logic and each transition corresponds to the meaning of the message that labels the transition.

G. In an open environment, two agents might sometimes need to combine their local observations in order to determine that a third agent is complying with its commitments.

H. Vector clocks can be used for synchronous messaging provided that when a message is sent, you set the sender and receiver of a message to have the same vector clocks.

I. Consider a system of two agents, each of whom sends exactly one message to the other; then when both messages have arrived, the two agents have equal vector clocks.