TTC 2011 Live Contest

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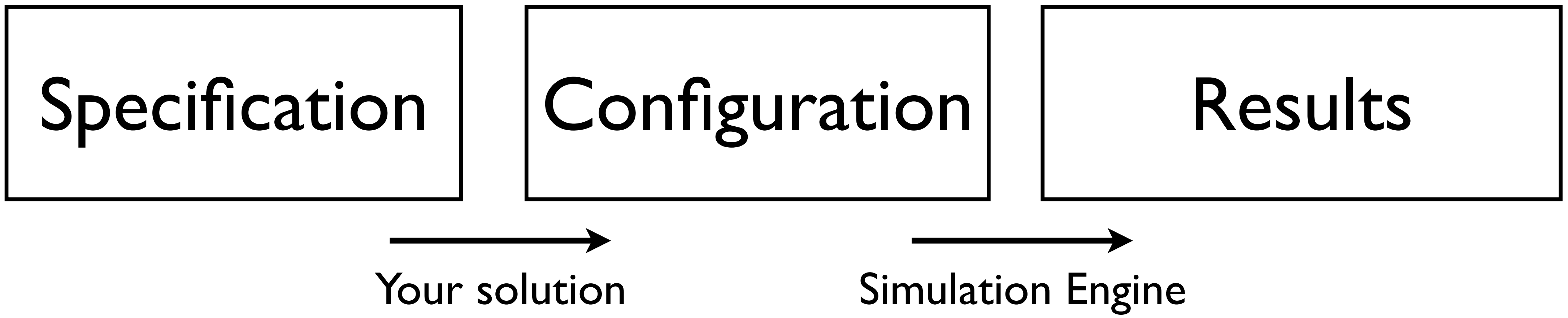
Themes

- Transformation for interoperability
- Behavioural modelling
- Model matching
- (A little) model-based testing

Overview

Metamodels:



Core Task:

Transform specifications to configurations.

Task Resources

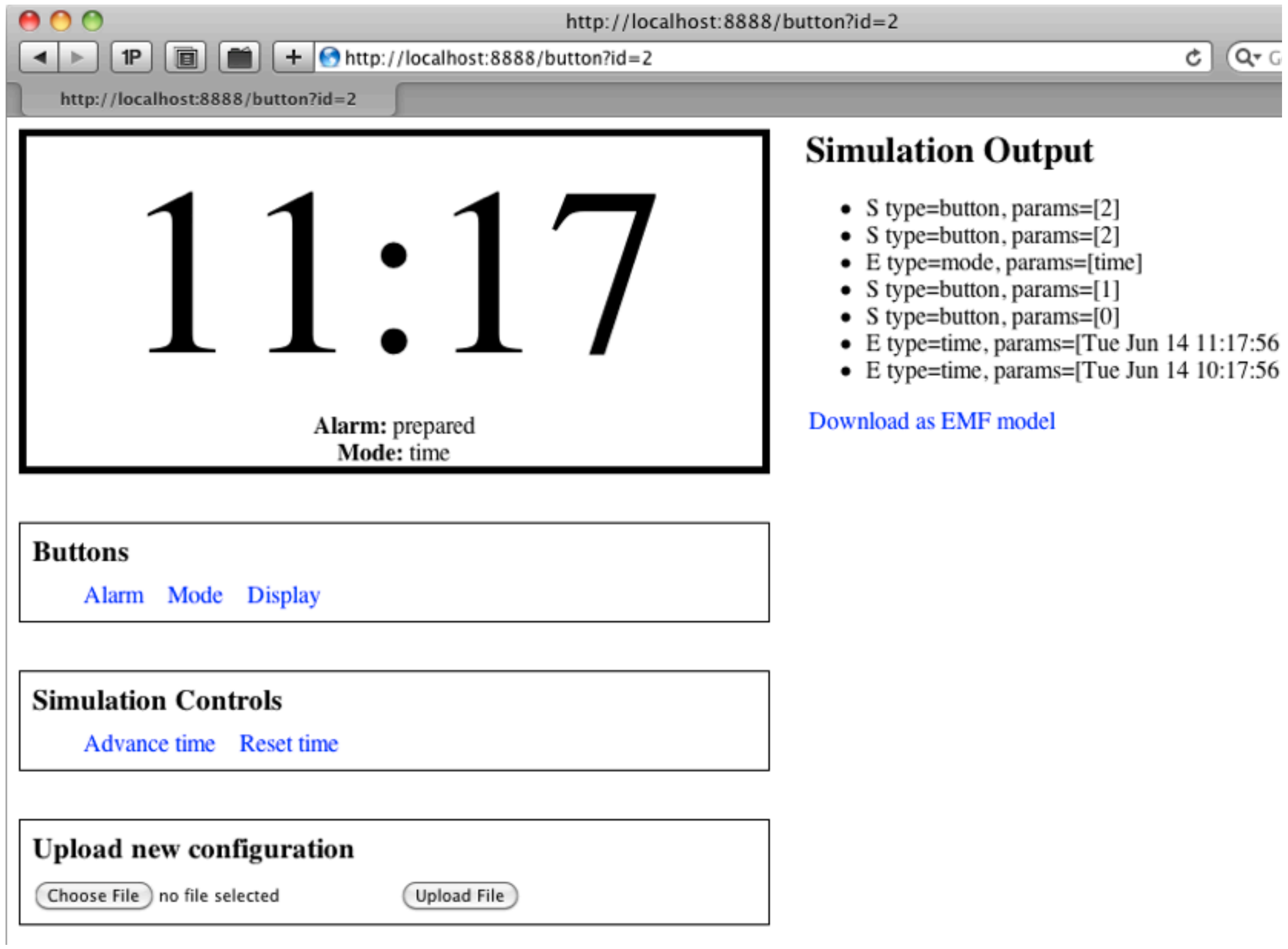
- All resources are stored on GitHub: https://github.com/louismrose/ttc2011
  - Metamodels.
  - Source models.
  - Reference target models.
  - Instructions and these slides.

