

CS846 Bicycle Project

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Outline

- Overview of MetaEdit
 - Motivation
 - Features of MetaEdit
 - Usage of MetaEdit
- Apply MetaEdit to Bicycle Project

Motivation

- DSM raises the level of abstraction to improve productivity.
- Graphical notation for DSM languages.
- Product generation in multiple forms is required.
- Documents need to be consistent with design.

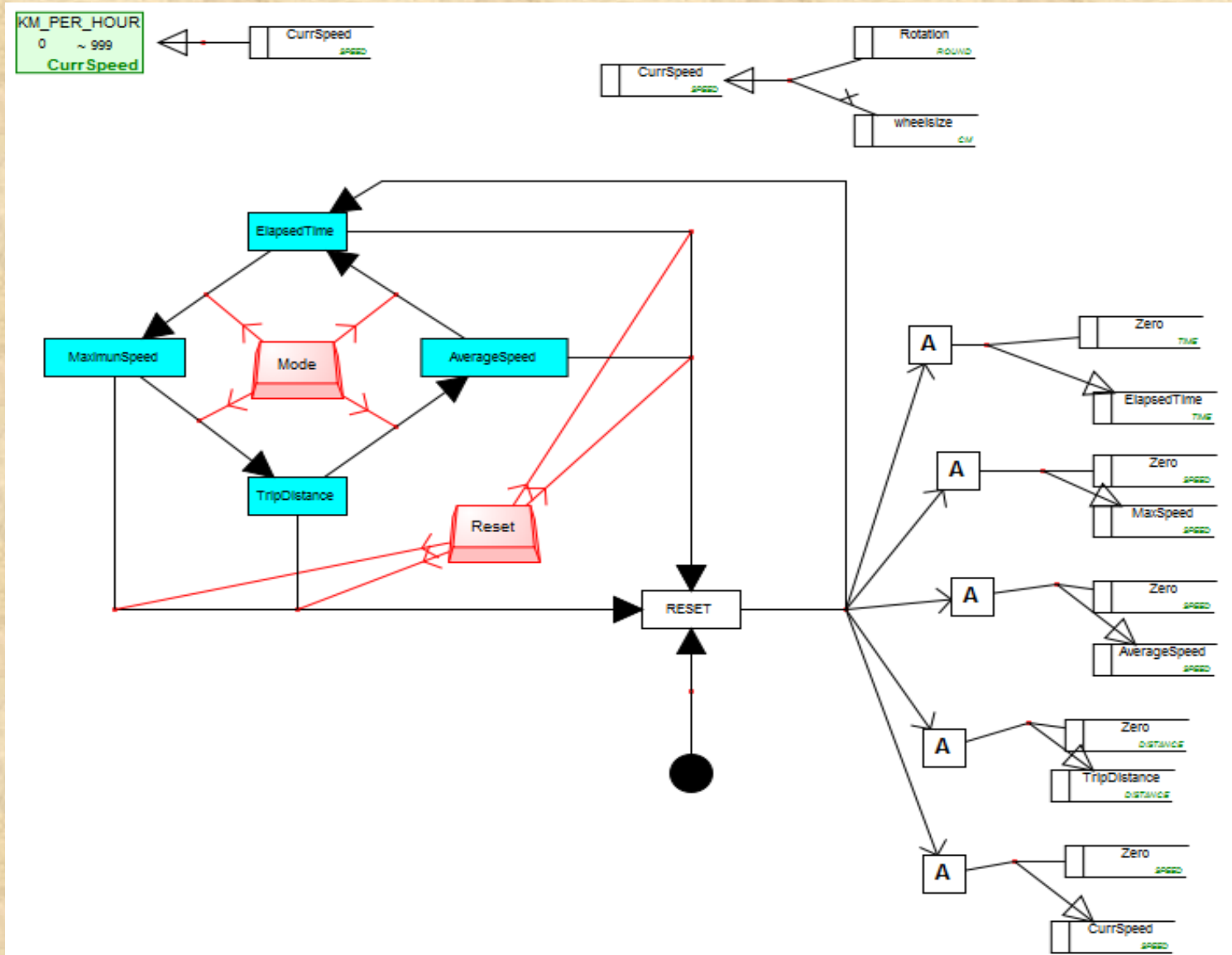
Features of MetaEdit

- Concepts – objects, roles and relationships.
- Rules – model constraints
- Symbols – Graphical representation
- Generator – Model transformation to code, support MERL.
- Model import and export

