

MODEL CHECKING FOR MULTI-AGENT BASED MODELS

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INTRODUCTION

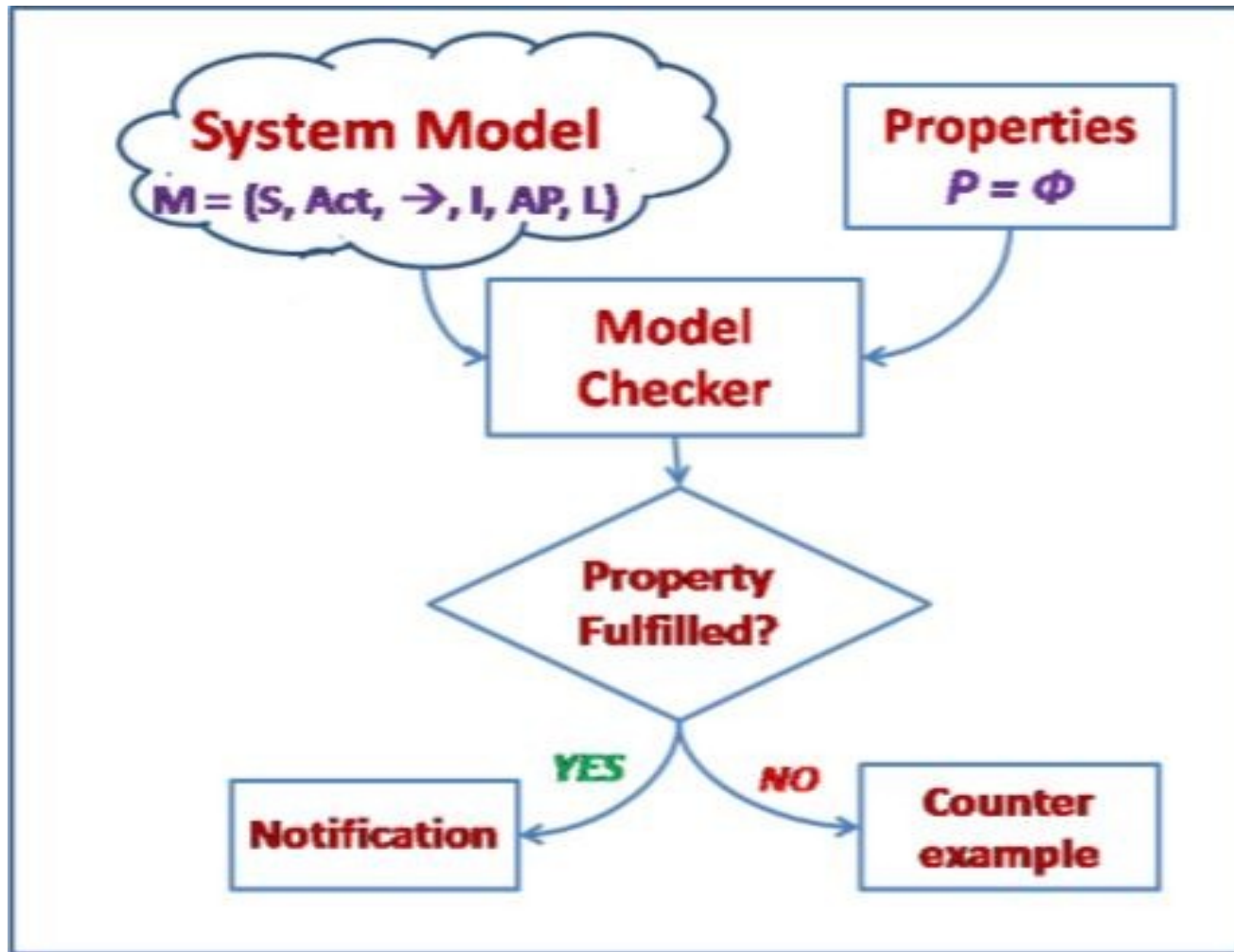
- What is Model Checking?

Model checking is an automated technique that, given a finite-state model of a system and a formal property, systematically checks whether this property holds for that model.

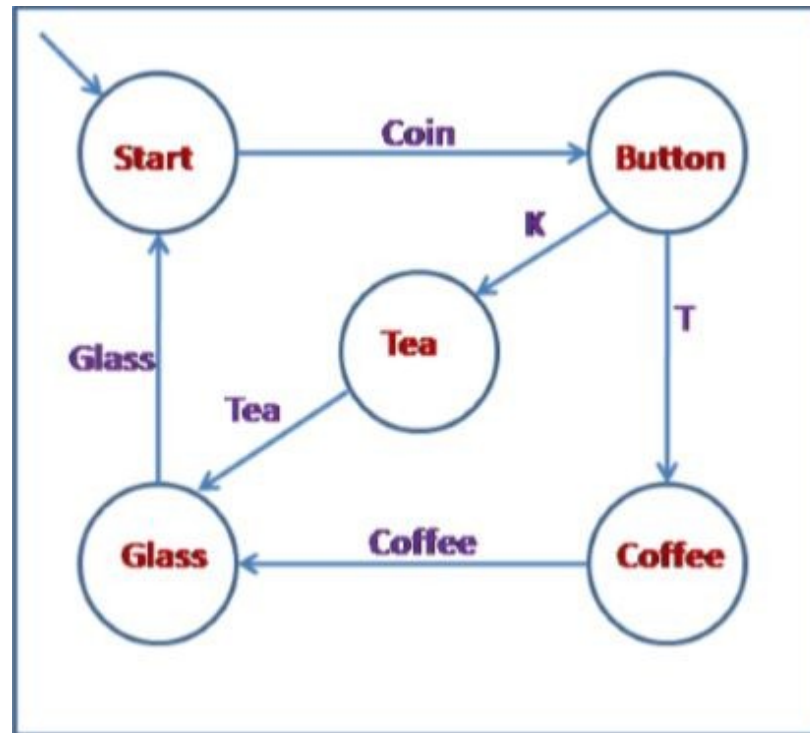
- Why is it useful?

- To validate the system before implementation.
- To reduce cost by predicting design defects.

FLOW OF MODEL CHECKING



EXAMPLE: Coffee Machine



- Property: “Always, after the machine gets a coin and the user press a button, it gives coffee or tea”
- Example:
ALWAYS S (IF button THEN
(SOMETIME – IN – THE – FUTURE (coffee OR tea)))

MC2MABS

- MC2MABS is a tool which stands for **Monte Carlo Model for MultiAgent-Based Simulations**.
- MC2MABS is **Checker** designed as a framework which incorporates the idea of statistical runtime verification and whose central characteristic is the interleaving of simulation and property evaluation. The framework consists of two central parts:
 - (i) a simulator which represents a framework that hosts custom model logic provided in a high-level programming language (C++) and performs the execution of the simulation, and
 - (ii) a monitor which implements the algorithms and evaluates a given property upon the traces produced by the simulator.

References:

- “MC2MAB “website.<https://github.com/bherd/mc2mabs>. Access: 02/15
- “MC2MABS: A Monte Carlo Model Checker for Multiagent-based Simulations” Benjamin Herd, Simon Miles, Peter McBurney, and Michael Luck Department of Informatics, King’s College London, United Kingdom.
- “MC2MABS(simulator)” 0.1 Generated by Doxygen 1.8.4 Sun Oct 12 2014 18:00:45
- “MC2MABS(Verifier)” V0.1 Benjamin C. Herd October 16, 2014