

# A Tool for Checking Correctness of Design Diagrams in UML

EEICT

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# Outline

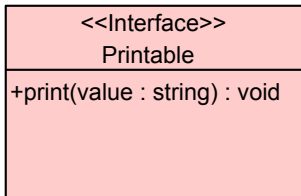
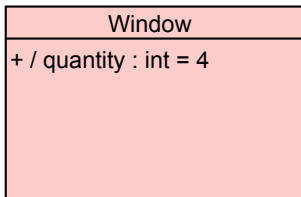
- ▶ UML Correctness
- ▶ Patterns
- ▶ Tool preview
- ▶ Model transformation
- ▶ Tool Workflow

# Introduction

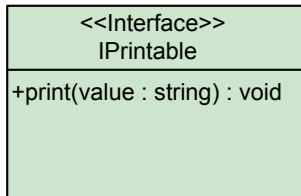
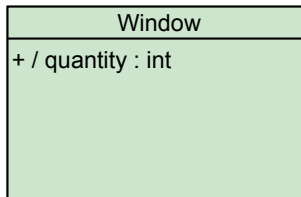
- ▶ UML Modelling Language, Class Diagram
- ▶ UML Diagram Correctness
  - ▶ OMG standard
  - ▶ Reliable sources
  - ▶ Custom requirements
- ▶ Goal: Implement a tool for checking UML correctness

# Patterns

## Incorrect



## Correct



# Tool Previews

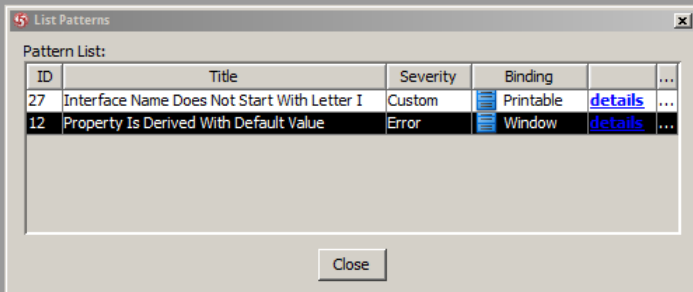
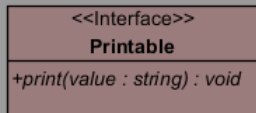
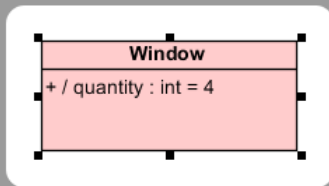
- ▶ Pattern detection
- ▶ Correctness checking
  - ▶ Command line tool
  - ▶ Visual Paradigm plugin
- ▶ Web based Pattern database

# Command Line Tool

- ▶ Input XMI
- ▶ Output text

| ID | Pattern Title                             | Binding   |
|----|---|-----------|
| 27 | Interface Name Does Not Start With Letter | Printable |
| 12 | Property Is Derived With Default Value    | quantity  |

# Visual Paradigm Plugin



# Pattern Database

The screenshot displays the UMLint Pattern Database interface. It features a 'List Patterns' window with a table of patterns and a 'Pattern Detail' window showing the details of a selected pattern.

**Pattern List:**

|                                     | ID | Title                           | Category      | Severity |                             |
|-------------------------------------|----|---------------------------------|---------------|----------|-----------------------------|
| <input checked="" type="checkbox"/> | 2  | AssociationHasBothEndsComposite | Incorrectness | Error    | <a href="#">view online</a> |
| <input checked="" type="checkbox"/> | 11 | ClassNameIsEmpty                | Incorrectness | Error    | <a href="#">view online</a> |
| <input checked="" type="checkbox"/> | 1  | Associe                         |               |          |                             |
| <input checked="" type="checkbox"/> | 3  | Comme                           |               |          |                             |
| <input checked="" type="checkbox"/> | 4  | Constr                          |               |          |                             |
| <input type="checkbox"/>            | 8  | Multipli                        |               |          |                             |
| <input checked="" type="checkbox"/> | 5  | Constr                          |               |          |                             |
| <input checked="" type="checkbox"/> | 6  | Constr                          |               |          |                             |
| <input type="checkbox"/>            | 7  | Multipli                        |               |          |                             |
| <input type="checkbox"/>            | 9  | Operat                          |               |          |                             |
| <input checked="" type="checkbox"/> | 10 | Operat                          |               |          |                             |
| <input checked="" type="checkbox"/> | 12 | Proper                          |               |          |                             |