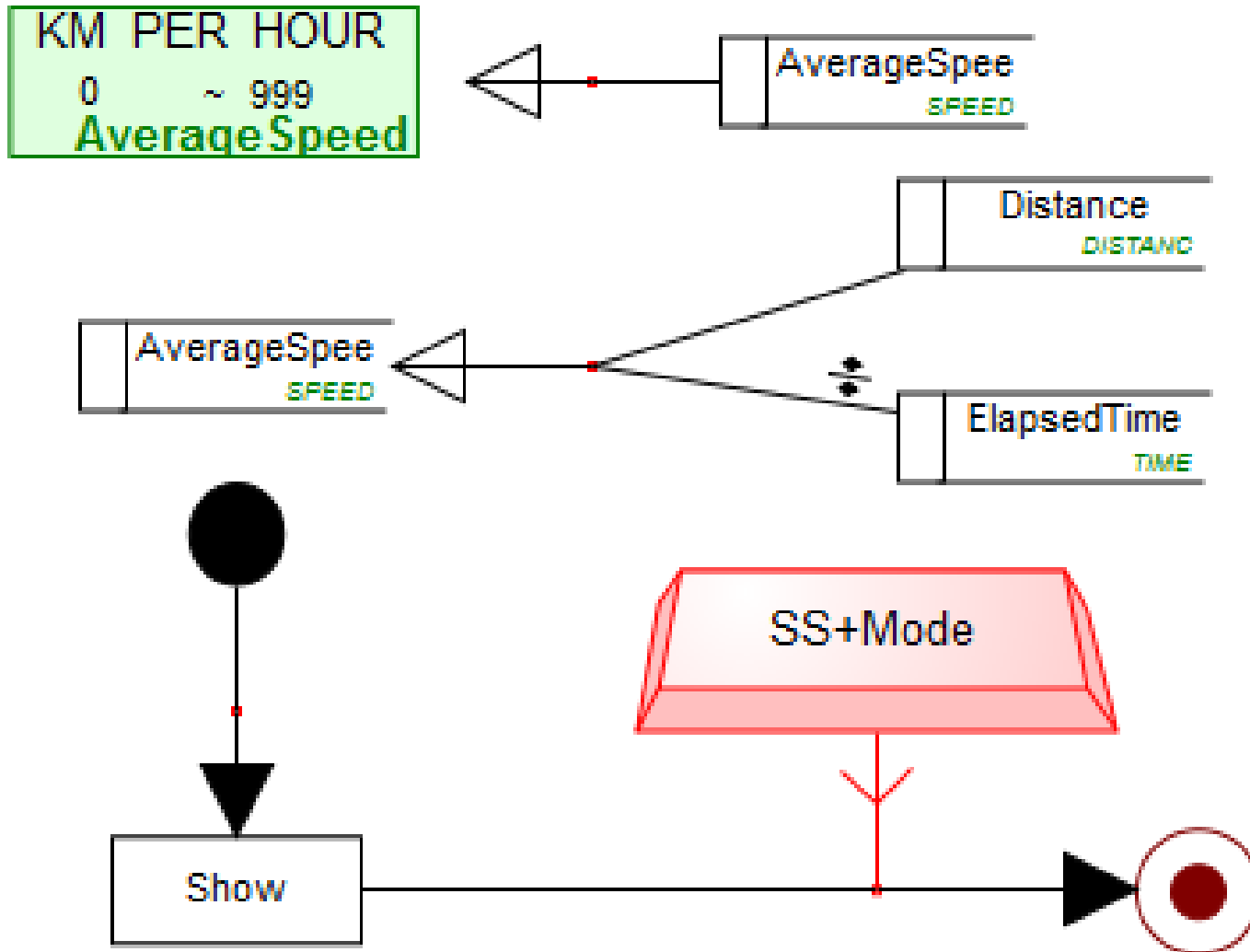
Usage of MetaEdit

- Defining the Metamodel language by abstraction
- Implement relationship between objects to form the model architecture
- Define generator to perform model transformation

