REMES Tool-chain

A Set of Integrated Tools for Behavioral Modeling and Analysis of Embedded Systems

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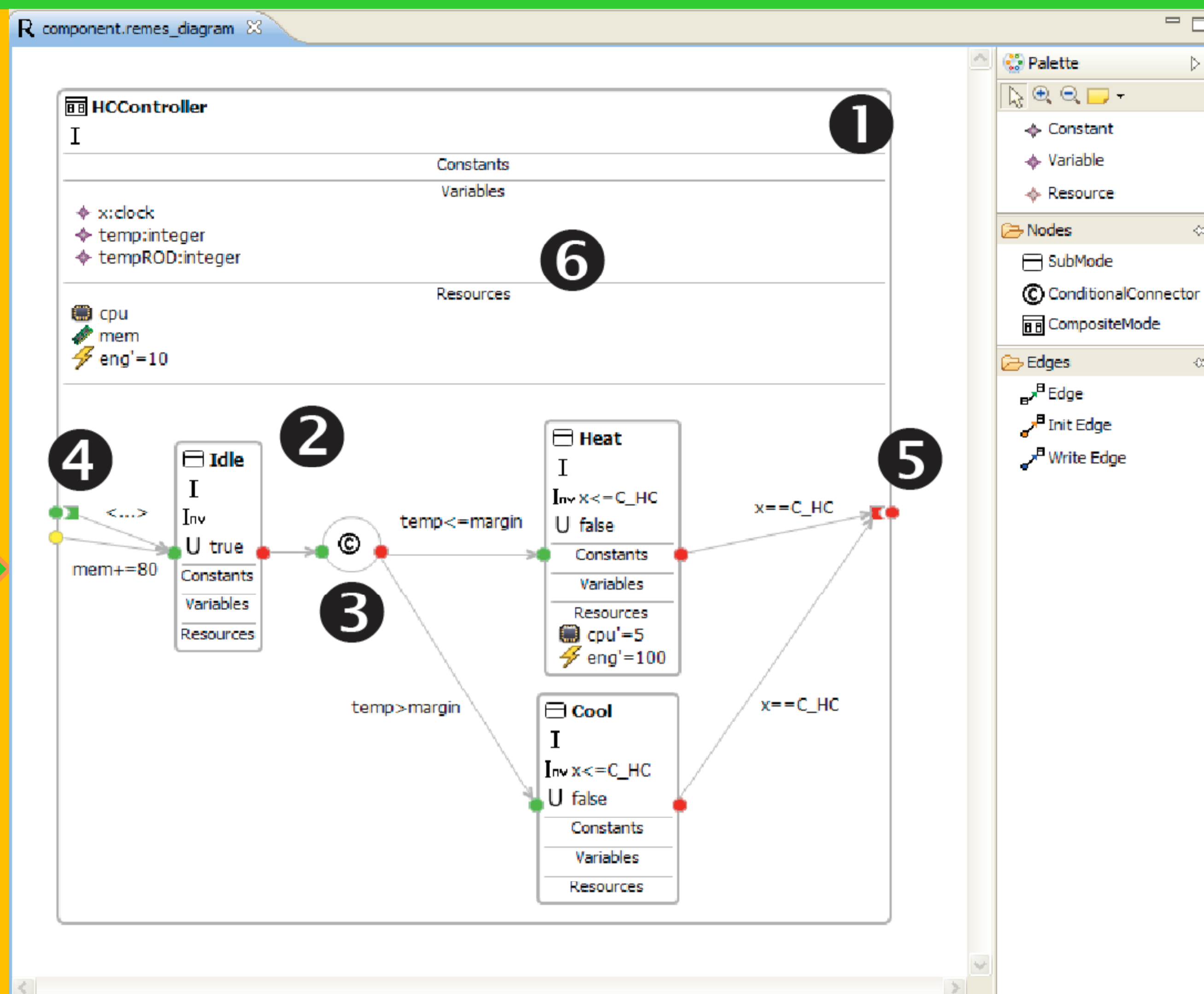*The REMES tool-chain consists of the following three tools:*
(i) a REMES editor for modeling behaviors of embedded components,
(ii) a REMES simulator to test timing and resource behavior prior to formal analysis,
(iii) an automated transformation from REMES to Priced Timed Automata, needed for formal analysis.


