

Software Quality FS 2010

Exercise 1 - Introduction

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Exercises

Objectives and Formalities

In theory there is no difference between theory and practice. In practice there is.

-- Jan L. A. van de Snepscheut or Yogi Berra.

- Necessary condition to pass the module
- 3 assignments (2 weeks)
- Can be solved in groups of 2

Exercises

Temptative Schedule

#	Theme	Release	Due	Discussion
1	Model Checking Preparation of Ex 2	March 8th	March 22nd	March 29th
2	Testing Debugging	April 12th	April 26th	May 10th
3	Product Quality Wiki contribution	May 10th	May 24th	May 31st

Exercises

What's new?

- Model checking assignment
- Use of a real case study (ImageJ)
- Single repository / wiki for all participants

Exercise 1

Model Checking & Preparation of Exercise 2

- Due: March 22nd, 2 pm
- *Note:* Exercise 3.1 requires my intervention
- Introduction
 - SPIN
 - Trac
 - SVN
 - Hudson
 - Maven 2

Model Checking

Presentation of SPIN

- Promela Language (non-deterministic)
 - loosely based on Hoare's CSP and Dijkstra's guarded commands
- Simulator (Random, Interactive, Replay)
- Exhaustive Verifier
 - Unreachable code
 - Presence of deadlocks
 - Violation of assertions
 - Satisfaction of never claims
 - Presence of non-progress loops
 - Satisfaction of LTL Properties

Model Checking

Presentation of SPIN

- Appeared in 1991
- ACM Software System Award in 2001
- A command line tool
 - Eclipse Plugin
 - xspin (TCL)
 - jSpin (Java)
- Requires C pre-processor / compiler
- Available on the macs in the lab rooms

Promela

Colony.pml

```
#define NRED          (20)
#define NBLUE        (18)
#define NGREEN       (16)
```

```
short nRed = NRED;
short nBlue = NBLUE;
short nGreen = NGREEN;
```

```
active proctype mutations() { ... }
```

"C" Macros:

- Constants
- Predicate

Data Types

Global Variables

*Communications
Channels*

Process Declarations

Promela

Mutations Process

```
active proctype mutations()  
{  
  do  
  :: d_step {nRed && nBlue;  
    nRed--; nBlue--; nGreen = nGreen + 2;}  
  :: d_step{nRed && nGreen;  
    nRed--; nGreen--; nBlue = nBlue + 2;}  
  :: d_step{nBlue && nGreen;  
    nBlue--; nGreen--; nRed = nRed + 2;}  
  :: else  
  od  
}
```