Core Task

Configuring the simulation

The Simulation Engine

Domain: digital watches


http://localhost:8888/button?id=2
http://localhost:8888/button?id=2
http://localhost:8888/button?id=2

11:17

Alarm: prepared
Mode: time

Simulation Output

- S type=button, params=[2]
- S type=button, params=[2]
- E type=mode, params=[time]
- S type=button, params=[1]
- S type=button, params=[0]
- E type=time, params=[Tue Jun 14 11:17:56
- E type=time, params=[Tue Jun 14 10:17:56

Download as EMF model

Buttons

Alarm Mode Display

Simulation Controls

Advance time Reset time

Upload new configuration

Choose File no file selected Upload File

- http://ttcsim.appspot.com
- ***Configured*** with an EMF model
- Produces an EMF ***results*** model

A Simple Specification

Given the watch is in mode “on”
Then the first button must be called “off”

When the watch enters mode "on"
Then the "display" must show "hello"

Given the watch is in mode "on"
When the first button is pressed
Then the watch must be in mode "off"

...

A Simple Specification

...

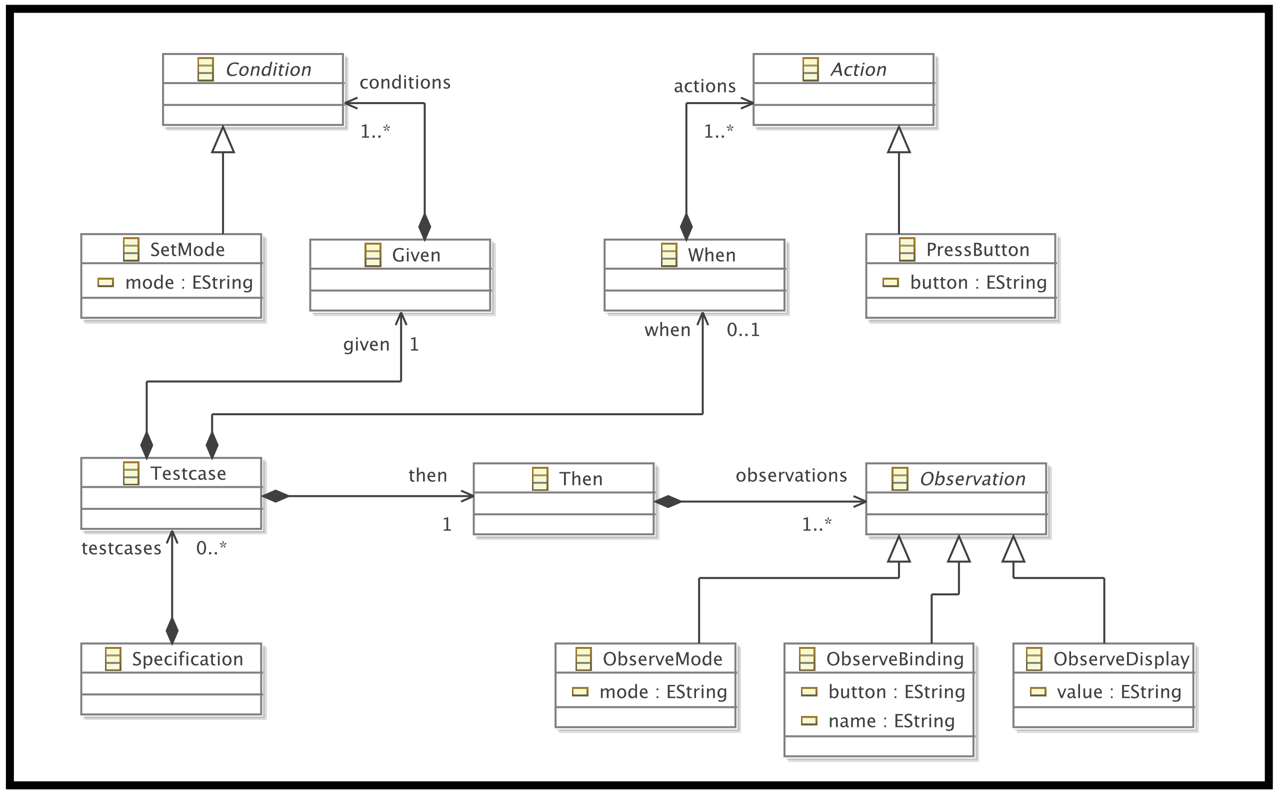
Given the watch is in mode “on”
Then the first button must be called “off”

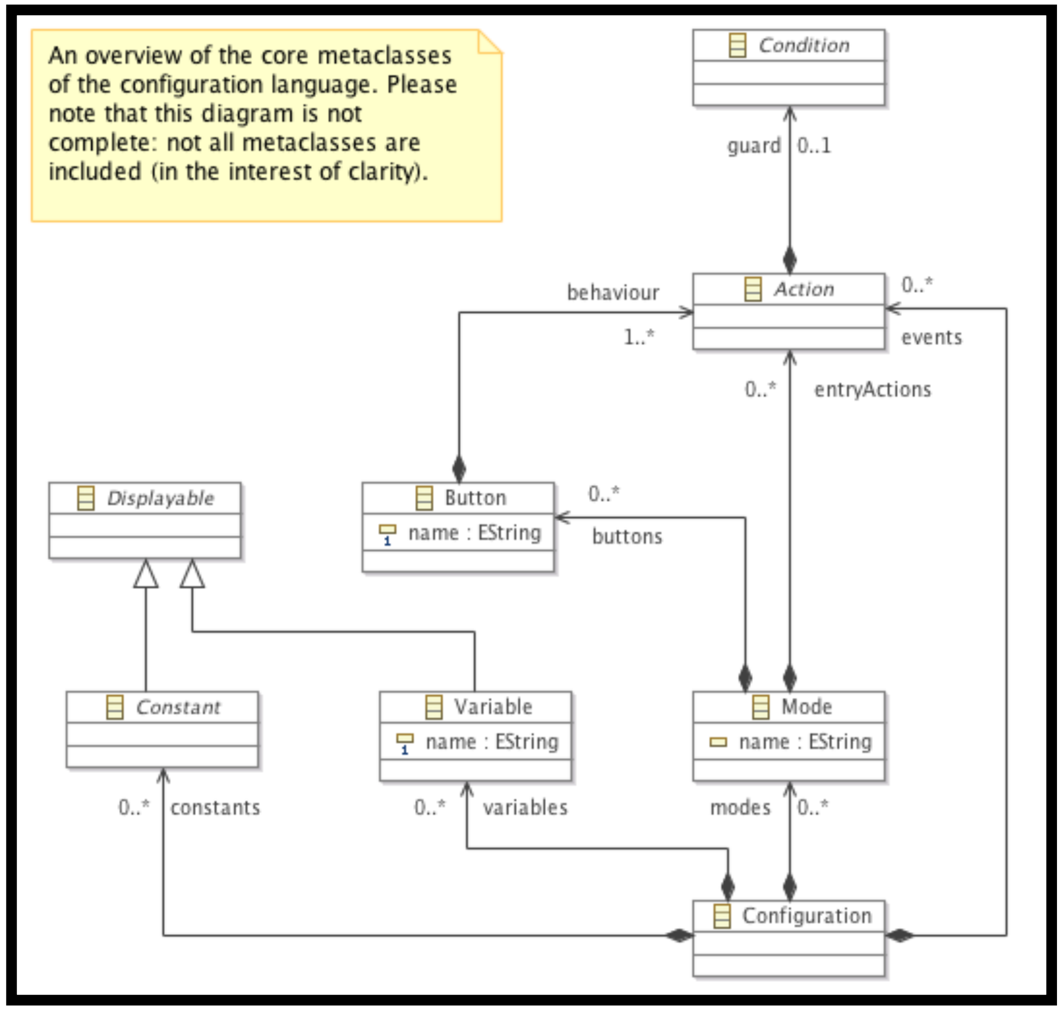
When the watch enters mode "on"
Then the "display" must show "hello"

