

Towards a Standard Schema for C/C++

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Introduction

- GXL (Graph eXchange Language)
- Schema
- Model
- Standard Schema
- Catalogue of issues to be considered for defining a standard schema

Motivation

- Building tools is expensive
- A SEF offers an infrastructure for tool interoperability and reuse
- Fundamental issues:
 - Standard schema for C/C++ at AST level
 - Defining a schema rather than a front end
 - Independence from parsing technologies
 - ANSI C++

Classifications of existing schemas

- According to the methods for deriving the schema from the grammar:
 - Automatically derived schemas
 - Manually derived schemas
- According to language dependence
 - Language-specific
 - Language-independent
- API

Datrix Schema

- Bell Canada
 - Represents ASTs for C/C++ and Java
 - Common front end for software analysis and assessment
- University of Waterloo
 - Andrew Malton, Tom Dean, Ric Holt
 - CPPX – open source, based on GNU GCC
 - Freely available

Columbus Schema

- University of Szeged & Nokia Research Center
 - C/C++ Schema
 - Columbus front end for various re- and reverse engineering tasks
- FrontEndART Ltd.
 - New owner of Columbus
 - Freely available soon for academic purposes

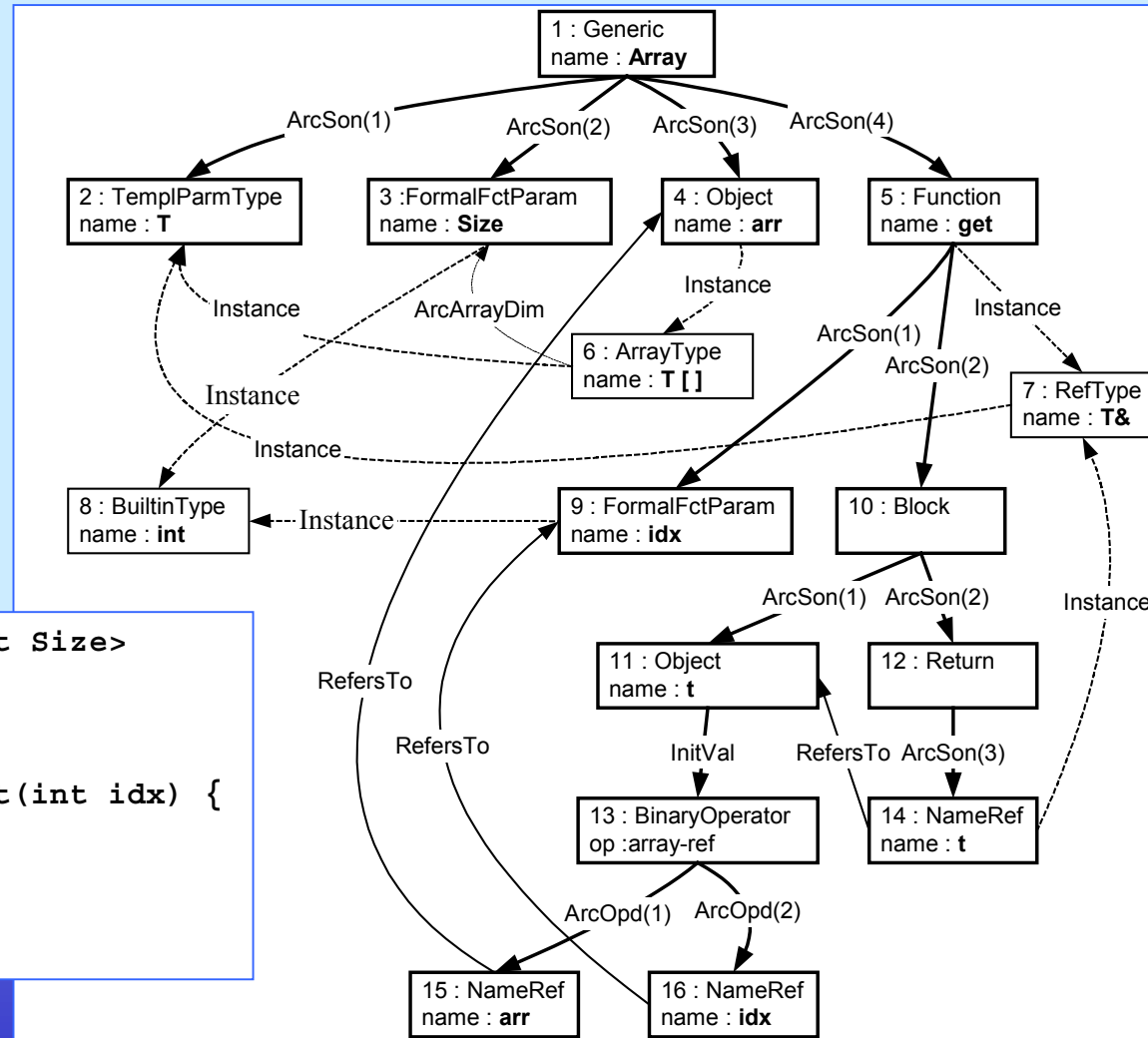
Catalogue of representation Issues

- Lexical Structure
 - Preprocessing
 - Line/column number problem
 - Project handling problem