Model Checking

Random / Interactive Simulation

model.pml

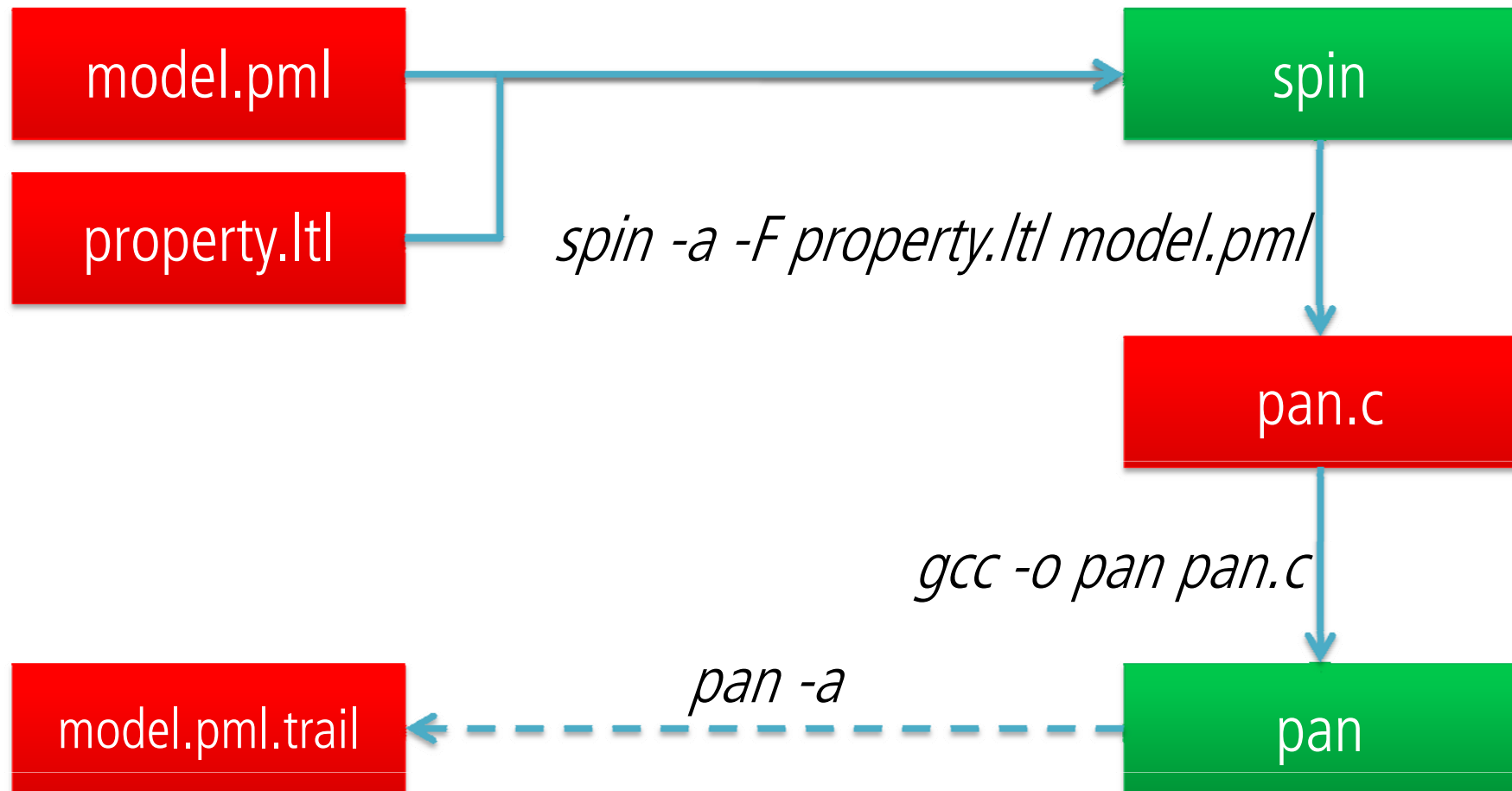


spin

spin model.pml
spin -i model.pml

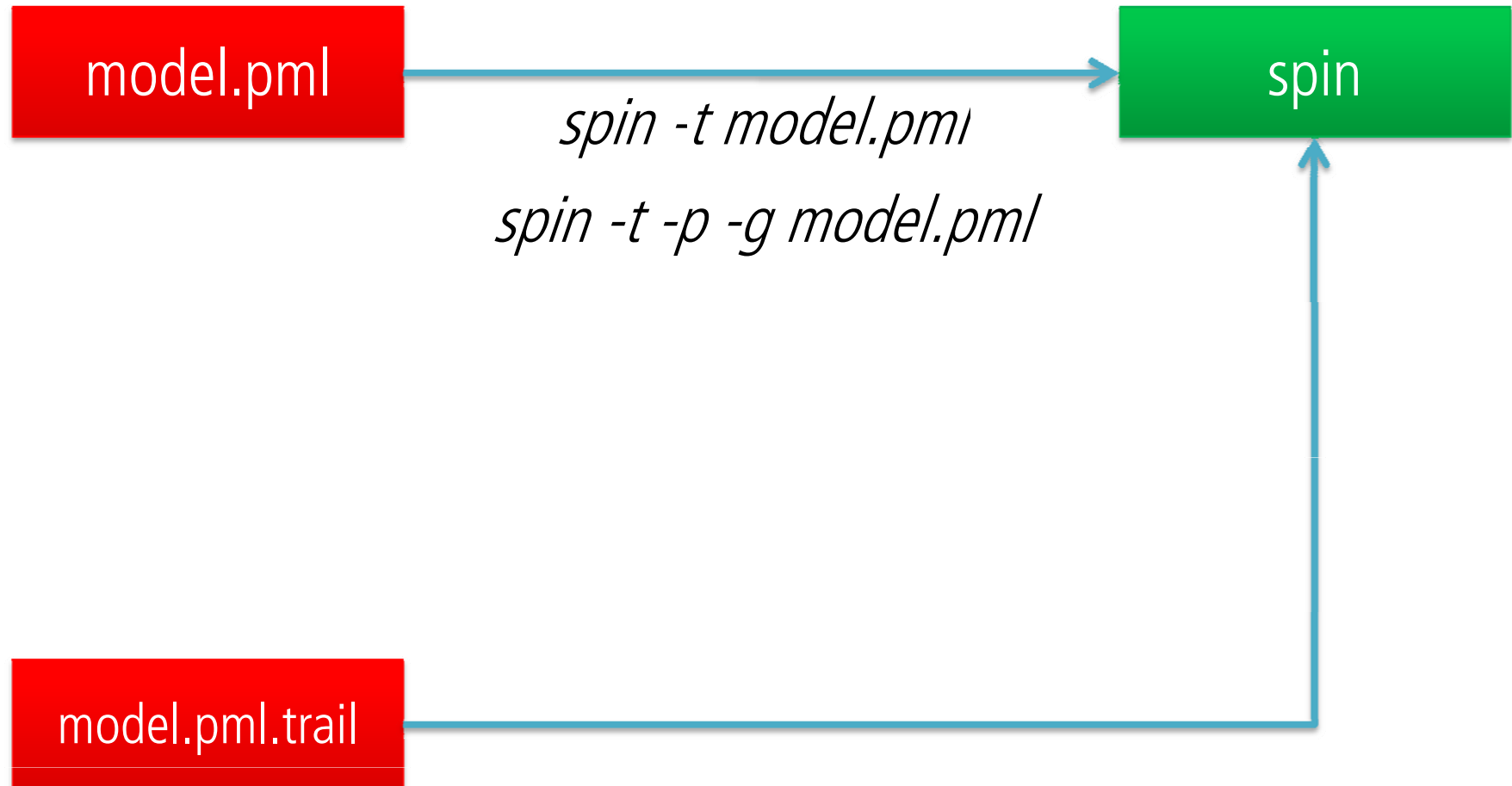
Model Checking

Verification



Model Checking

Guided Simulation



ImageJ

Preparation for Ex 2 (Agile SD Environment)

- Bug Tracking: Trac [Register]
<http://daiquiri.ifi.uzh.ch/trac/swq10/>
- Version control: SVN [Install, Obtain Access]
<https://daiquiri.ifi.uzh.ch/svnswq10/>
- Continuous Integration: Hudson
<http://daiquiri.ifi.uzh.ch/hudson/job/ImageJ/>
- Builder: Maven 2 [Install]