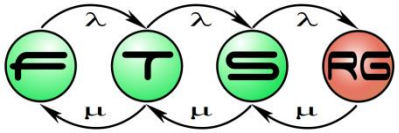
System Modelling
Introduction to the Home Assignment

Budapest University of Technology and Economics
Fault Tolerant Systems Research Group



Motivation

- Modelling skills:
  - Working with software components (borders, interfaces)
  - Definition of **States** of a complex system
  - Modelling **Events** and **Transitions**
  - Experience with the broader **Modelling Paradigm**
- Gain:
  - Experience with a **Modelling Environment**
  - Own **Design** of a system model
  - Application development **without Coding**
  - Validation: Simulation + Testing + …

Home Assignment: Digital Chess Clock

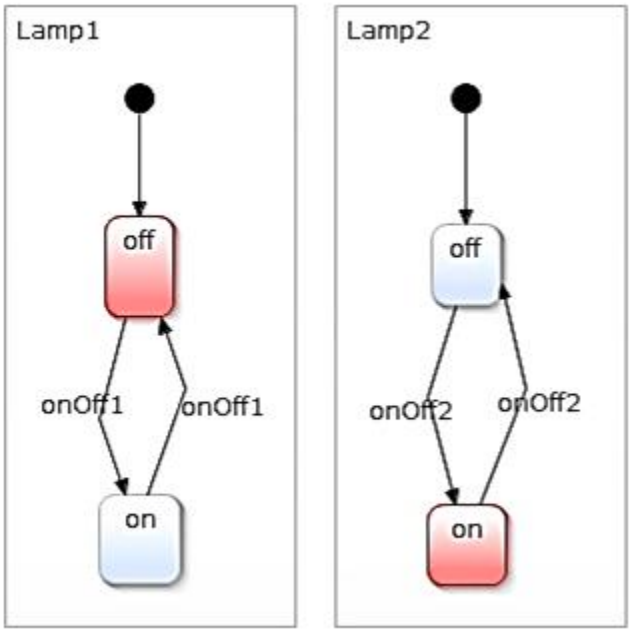
- **Behavioural modelling of a chess clock**
- Shows the **remaining time** of both player
- **Warns** when a player exceeds his time
- **Tuneable** parameters (e.g. initial time)

Yakindu: Introduction

- Statechart modelling environment
  - simple user interface
  - platform independent model
    Phone-App ⇔ platform specific code gen.

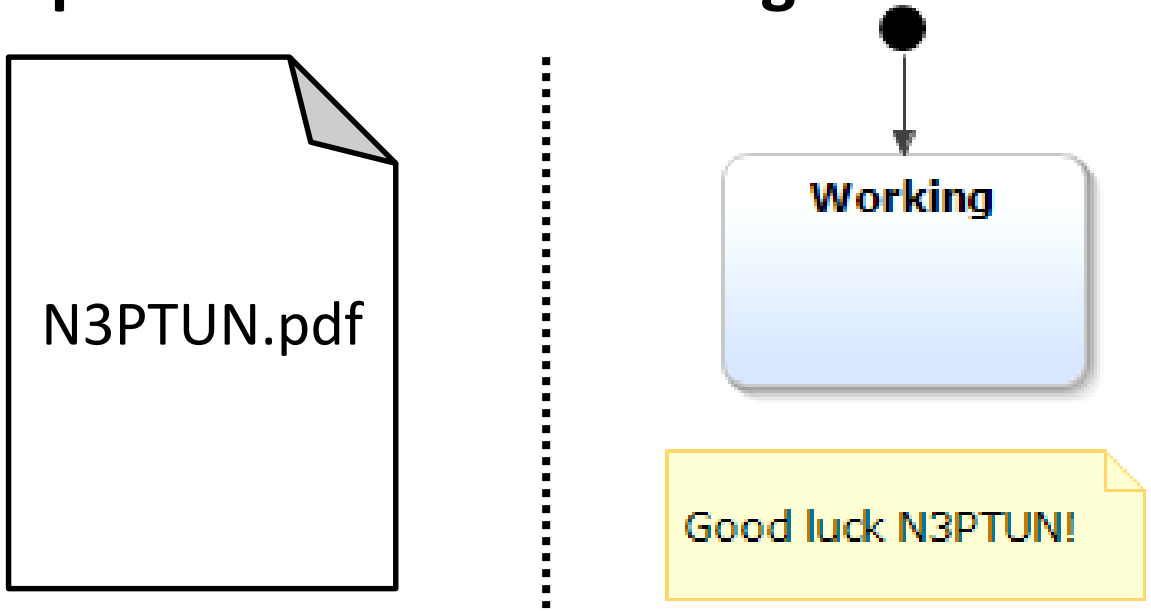
YAKINDU

- Editing of models
- Simulation
- Automatic code generation:
  Model → C/C++, **Java**,
  LEGO Mindstorms