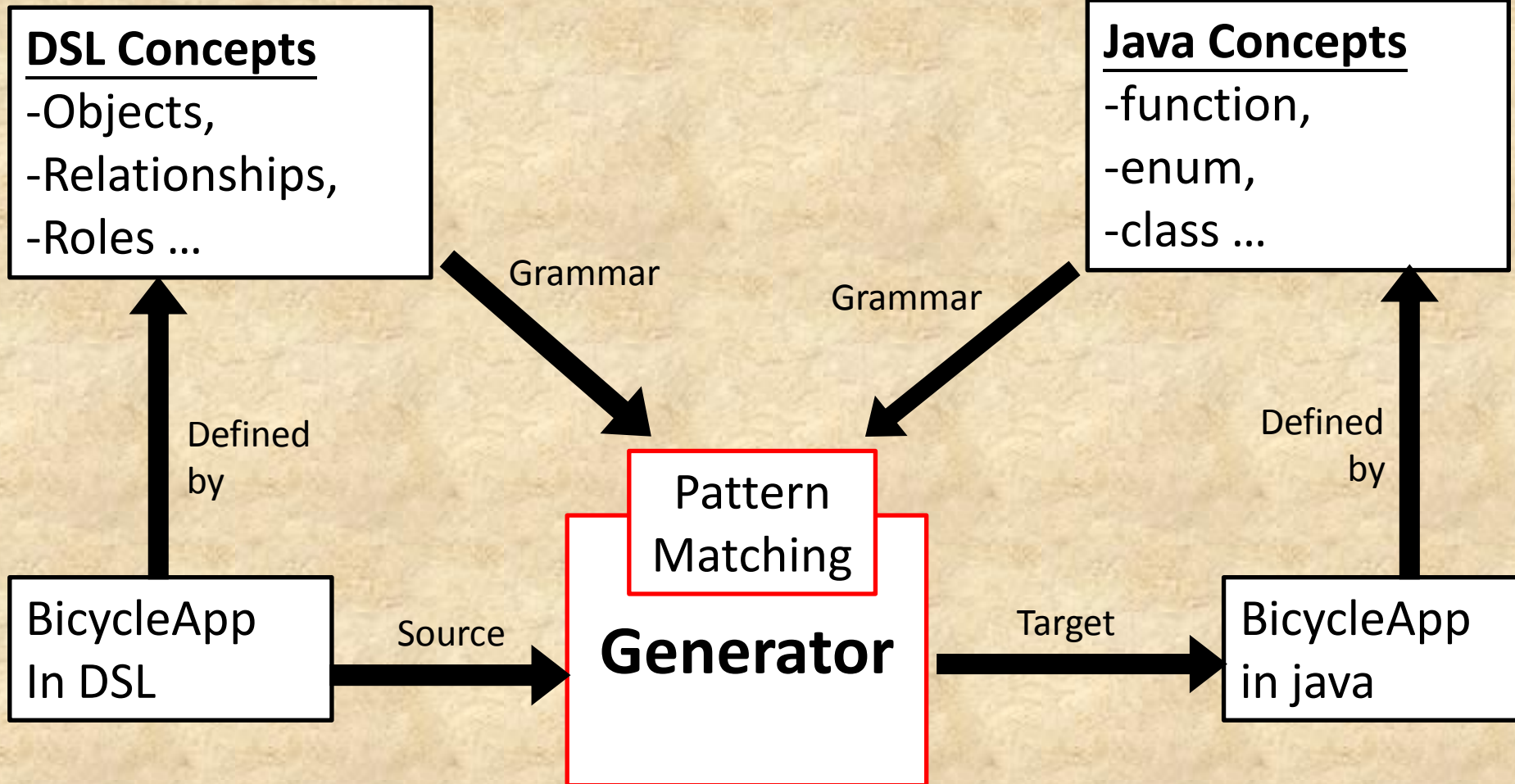
Bicycle Statechart



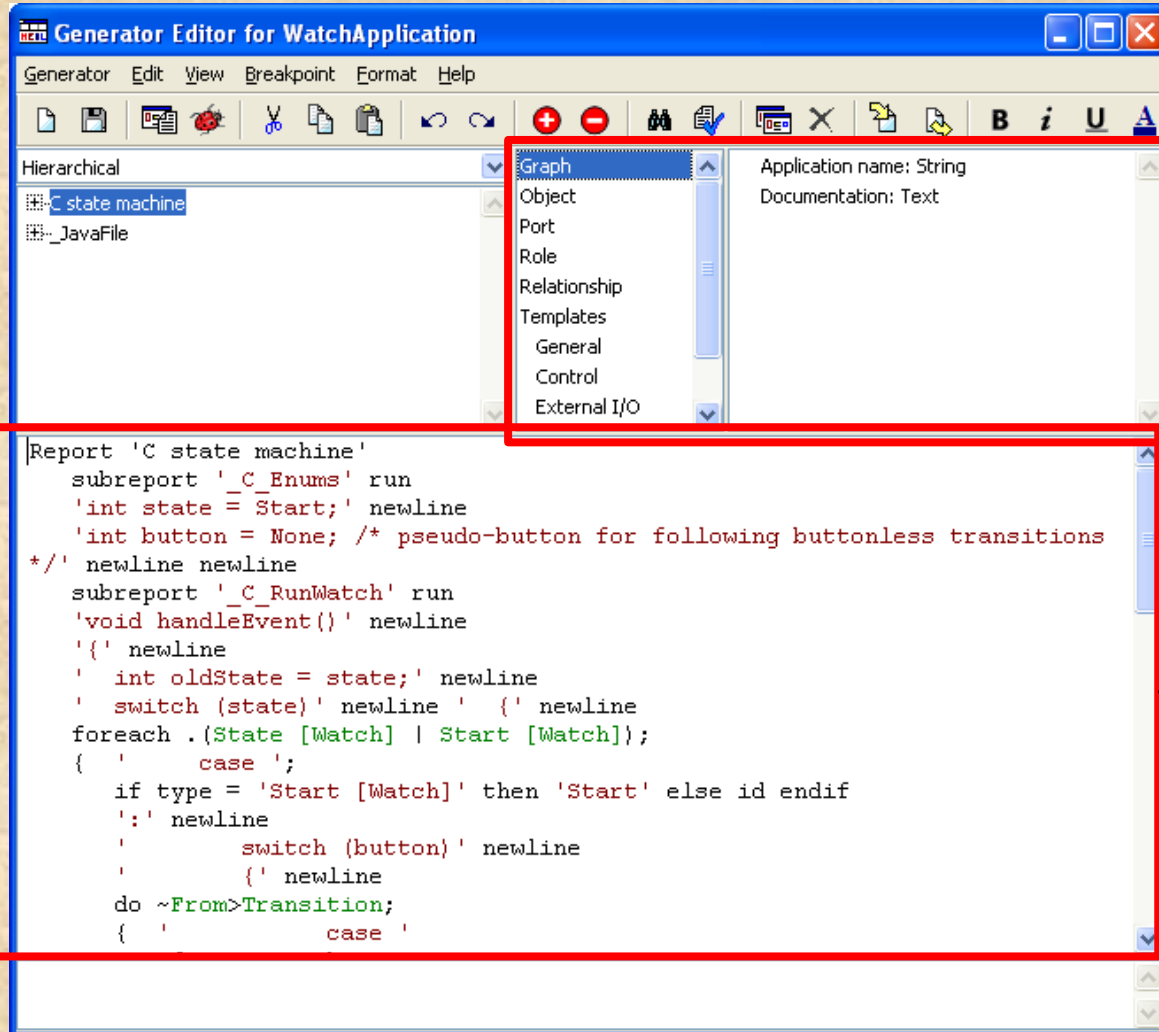
Average Speed Sub-state



Generator



Generator Editor



→ Our DSL Concepts

→ Transformation Rules
(in MERL scripts)

More on MERL

- The MetaEdit+ Reporting Language,
- is used to define generators for code and documentation.

```
Report 'Test'
  foreach .(State [Bic]|modeState [Bic])
  { 'State : '
    :StateName;
    newline
    'Connects to: '
    do ~From [Bic]>()~To [Bic].()
    {
      :StateName;
      ', '
    }
    newline
    newline
  }
endreport |
```

