Contents & Goals

Last Lecture:
• System configuration
• Transformer
• Action language: skip, update, send

This Lecture:
• Educational Objectives:
  Capabilities for following tasks/questions.
  • What does this State Machine mean? What happens if I inject this event?
  • Can you please model the following behaviour.
  • What is: Signal, Event, Ethereal, Transformer, Step, RTC.

Content:
• Transformers for Action Language
• Run-to-completion Step
• Putting It All Together
Our choice of observables: not defined if one of the two intermediate "microsteps" is not defined.

\[
\begin{align*}
\text{destroy} & \models \emptyset, \perp, \{ \}
\end{align*}
\]

Clear •

\[
\begin{align*}
\text{dom}(I) & = \text{expr}/C2, \text{ε} \cup \text{expr}/C3, \text{σ}, \text{ε} \in C, \text{σ, ε} \text{ are arbitrary, i.e.,} \\
\text{Obs} & = \text{create}: \text{expr} \\
\text{obs} & = \text{destroy}: \text{expr}
\end{align*}
\]

\[
\begin{align*}
\text{destroy} & \models \text{create} & \text{create} & \models \text{destroy}
\end{align*}
\]
(i) The system is mapped to a class called Constraint

(ii) A core state machine

(iii) Run-to-completion processing by σ, i.e., if a class 

(iv) The environment interacts with object

Note: The following RTC "algorithm" follows

We'll later briefly discuss the Rhapsody framework which proposes a way
Examples
We can read that as an abbreviation for an object diagram. In other words: even in presence of mis-
other objects. Adding classes (or even objects) may change the divergence behavior of exis-
ting ones.

Divergence

\[ M_{\sigma} \rightarrow \sigma, \varepsilon \]

Note: initial states

\[ S \]

Want the same divergentness as of the object model.

In the projection onto a single object we still see the effect of interaction with
other objects. In the case of a single object, we can diverge, even if it is
not divergent alone. Therefore, we need to consider the interactions between
different objects.

The Missing Piece: Initial States

By the current definitions, it's neither divergence nor an RTC-step.

What people may dislike is that our definition of RTC-step is that it takes a
non-compositional step: Let object only communicate by events, i.e.
(B)

\[ \text{Referto private features only via "self".} \]

(OCL Constraints and Behaviour)

Proof left as exercise...

\( (\text{Cf. exercises and tutorial for discussion of "reasonable point".}) \)

Putting It All Together

Our semantics and notion of RTC-step doesn't have this (often desired) property.

Maybe an interleaving of local ones?

Can we give (syntactical) criteria such that any global run-to-completion step
becomes stable again.

Maybe it's an interaction of local ones?

This is a set of object diagrams over
\( G \in \sigma | \emptyset, \varepsilon \{ \} = S \).

\( M \) is consistent.

\[ \text{For each "reasonable point"} \]

\[ inv \text{ of computation of } M \]

\[ M = (M_0, S) \]

\[ \text{as part of a UML model} \]

\[ \text{OD} \in \sigma | \emptyset, \varepsilon \{ \} = S \]

\[ \text{Other Approach} \]

\[ \text{OD} \]

\[ \text{if} \]

\[ \text{Not common} \]

\[ \text{M} \]

\[ \text{is inconsistent.} \]

\[ \text{If the developer makes a mistake, then} \]

\[ \text{we never move to inconsistent configurations.} \]

\[ \text{We call} \]

\[ \text{the effect of interaction with} \]

\[ \text{other objects.} \]

\[ \text{In the projection onto a single object we still see the effect of interaction with} \]

\[ \text{other objects.} \]

\[ \text{Therefore, we need to consider the interactions between different objects.} \]

\[ \text{The Missing Piece: Initial States} \]

\[ \text{Putting It All Together} \]

\[ \text{Our semantics and notion of RTC-step doesn't have this (often desired) property.} \]

\[ \text{Maybe it's an interaction of local ones?} \]

\[ \text{Can we give (syntactical) criteria such that any global run-to-completion step} \]

\[ \text{becomes stable again.} \]

\[ \text{Maybe it's an interaction of local ones?} \]

\[ \text{This is a set of object diagrams over} \]

\[ G \in \sigma | \emptyset, \varepsilon \{ \} = S \]
References