Home Assignment: Overview

- **Individual home assignment:**
  - specification of variants of the chess clock
  - development of a model that satisfies the specification
  - our goal: **significant** differences among assignments
- Individual **specification** and **starting model**

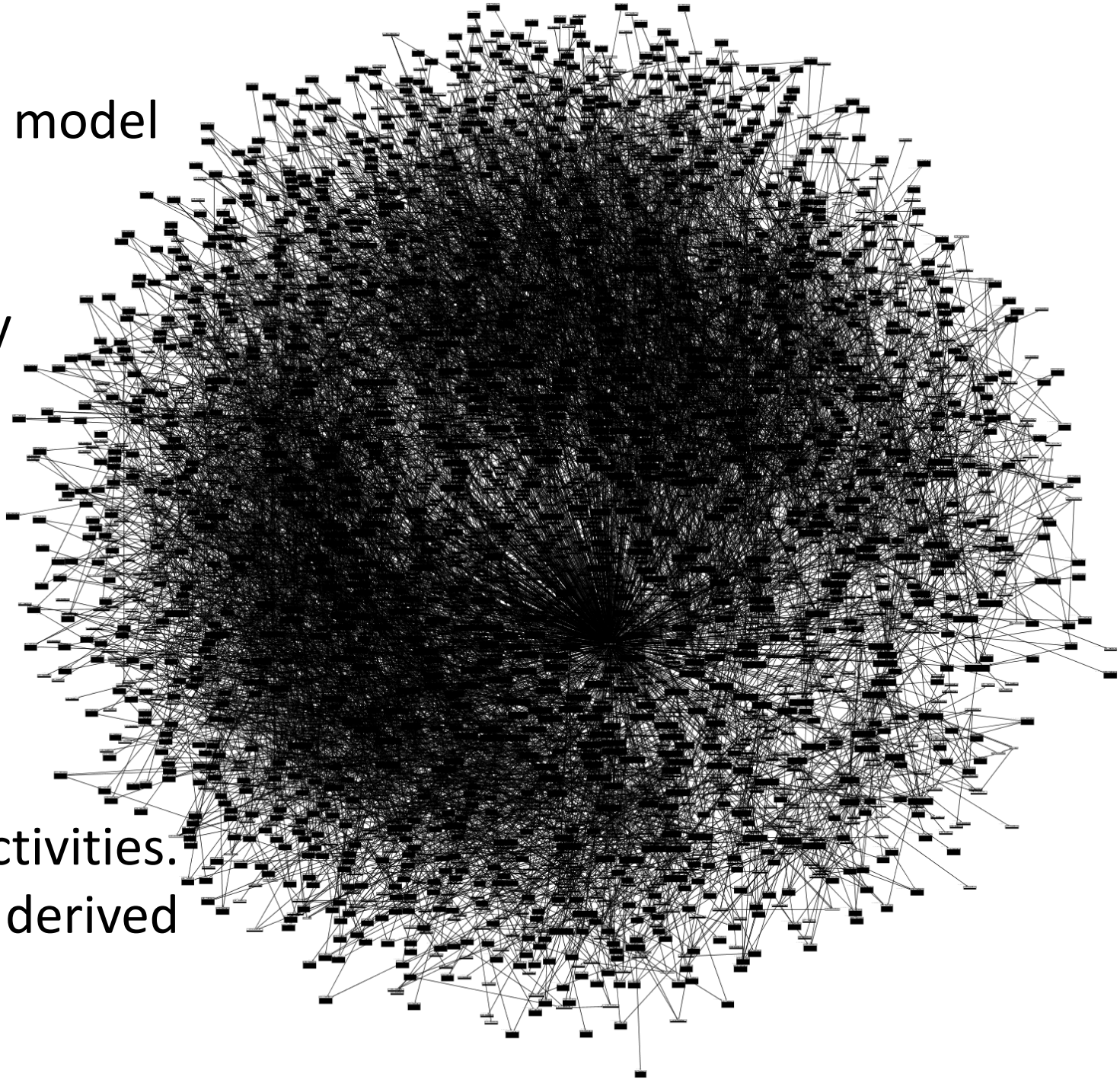


Results of the Warm-up Homework

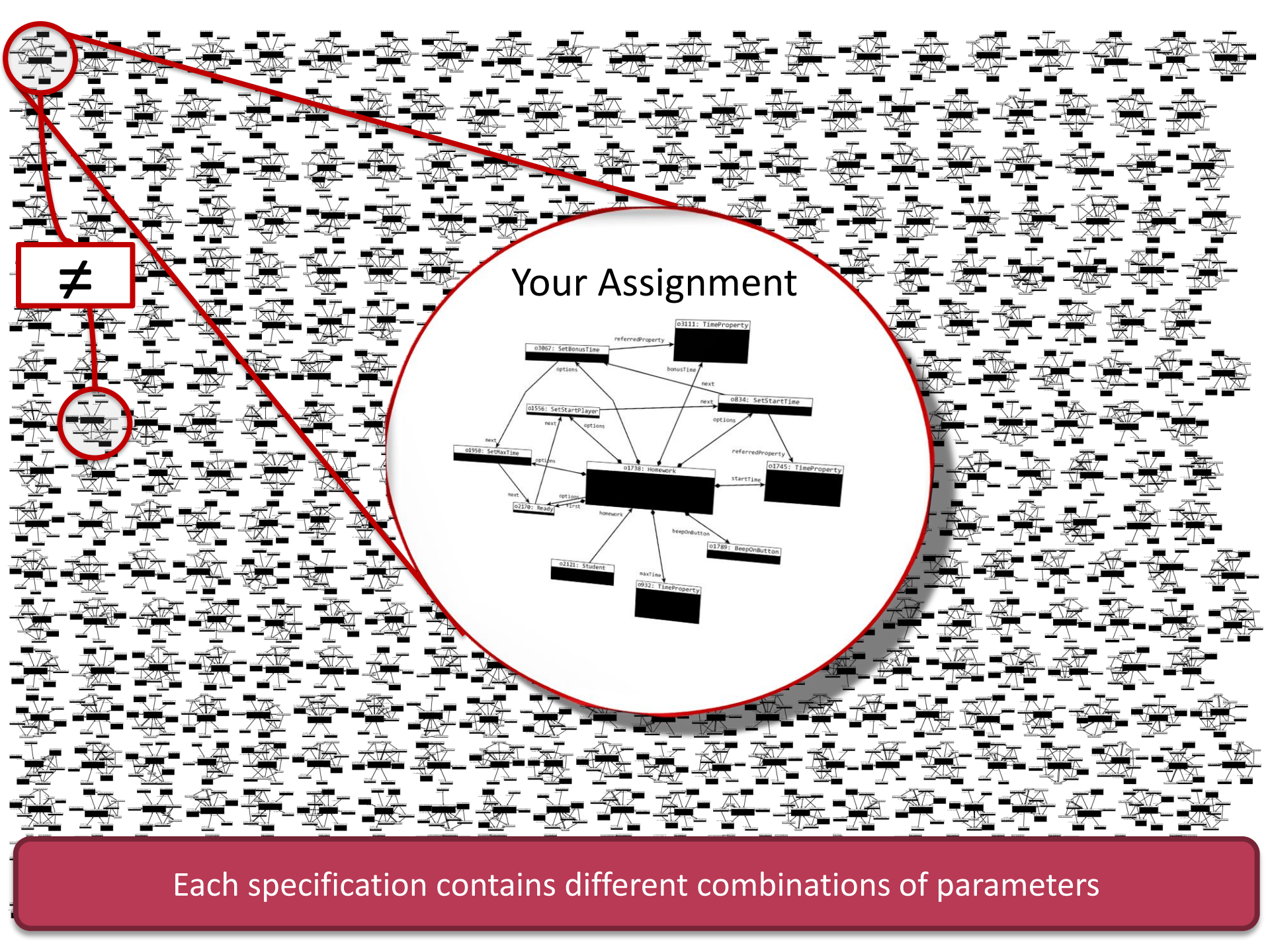
- 41 submissions (there are 68 students)
  - 34 accepted
  - Hungarian courses: 355 out of 518 (337 accepted)
  - German course: 11 out of 11 (11 accepted)

- Last registered submission at 23:59:58
  - not accepted because of submitting whole project
- Most unsuccessfully submitting students had their first submission on the last day
  - upload earlier and correct if necessary