Syntax

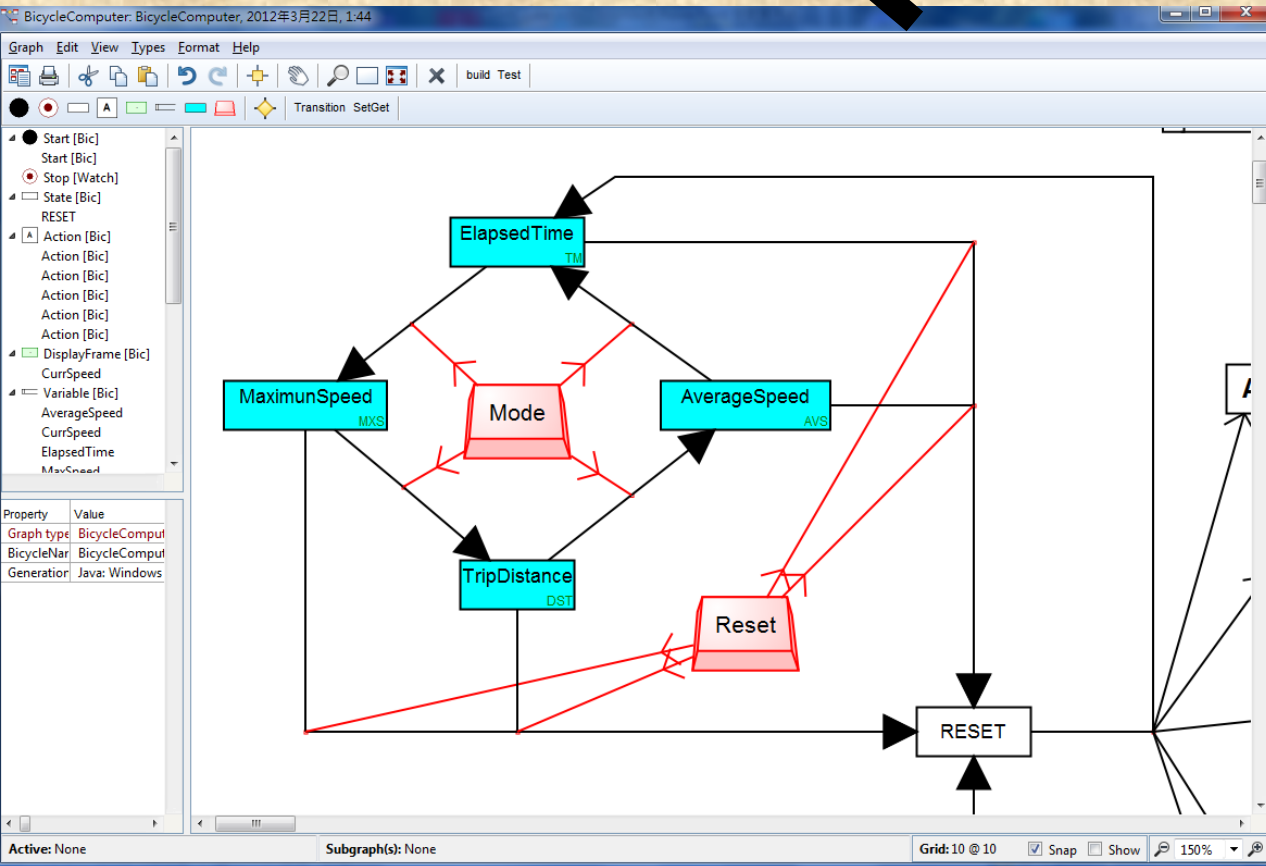
.object	object
:objectProperty	objProperty
.(object object)	RegularExpression
'Text'	Printout
~role	Role
>relation	Relation
()	Wildcard

Generating Text

```
Report 'Test'  
  foreach .(State [Bic]|modeState [Bic])  
  { 'State : '  
    :StateName;  
    newline  
    'Connects to: '  
    do ~From [Bic]>() ~To [Bic].()  
    {  
      :StateName;  
      ', '  
    }  
    newline  
    newline  
  }  
endreport |
```

Target

Source



Generator Output: BicycleC...