Given the watch is in mode "on"
When the first button is pressed
Then the watch must be in mode "off"

The Transformation

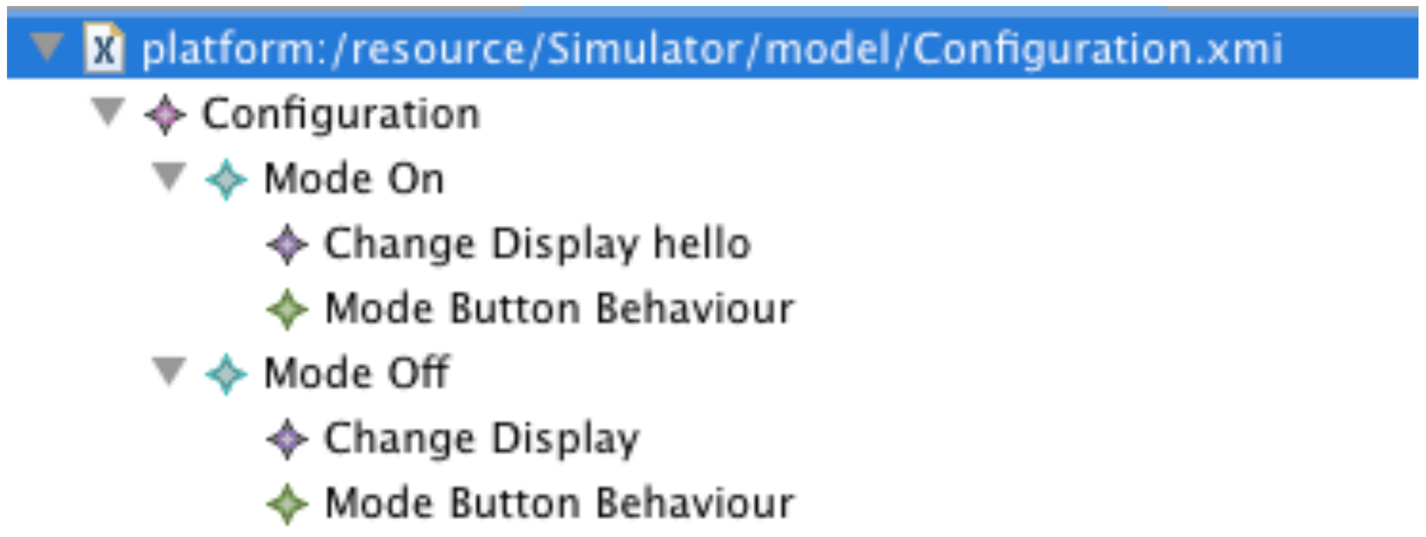
$\boxed{\text{Specification}} \longrightarrow \boxed{\text{Simulation configuration}}$




An overview of the core metaclasses of the configuration language. Please note that this diagram is not complete: not all metaclasses are included (in the interest of clarity).

