



# PROPOSED SOLUTION OBLIG-II

# Note

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- There was an unfortunate mistake in the Oblig-II task formulation. The message **logout** in **Interview** should have been **finish** as in **Interview'**.
- I'm sorry!
- The proposed solution assumes that this bug has been corrected.

# 1 a)

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- What are the potential initial events of **sd** interview. Explain your answer. (Hint: there is more than one)
- Answer: There are two:
  - !open application
  - !question

# 1 b)

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- What are the potential last events of **sd** interview. Explain your answer. (Hint: there is more than one)
- Answer: There are two:
  - ?close
  - ?answer

# I c)

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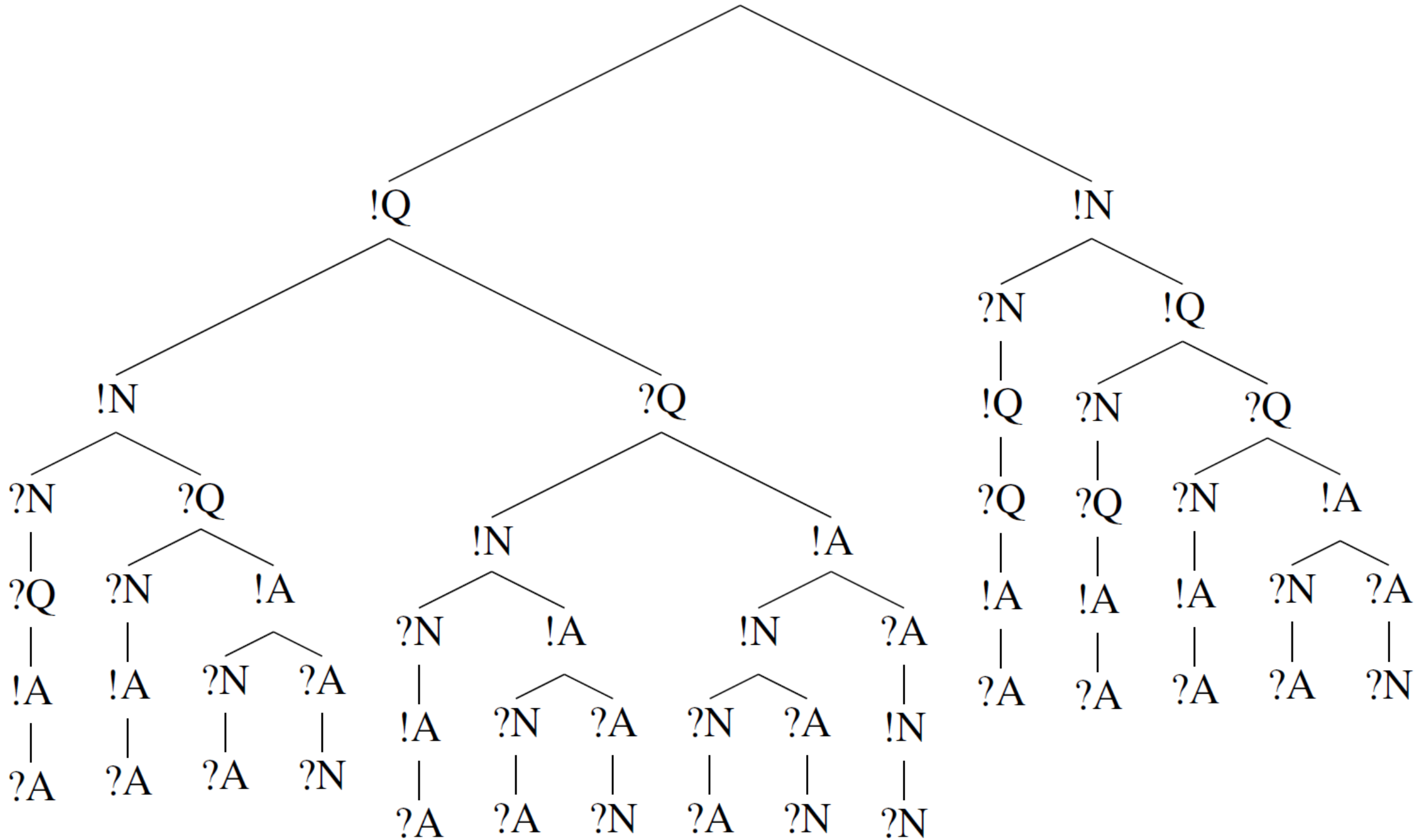
- Consider the first operand of the **alt** construct. Make a tree describing all possible traces of this operand.
  
- Answer: See next page
  - N is shorthand for note
  - Q is shorthand for question



# I c)

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- Consider the second operand of the **alt** construct. Make a tree describing all possible traces of this operand.
  
- Answer: See next page
  - N is shorthand for note
  - Q is shorthand for question





## II a)

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- Is **sd** interview' a narrowing of **sd** interview? Explain your answer.
- Answer: **sd** interview' contains negative traces that are inconclusive in **sd** interview. Since narrowing by definition leaves the set of inconclusive traces unchanged it is not a narrowing.

