

ROSEA

A Basis for Model Translation

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What is ROSEA?

- Rosea is package to support model translation using Tcl.
 - Rosea is an acronym for Relation Oriented Software Execution Architecture.
 - Rosea is also a viral skin rash (Pityriasis Rosea).

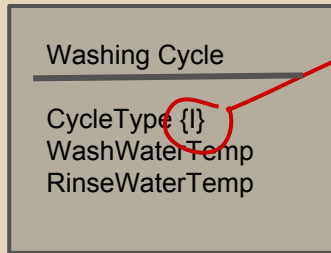
When the Outcome Matters

- Real engineers model before they build.
 - Electrical engineers draw schematic diagrams.
 - Architects draw blueprints.
 - Chemical engineers build pilot plants.
- Software engineers need to build executable models.
 - Separate problem logic from implementation technology.

Model Translation

- Rosea is a target for translating executable models onto Tcl.
 - Models must be **executable**
 - UML graphical notation is used
- A Domain Specific Language is used to describe the model.
- A run time component maps model concepts to Tcl constructs.
- A code generator builds the run time data structures.

Translating Data



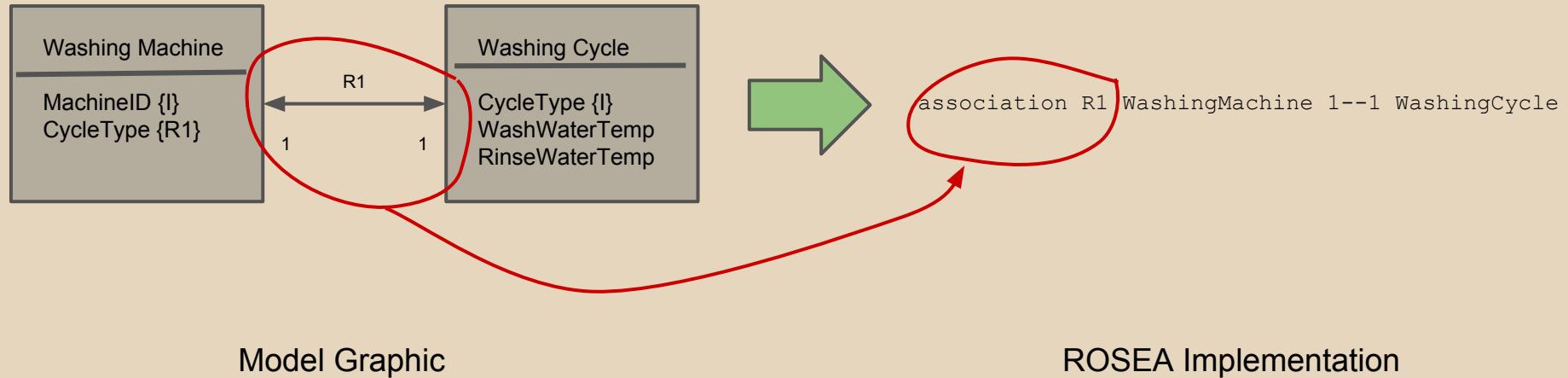
Model Graphic



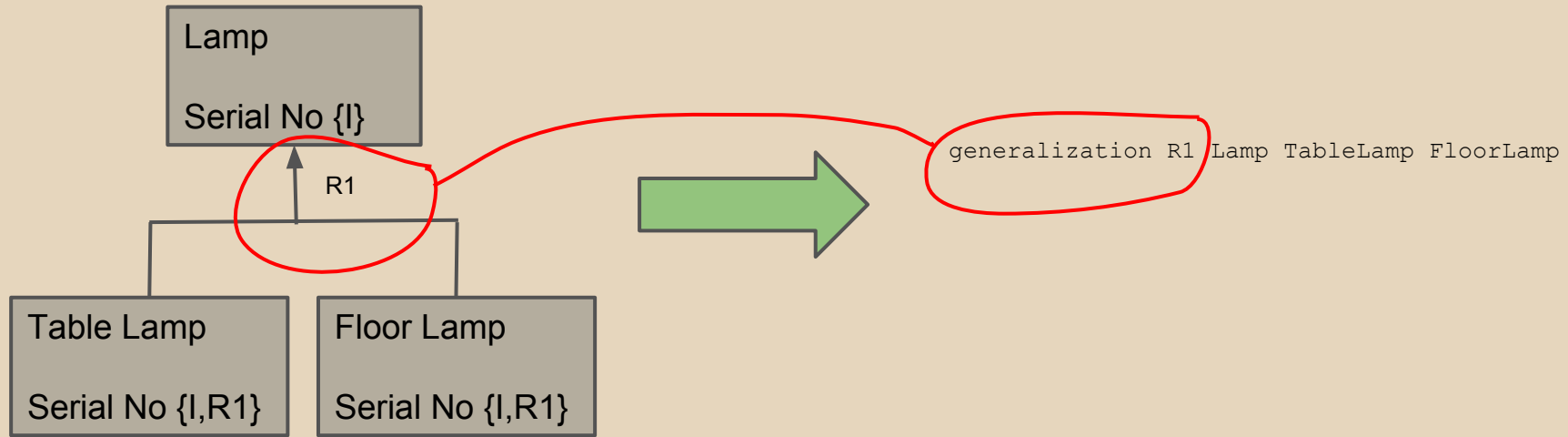
```
class WashingCycle {  
    attribute CycleType string -id 1  
    attribute WashWaterTemp int  
    attribute RinseWaterTemp int  
}
```

