Intro to Design Patterns and the Unified Modeling Language

CSC207 Fall 2017

Computer Science
UNIVERSITY OF TORONTO

Iterator Design Pattern

Context

- A container/collection object.

Problem

- Want a way to iterate over the elements of the container.
- Want to have multiple, independent iterators over the elements of the container.
- Do not want to expose the underlying representation: should not reveal how the elements are stored.

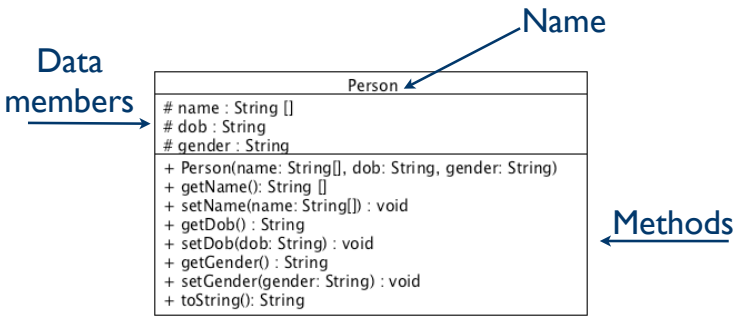
UML

Unified Modeling Language (UML)

A way to draw information about software, including how parts of a program interact.

We'll use only a small part of the language, Class Diagrams, to represent basic OO design.

Example: Class Person



Notation

Data members:

```
name: type
```

Methods:

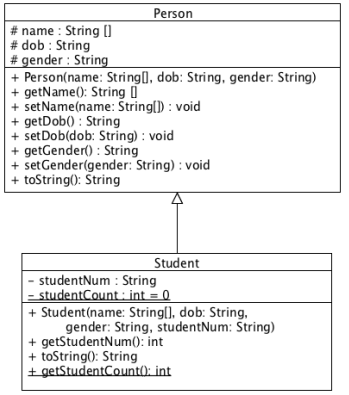
```
methodName(param1: type1, param2: type2,... ): returnType
```

Visibility:

- – private
- + public
- # protected
- ~ package

Static: <u>underline</u>

Example: Inheritance



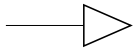
Notation (cont'd)

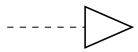
Abstract method: *italic*

Abstract class: *italic* or <<abstract>>

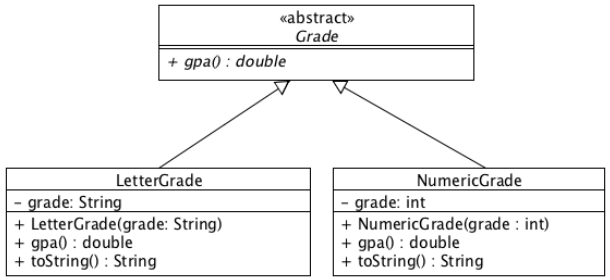
Interface: <<interface>>

Relationship between classes:

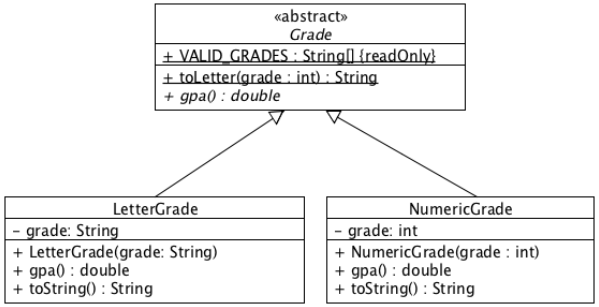
Inheritance 

Interface 

Example: Abstract Class



Example: Abstract Class



Design Patterns

A **design pattern** is a general description of the solution to a well-established problem using an arrangement of classes and objects.

Patterns describe the shape of code rather than the details.

They're a means of communicating design ideas.

They are not specific to any one programming language.

You'll learn about lots of patterns in CSC301 (Introduction to Software Engineering) and CSC302 (Engineering Large Software Systems).

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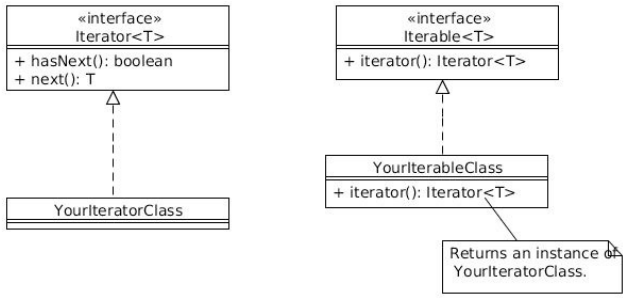
Iterator Design Pattern: Java



Iterator: Example in Java