## II b)

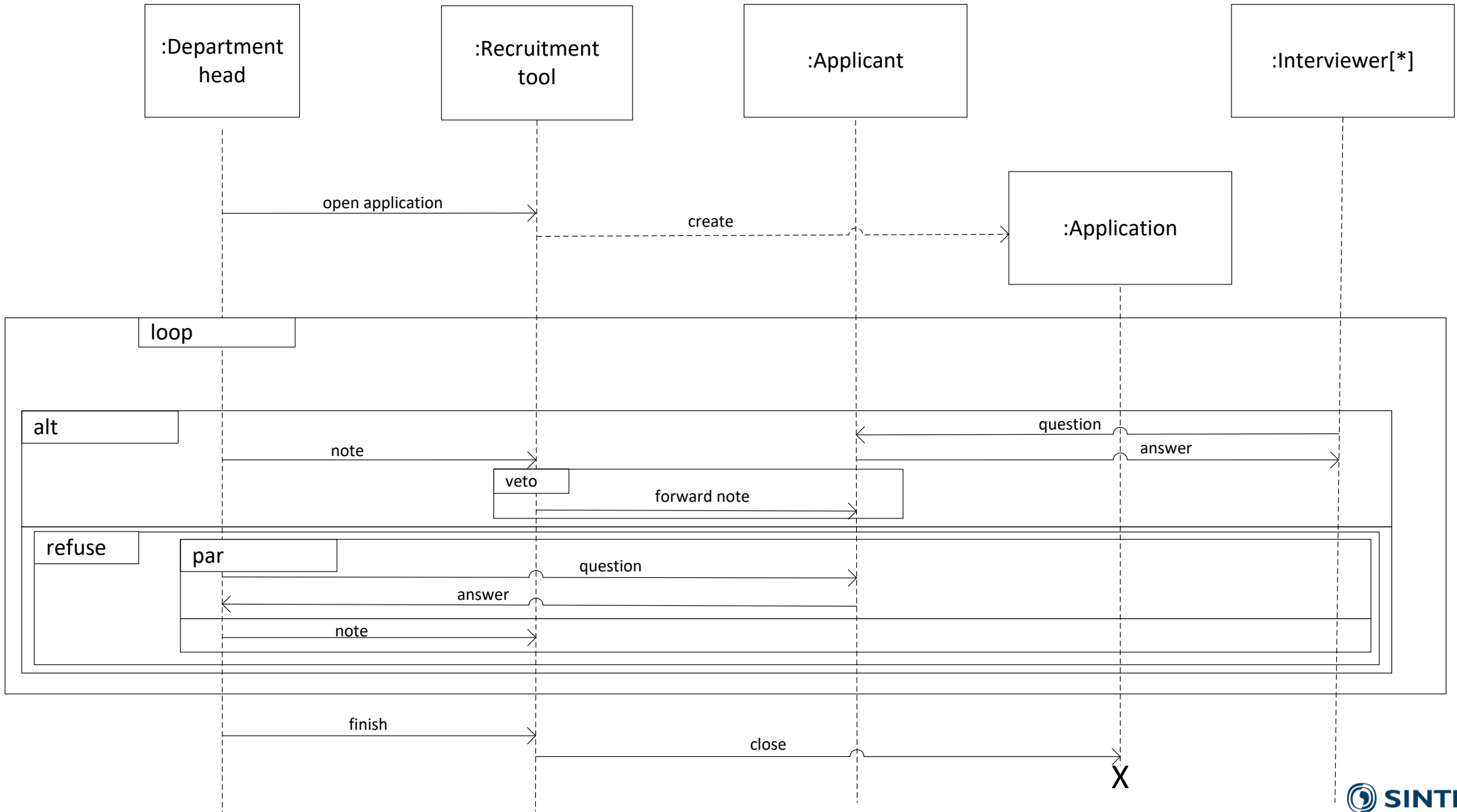
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- Is **sd** interview' a supplementing of **sd** interview? Explain your answer.
- Answer: The positive traces of **sd** interview' are exactly the same as for **sd** interview. **sd** interview is without negative traces while **sd** interview' describes a set of negative traces that are inconclusive in **sd** interview. By definition, this means we have a supplementing.

## II c)

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- Make a diagram **sd** interview'' that is a narrowing of **sd** interview'. Explain your answer.
- Answer: By surrounding the par-construct in the second operand of the alt-construct with a refuse (see next page), we make the traces corresponding to the second operand of the alt-construct negative. The traces corresponding to the first operand of alt remains positive and the inconclusive traces are unchanged. Hence, the result is a narrowing.



## II d)

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- Let **sd** interview''' be the sequence diagram obtained from **sd** interview' by replacing **alt** with **xalt**. How many interaction obligations is there in [[**sd** interview''']] (in the semantics of **sd** interview''')?
- Answer: We get  $2 * N$  where  $N$  is the number of iterations. The loop may iterate any finite or infinite number. Hence, the answer is infinitely many.

## II e)

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- Is **sd** interview''' a refinement of **sd** interview'? Explain your answer.
- It is not, because each interaction obligation in the semantics **sd** interview''' has inconclusive traces that are not inconclusive in **sd** interview'.
- Note that strictly speaking an event also contains information about its sender and receiver. Hence, a sending event is of the form !(m, sending lifeline, receiving lifeline) and not just !m. This means that the positive traces of the two operands actually are different because they involve different lifelines.

## III a)

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- What is the shortest possible positive trace of **sm** Recruitment tool?
- Answer: The empty trace  $\langle \rangle$  since it does nothing if it receives no input.

## III b)

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- Describe one negative trace of **sm** Recruitment tool.
- Answer: The machine cannot produce the following trace which means that it is negative
  - <?open application, !close>



## III c)

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- How many positive traces is there for **sm** Recruitment tool?
- Answer: Infinitely many. It may loop forever or it may stop at any point.

# IV)

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- Is **sm** Recrutement tool a refinement of the sequence diagram **sd** tool?
- Answer: It is. Any positive behavior of of the sequence diagram is allowed by the state machine. No negative behaviour of the sequence diagram is allowed by the state machine.



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