- Syntax
 - Templates
 - Types
 - Functions
 - Statements

- Semantics
 - Naming problem
 - Resolution problem

Matrix representation of types



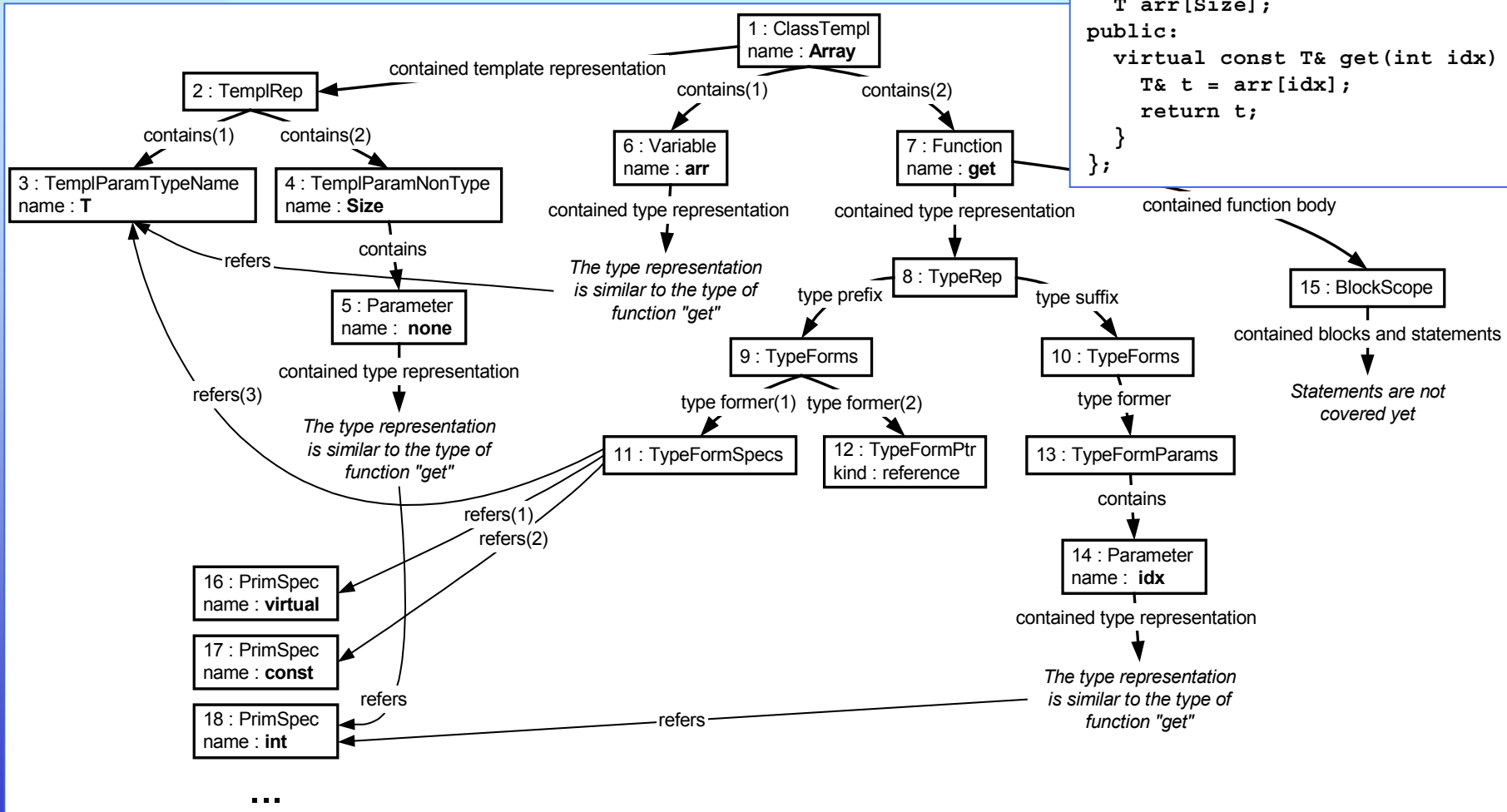
```

template <class T, int Size>
class Array{
    T arr[Size];
public:
    virtual const T& get(int idx) {
        T& t = arr[idx];
        return t;
    }
};
    
```

Columbus representation of types

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Discussion

- Comparison of the two schemas
- Other approaches

Conclusion

- Continue our work on creating a standard schema for C++ at the AST level
- A hope to advance the state of tool interoperability
- Mailing list:
 - <http://rgai.inf.u-szeged.hu/mailman/listinfo/gxl-cpp>