(i)

System designer — uses

REMES Editor

– GUI to create formal behavioral models of components
– Based on ECore Models + EMF/GMF
– ❶ A composite mode consists of :
  - ❷ several submodes (atomic modes)
  - ❸ edges and conditional connectors that connect the submodes
  - ❹ init- and entry points through which the modes are entered
  - ❺ exit points through which the modes are exited
  - ❻ number of associated constants, variables, and resources displayed in separate compartments components.

M2M   M2M
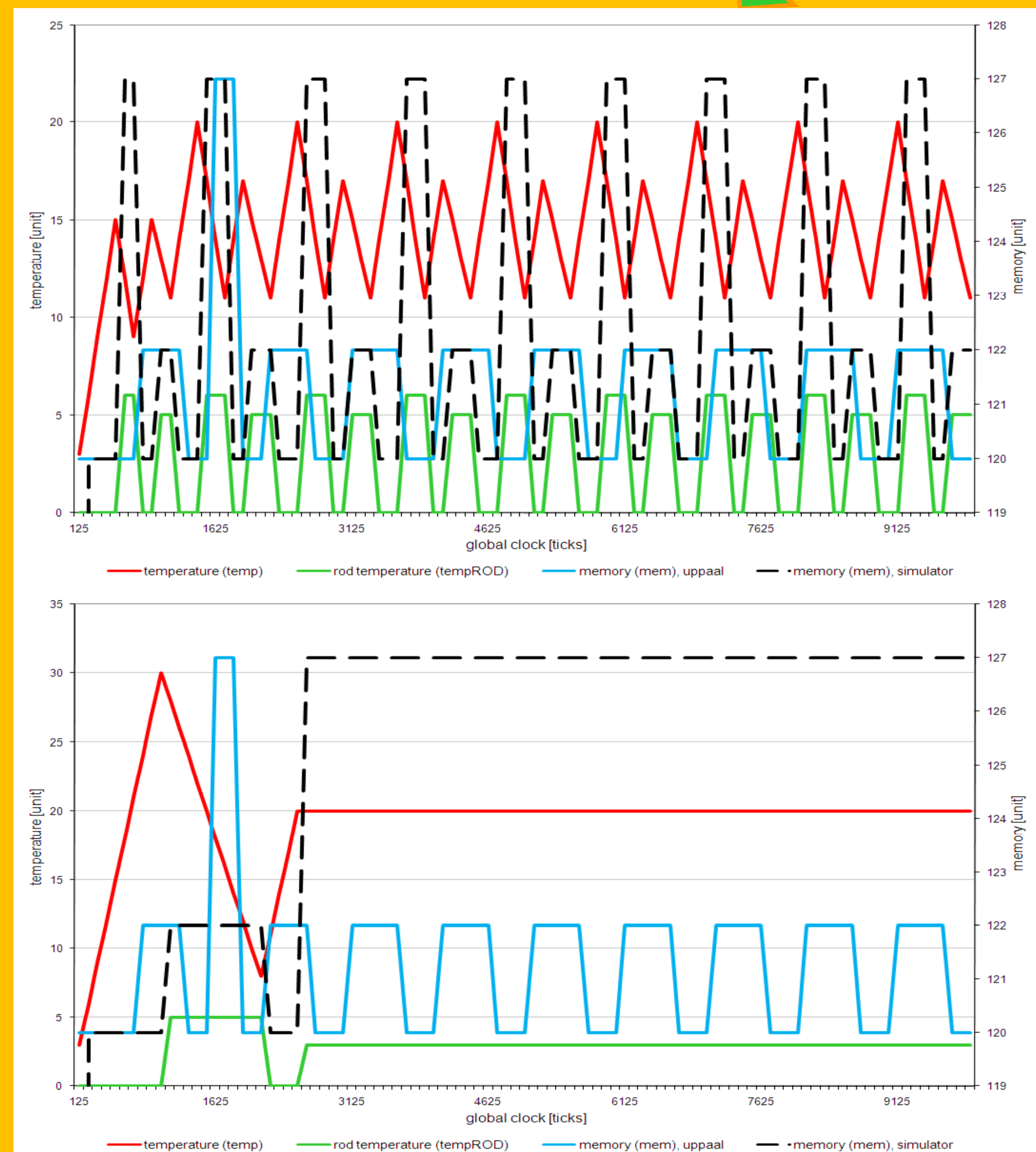
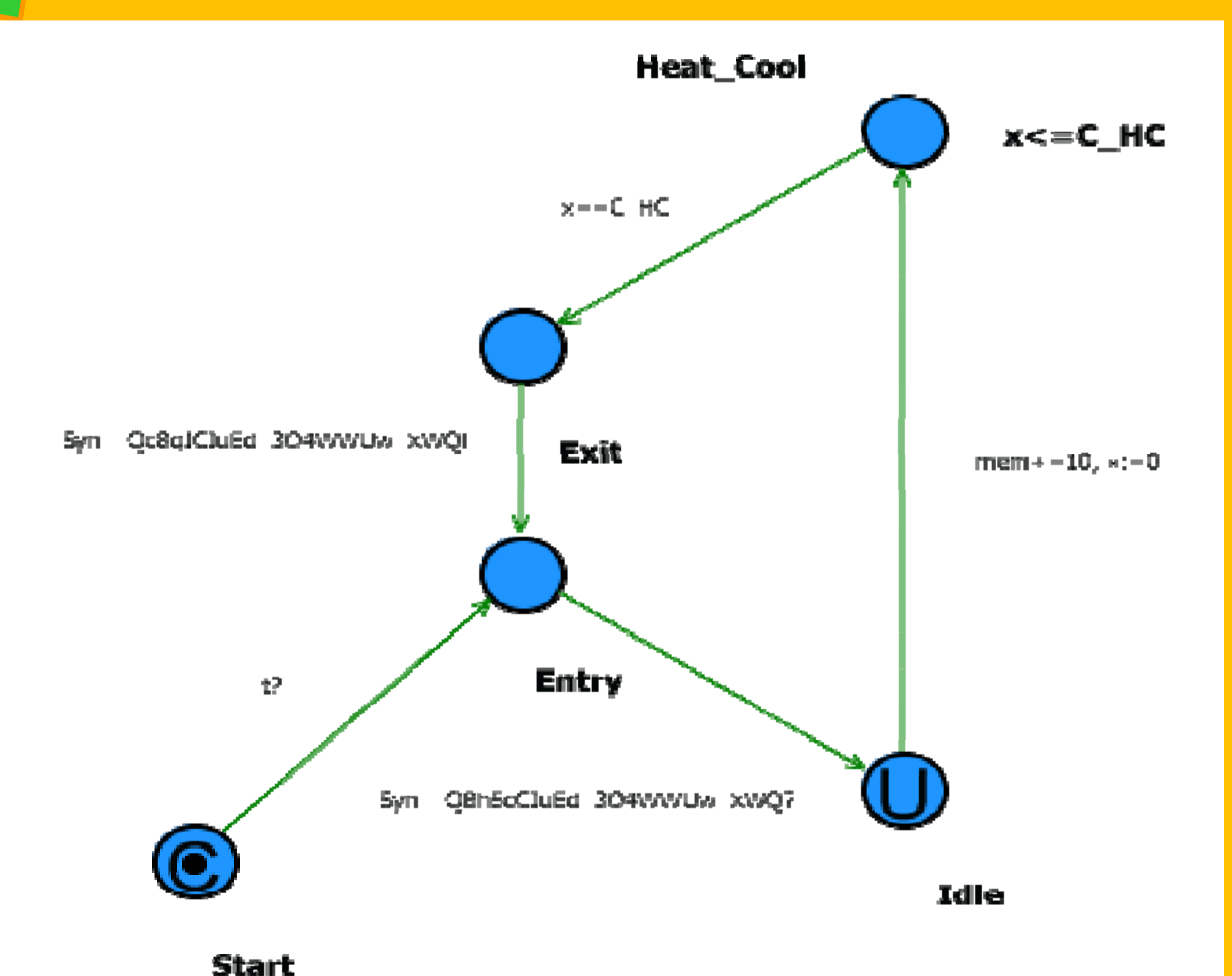**(ii)**   **(iii)**

tests behavior

!

verifies behavior

Uppaal/ Uppaal Cora tools

REMES Simulator

– Model to model transformation to transform behaviors into source code that simulates the modeled system.
– Transformation performed over intermediate models created from REMES models.
– The main benefit of the simulator is its ability to track each resource as a separate variable.

Transforming REMES to PTA

– Transformation implemented by the model to model transformation language ATL (Atlas Transformation Language)
– The transformation rules applied to REMES diagrams result in UppaalLite models representing the same behavior.
– UppalLite editor is a tool to visually inspect transformation results.
– Formal analysis:
  - Feasibility analysis
  - Optimal and worst-case resource consumption
  - Trade-off analysis

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