ROSEA Implementation

Translating Associations



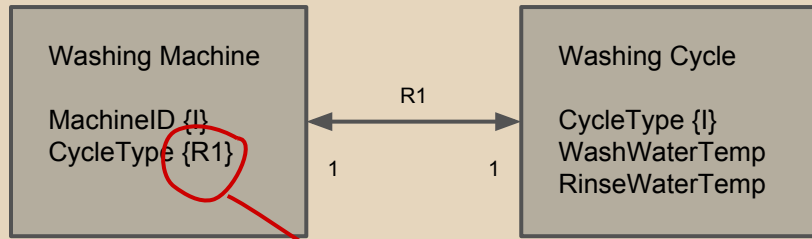
Translating Generalizations



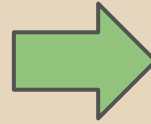
Model Graphic

ROSEA Implementation

Translating References



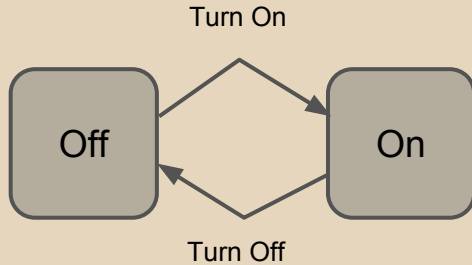
Model Graphic



```
class WashingMachine {  
    attribute MachineId string -id 1  
    attribute CycleType string  
    reference R1 WashingCycle -link CycleType  
}
```

ROSEA Implementation

Translating State Models



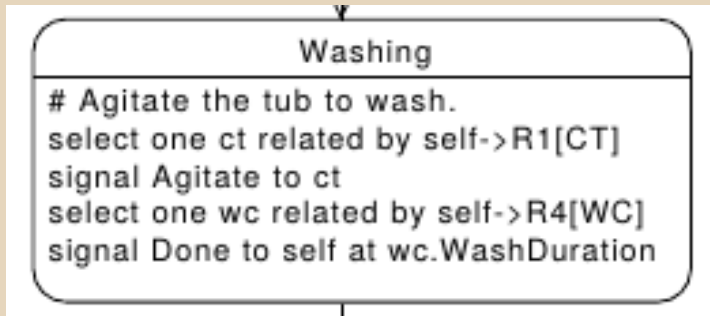
Model Graphic



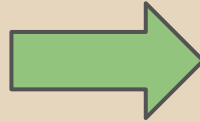
```
statemodel {  
    initialstate Off  
    state On {} {  
        # Tcl code for On state  
    }  
    state Off {} {  
        # Tcl code for Off state  
    }  
    transition Off - TurnOn -> On  
    transition On - TurnOff -> Off  
}
```

ROSEA Implementation

Translating Processing



Model Graphic



```
state Washing {} {  
    # Agitate the tub to wash.  
    set ct [findRelated $self ~R1]  
    signal $ct Agitate  
    set wc [findRelated $self R4]  
    set donetime [readAttribute $wc WashDuration]  
    delaysignal $donetime $self Done  
}
```

ROSEA Implementation

ROSEA as an Object System

- From the Tcl point of view ROSEA is an object system.
 - Namespace ensemble based
 - Event driven
 - Data is stored in TclRAL Relation Variables
 - Referential integrity checking
 - Direct support of State Machine based dynamics
 - Full access to all Tcl language features

Resources

- [Literate program document.](#)
- [Reference documentation.](#)
- Fossil repositories
 - repos.modelrealization.com
 - [chiselapp](#)

Demo

- Example domain is a washing machine control domain.
- We use a companion program called `rash`.
 - Rash is a generic introspection program for rosea translated domains.
 - Reads the domain configuration and creates a Tk interface on the fly.