Background:
Requirement model for each assignment automatically constructed



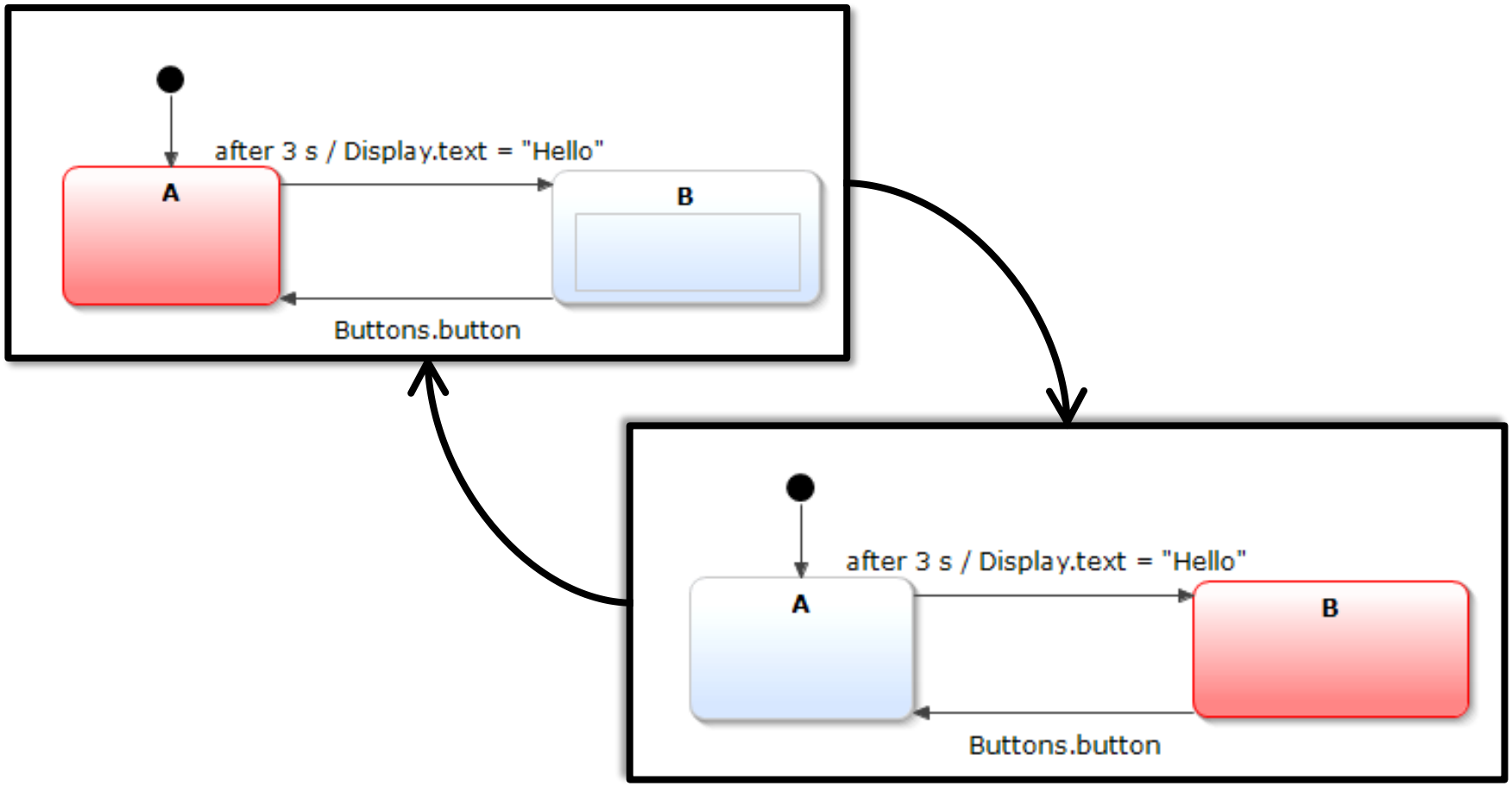
Graph based model of interacting activities. Everything is derived from that.