A Configuration

The on/off watch specification should be transformed to produce the following configuration:



```
▼ platform:/resource/Simulator/model/Configuration.xmi
    ▼ Configuration
        ▼ Mode On
              Change Display hello
              Mode Button Behaviour
        ▼ Mode Off
              Change Display
              Mode Button Behaviour
```

Extension 1

Robustness of the transformation

Unusual Specifications

Given the watch is in mode "alarmTime"
Then the third button must be called "minute"
the first button must be called "mode"
the second button must be called "hour"

Given the watch is in mode "time"
the "indicator" is showing "unset"
When the second button is pressed
Then the "indicator" must show "set"
the alarm must ring
the display must show "alarm"

Unusual Specifications

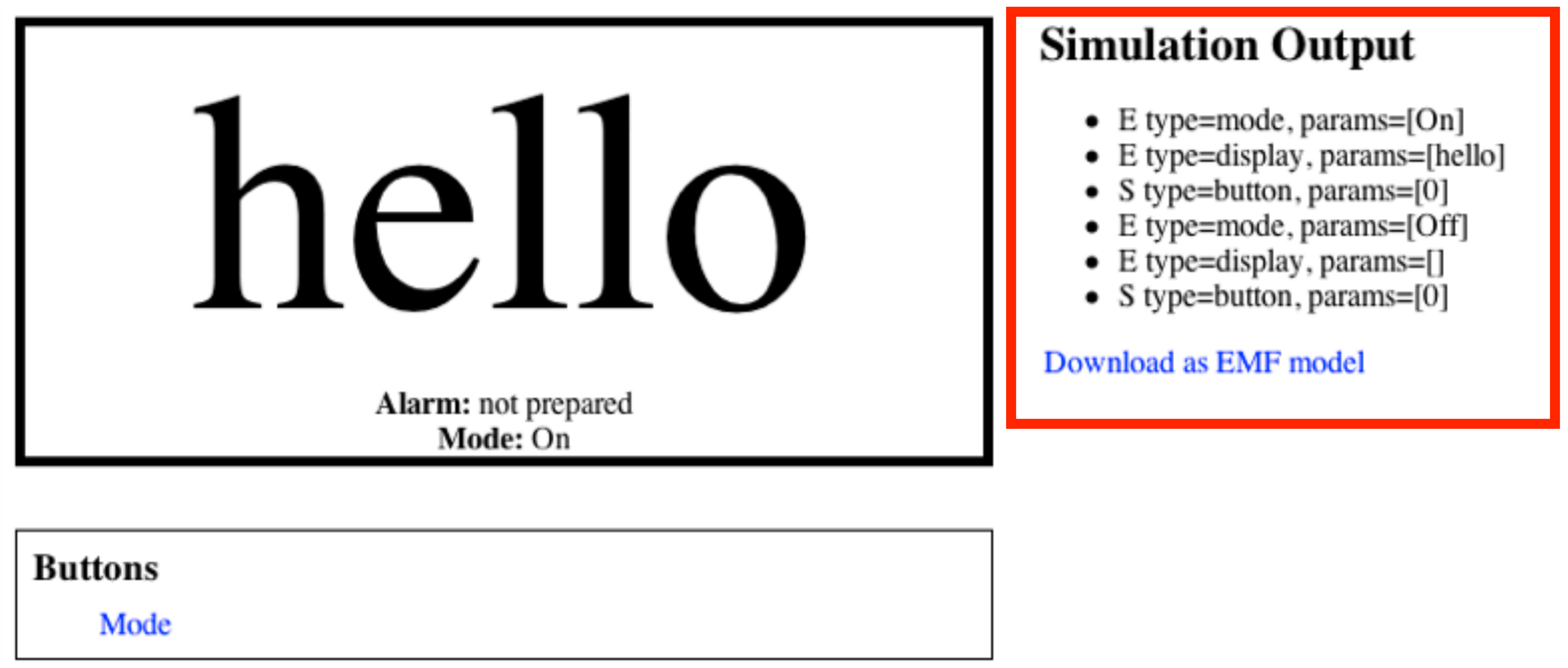
- Can your transformation manage these unusual specifications?
- Can you define further types of (valid and consistent) specification that all solutions should aim to tolerate?