**Pattern Detail:**

**Property Is Derived With Default Value**

**name:** PropertyIsDerivedWithDefaultValue  
**title:** Property Is Derived With Default Value  
**category:** Incorrectness  
**severity:** Error  
**reference:** qvt  
**description:**  
This anti-pattern detects a property that is specified as derived but also has a default value. Being derived means the property' value is calculated not set, and since a default value is understood to be an initial value that is set to the property at object creation, there is a contradiction.  
Source: *Elaasar, M., Briand, L. and Labiche Y., "Metamodeling Anti-Patterns", 2010.*

**Class**

**+ /property : Boolean = false**

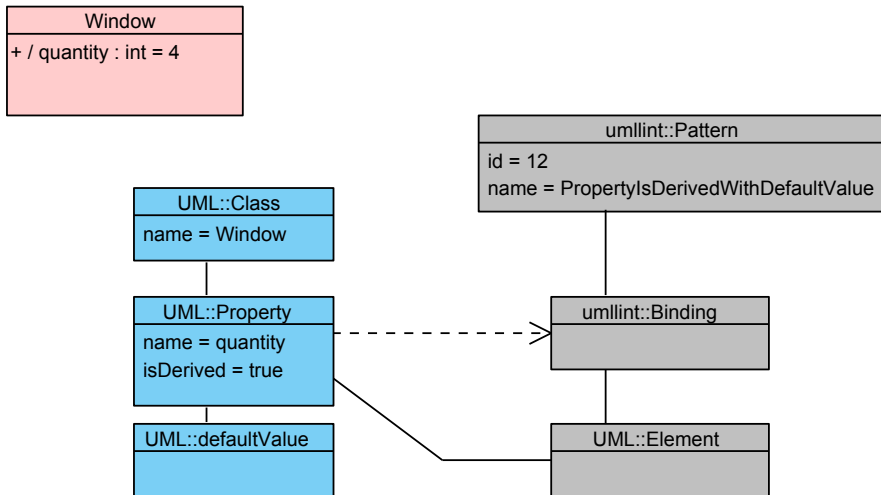
**code:**

```
checkonly domain source _property:Property {  
    isDerived = true,  
    defaultValue = _defaultValue:ValueSpecification {}  
};
```

Close



# M2M Transformation and Results



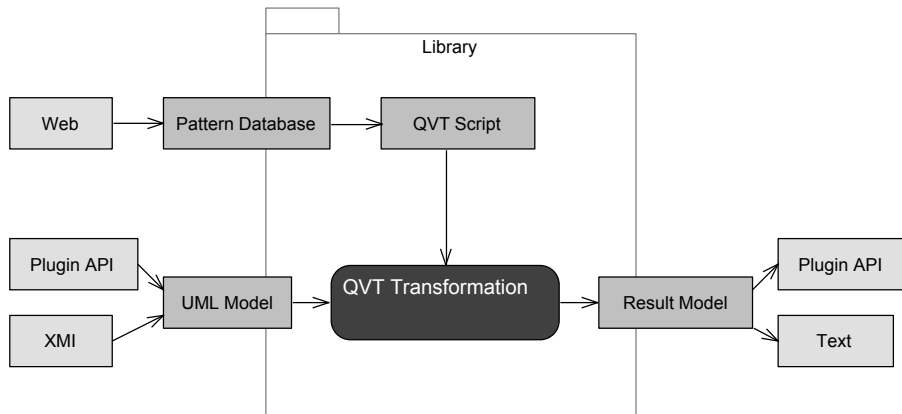
# M2M Transformation in QVTr

## Query/View/Transformation Relations language

```
checkonly domain source _property:Property {  
    isDerived = true,  
    defaultValue = _defaultValue:ValueSpecification {}  
};
```

```
enforce domain target _pattern : umllint::Pattern {  
    id = '12',  
    name = 'PropertyIsDerivedWithDefaultValue',  
    binding = _binding1 : umllint::Binding {  
        name = _property.name,  
        element = _property  
    }  
}
```

# Structure



# Conclusion

- ▶ Shared library, user interfaces
- ▶ Pattern database, collaboration, sharing
- ▶ QVT
- ▶ Application support
- ▶ Platform for UML correctness validation

# Summary

- ▶ UML Correctness
- ▶ Patterns
- ▶ Tool preview
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# Thank you!

**Author:**

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Visit the project at

<http://umllint.net>