OOP Program Metamodels

DVA436 - Model-driven Engineering

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Presentation structure

- Introduction
- Metamodels
- Transformation
- Future work
- Summary
- Demo

Introduction

- Model-driven engineering
  - Models as primary artifact
  - Majority of code generated from models
- Model
  - Abstract representation of knowledge and activities
- Meta-model
  - To formalize and capture concepts and relationship among them
- Model transformations
  - Manipulation of models
  - Defines mapping between source and target models

OOP Metamodels

- Structural model
  - Structure of program model that consists of classes and their related data
- Behavioural model
  - Set of function bodies that has to be mapped with the classes defined in the structural model
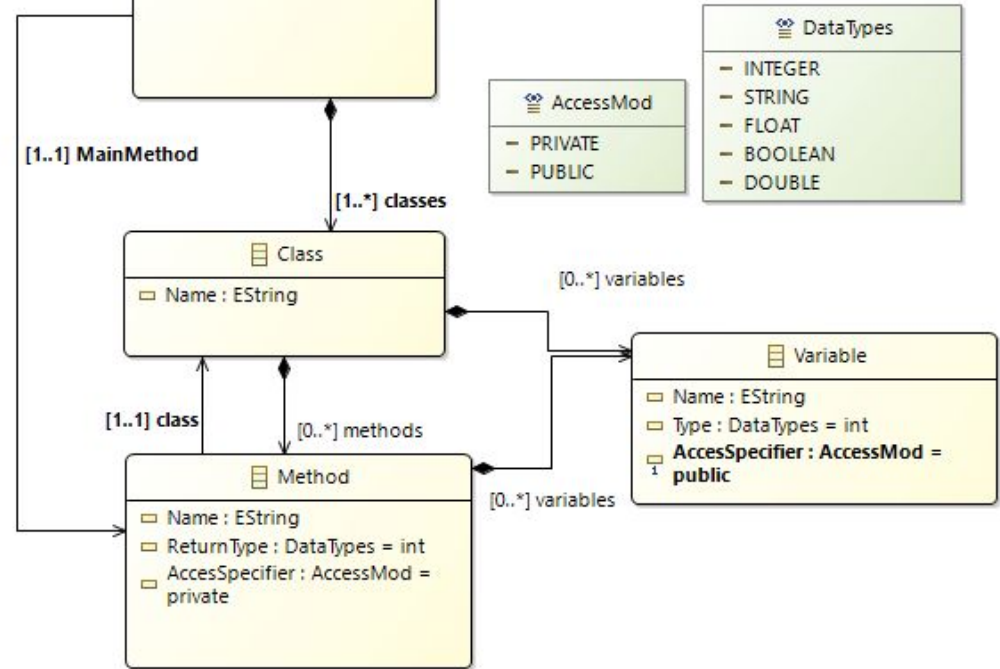
Structural model