Each specification contains different combinations of parameters

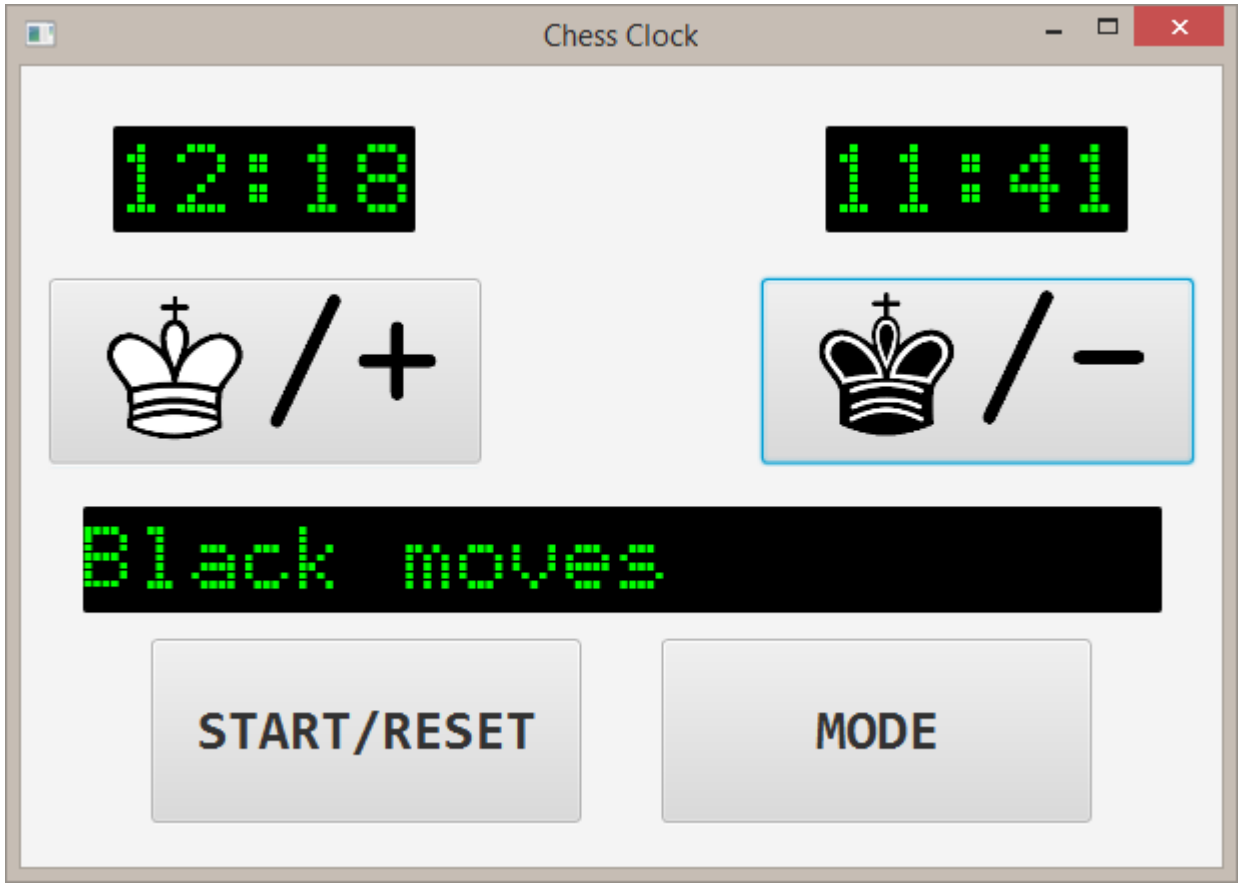
Home Assignment: Simulation

- The developed model can be simulated



Home Assignment: Application

- A desktop Application derived from the model
- You can try your solution
- Buttons → Events
- Variables → Displays



Home Assignment: Verification

- Initial set of test cases
  - to cover the feature requirements
  - to test your solution before submission
- Error → Report with the broken combination

```
neptun2 Failed:
After pressing a button it shows your Neptun code XXXXXX
----------
 - Button at 0s
 - Failed main display check: expected "XXXXXX" but found "Other text"
```

- Functional tests:

  the approach is correct ⇔ satisfying the requirements
- Rating:

  will be supported by an extended set of test cases + static analysis

Assignments, Links and Deadlines

- Individual assignments published: from the 13th March 2019
  - individual project frames + test cases + GUI
- Submission deadline: the 5th May 2019 23:59 (CEST)
  - modell (.sct file) in a ZIP archive
  - before the deadline, submission can be corrected
  - submissions automatically tested by extended test set
- Rating: maximum 30 points
  - oral defence can be required
  - Prohibited elements must be absent
  - automatized tests should run successfully

Typical Errors

- Submission of the initial (empty) statechart model
- Submission of the project description file
- Interface definition changed or deleted
- Published test cases also fail
  - not run before submission?
  - run but not checked before submission?
- Usage of prohibited elements
  - always, oncycle, …
- Typso

Further Help

- Yakindu: official tutorials
- Our own Yakindu tutorial
- Video
- QA page