Extension 2

Matching test results with specifications

Simulation Results

The simulation provides a results model:



hello

Alarm: not prepared
Mode: On

Buttons

Mode

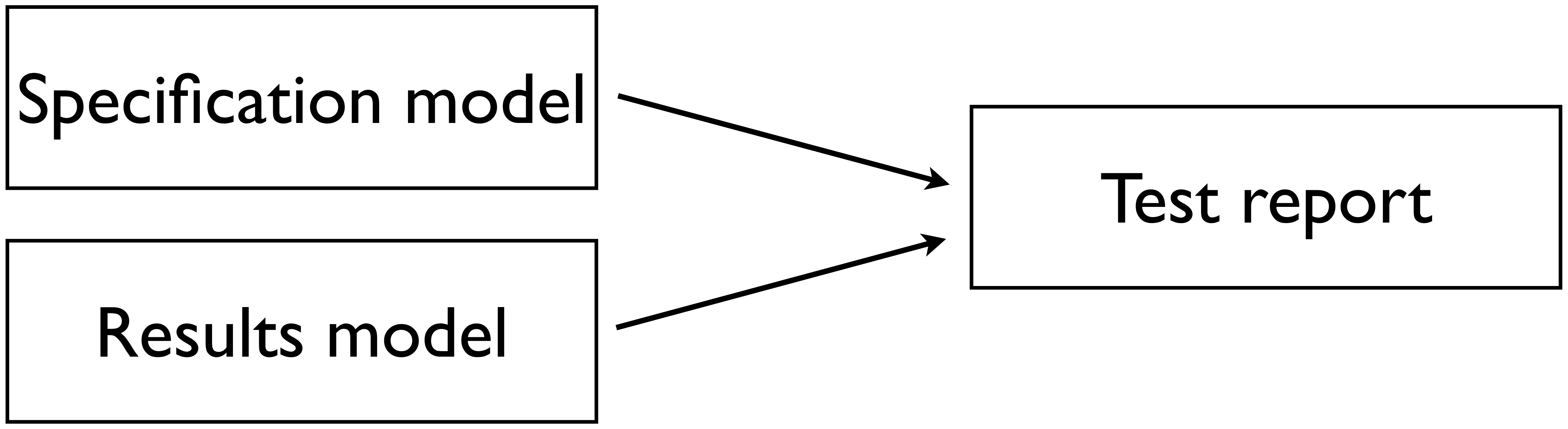
Simulation Output

- E type=mode, params=[On]
- E type=display, params=[hello]
- S type=button, params=[0]
- E type=mode, params=[Off]
- E type=display, params=[]
- S type=button, params=[0]

Download as EMF model

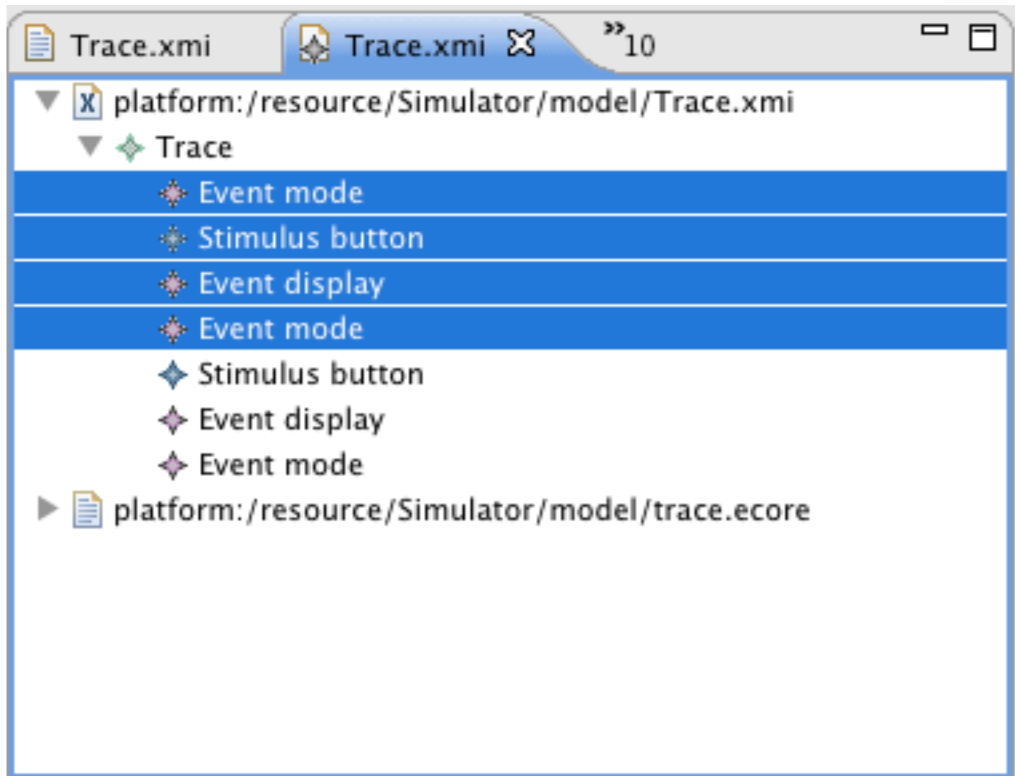
Extension 2 (Matching)