File Edit View Help

State : AverageSpeed
Connects to: ElapsedTime, RESET,

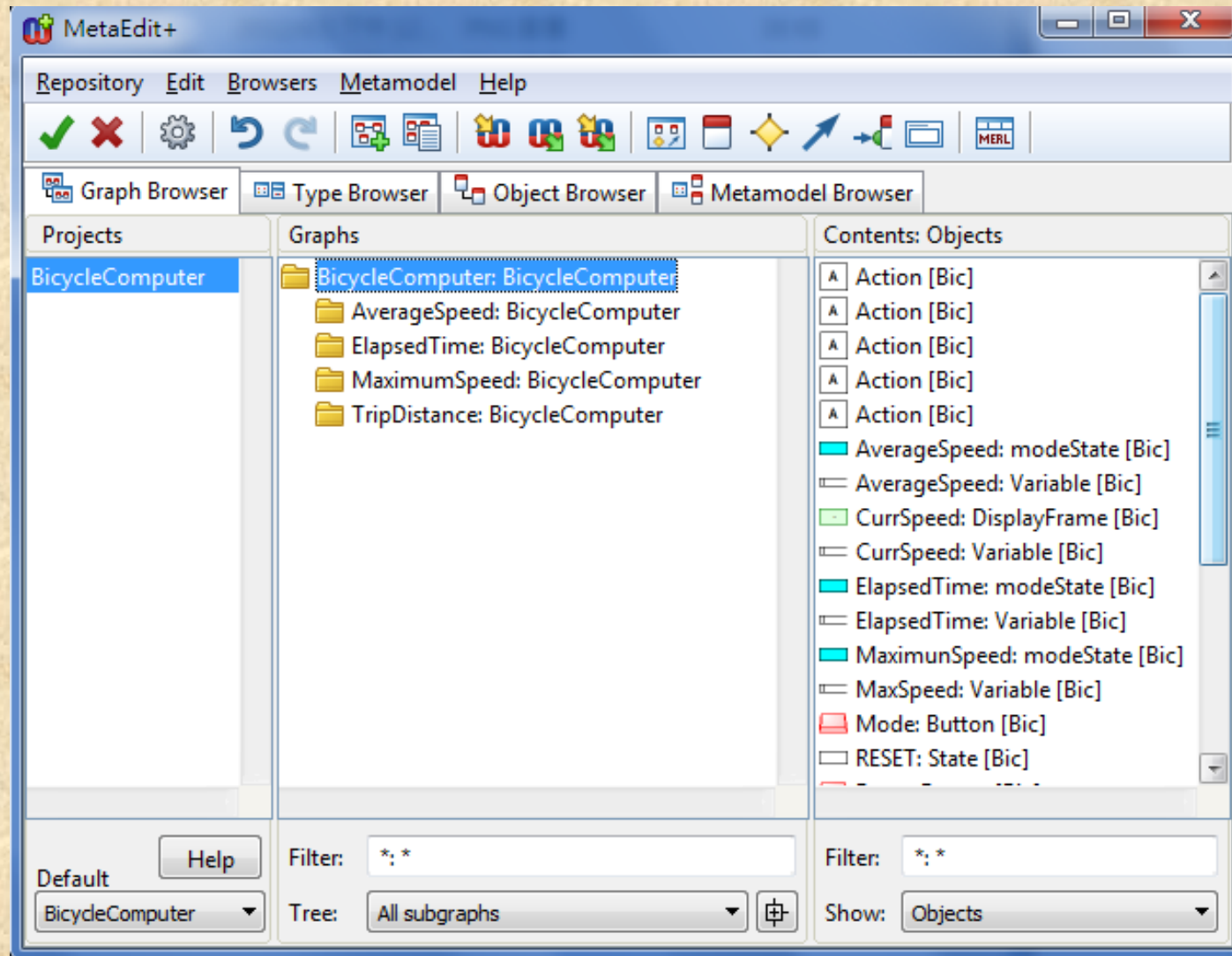
State : ElapsedTime
Connects to: MaximunSpeed, RESET,

State : MaximunSpeed
Connects to: TripDistance, RESET,

State : TripDistance
Connects to: AverageSpeed, RESET,

State : RESET
Connects to: ElapsedTime, |

Demo



Insight/Lesson Learned

- Advantages

- leave end-users an better programming environment.
- Easier to implement programming constraints.
- Link two phases together
 - ✓ Designing Application, and
 - ✓ Implementing Code

- Disadvantages

- Extra works on designing and implementing DSL models and Generator.
- Writing a good generator is difficult
 - To write generator, we need to know three languages very well
 - ✓ Our Domain Specific Language (objects, relations, roles... concepts)
 - ✓ MERL scripts (defining transformation rules)
 - ✓ Java code concepts

END