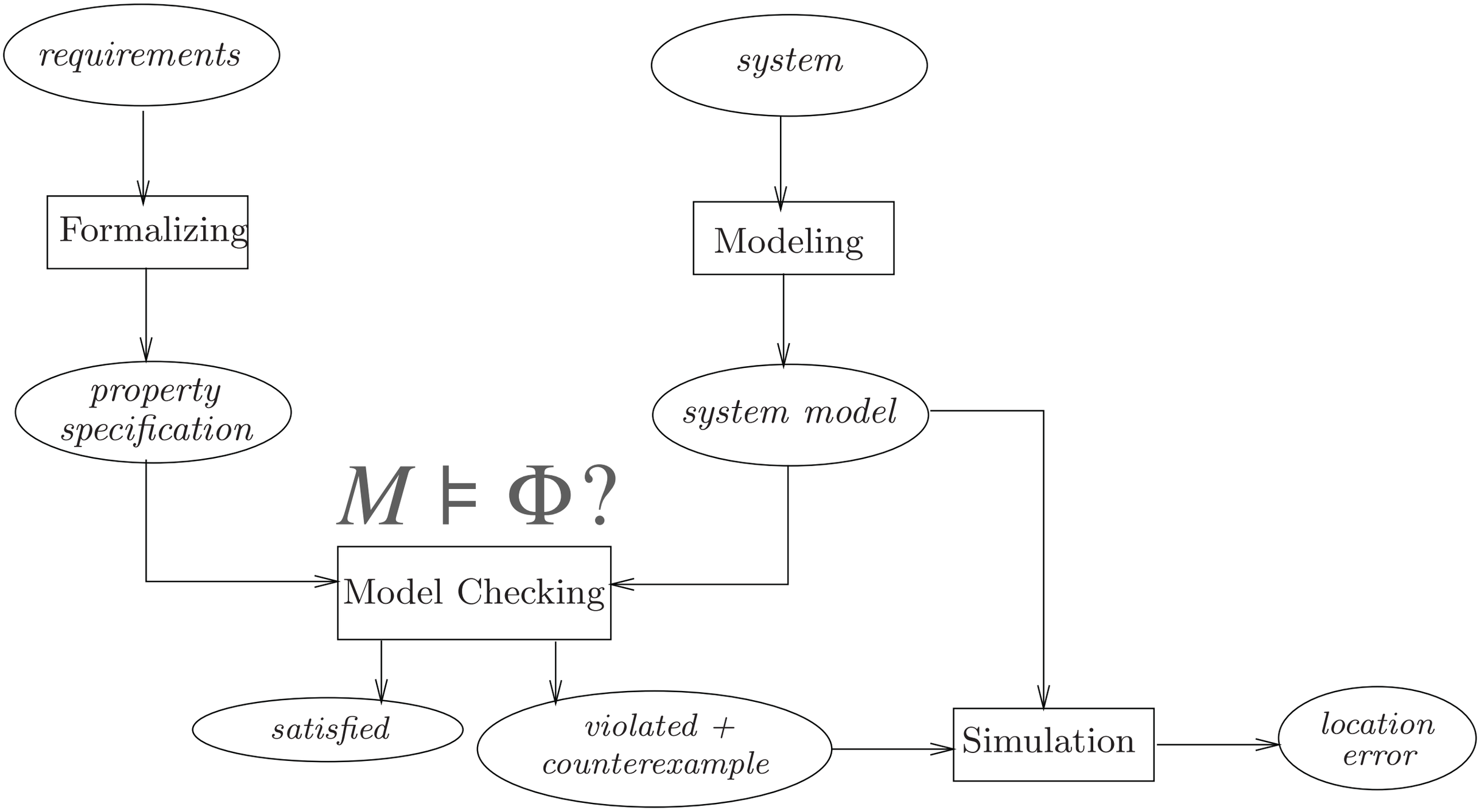
Model Checking

$$M \models \Phi ?$$

Introduction

adapted from slides by Alberto Lluch Lafuente, Technical University of Denmark, Fall 2020
based on material from the book “Principles of Model Checking” by Christel Baier and Joost-Pieter Katoen

What is Model Checking?



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- *Analysis* phase:
  - property satisfied? → check next property (if any);
  - property violated? →
    1. analyse generated counterexample by simulation;
    2. refine the model, design or property;
    3. repeat the entire procedure.
  - out of memory? → try to reduce the model and try again.

System

refine/implement

Requirements

abstract model

$M \models \Phi$?

some logic here

Finite-state transition System

some smart algorithm here

yes ☺

may be 😐

no ☹

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- *Sound and mathematical underpinning*, based on theory of graph algorithms, data structures and logic.

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- Correct results not guaranteed: as any other tool, it may contain *software defects*;