Match the specification and results models to produce a test report

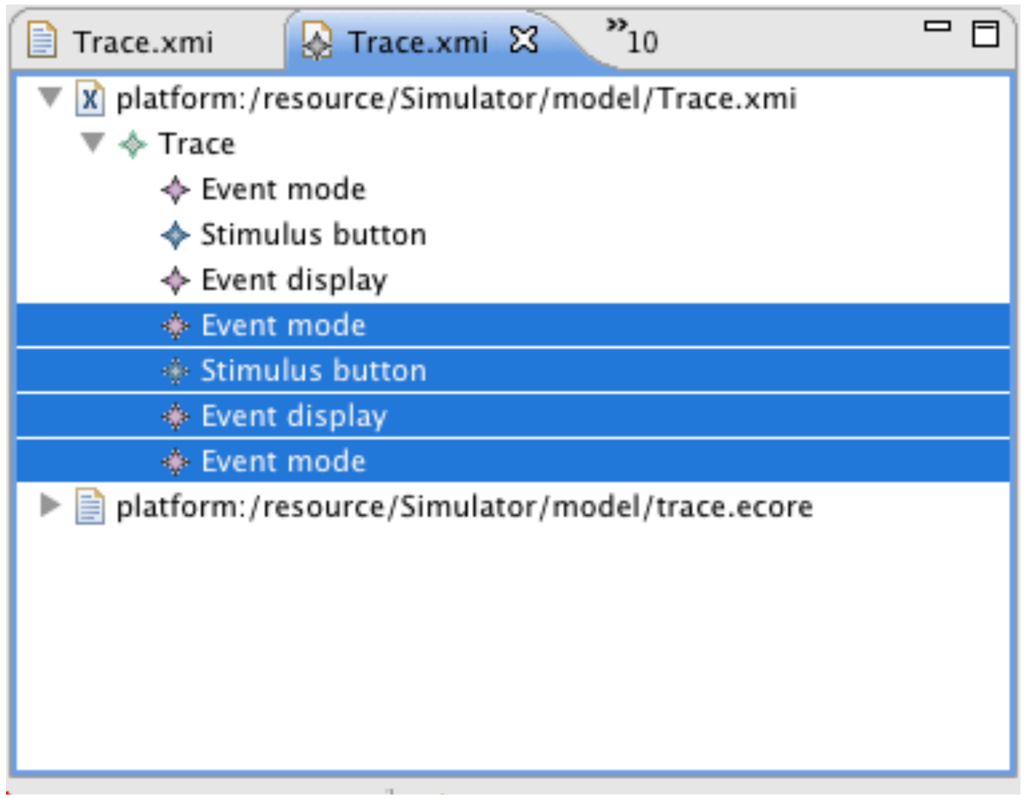


Matching Example

Given the watch is in mode “on”
When the first button is pressed
Then the mode must be “off”
the display must show “”


Trace.xmi | Trace.xmi | »10

- platform:/resource/Simulator/model/Trace.xmi
  - Trace
    - Event mode
    - Stimulus button
    - Event display
    - Event mode
    - Stimulus button
    - Event display
    - Event mode
- platform:/resource/Simulator/model/trace.ecore


Trace.xmi | Trace.xmi | »10

- platform:/resource/Simulator/model/Trace.xmi
  - Trace
    - Event mode
    - Stimulus button
    - Event display
    - Event mode
    - Stimulus button
    - Event display
    - Event mode
- platform:/resource/Simulator/model/trace.ecore

Evaluation Criteria

Evaluation Criteria

- Completeness
  - Core task: 1 point for each of 3 watches
  - Extension 1 (Robustness): 1 point
  - Extension 2 (Matching): 1 point
- Clarity: e.g. expressiveness of the code.
- Conciseness: # of modules, rules, etc
- Architecture: quality of modularity / abstraction