- Classes
  - Name
  - Variables
    - Name
    - Type
    - Access specifier
  - Methods
    - Name
    - Returntype
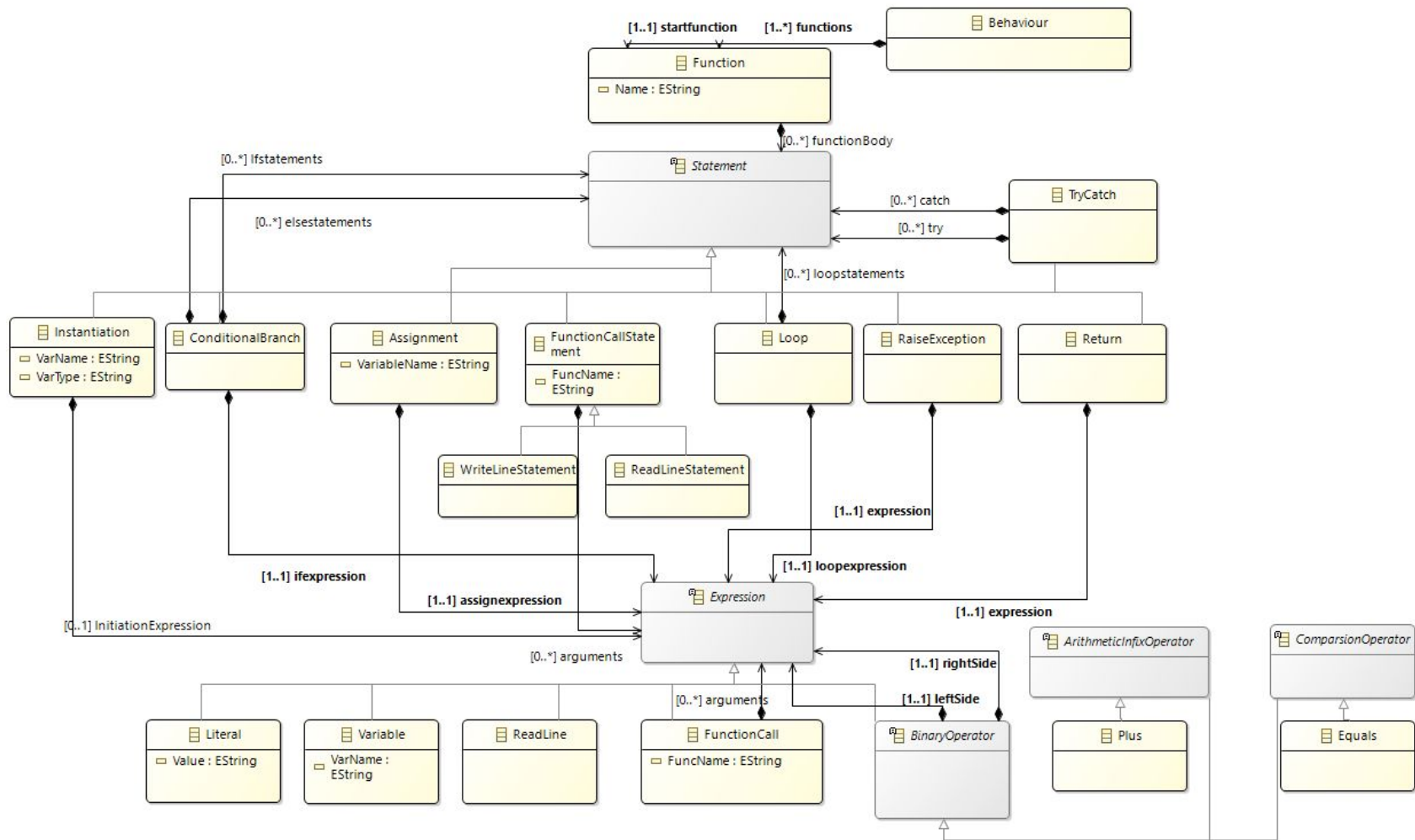   - Access specifier
- Main method
  - Containing class names the generated file

Behavioural model

- Functions
  - Name
  - Statements
    - Create and change variable values
    - Call functions
    - Loops
    - Branches
  - Expressions
- Main Function
  - Defines the start point of the execution

Model-to-code transformation

- No intermediate model
  - Metamodels created to work together
- Transformation code written in Xtend
- Class structure generated from structural model
- Method bodies retrieved from behavioural model
- Special case: Program entrypoint (main method)
- Supports Java and C++ code generation

Future work

- Add more functionality
  - Class and interface inheritance
  - Support for more datatypes, operators etc.
  - Ability to choose standard library packages to import
- Support for more languages
- Add some sort of validation

Summary

- A model is an abstraction
- Object-oriented program representation
  - Structure
  - Behaviour
- Program is realized from model through transformation
- Somewhat limited functionality
- Validation of end result left completely to compilers

Demo

Thank You!

Questions?