CS 2334: Lab 4
Inheritance and Polymorphism

Class Inheritance

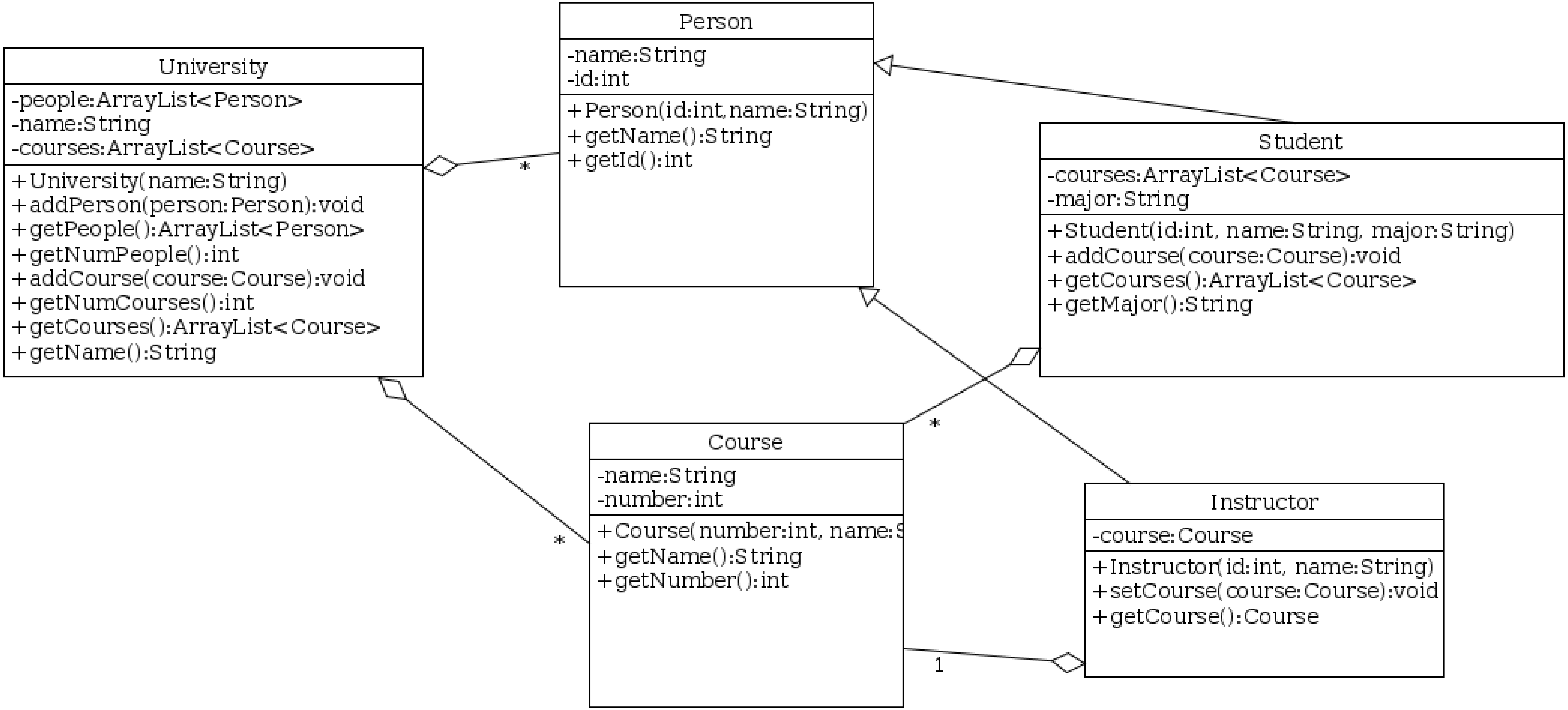
- We have already studied “has-a” relationships between classes: one class containing references to other classes
- Class inheritance captures the idea that one class “is-a” special case of another class
- Terminology:
  - Child class or subclass
  - Parent class or superclass

Lab 4

Given a UML diagram that describes the relationships between object classes:

- Implement each class, including specified instance variables and methods
- Implement testing procedures for the classes

Representing People and Courses at a University



Person
-name:String
-id:int
+Person(id:int,name:String)
+getName():String
+getId():int
University
-people:ArrayList<Person>
-name:String
-courses:ArrayList<Course>
+University(name:String)
+addPerson(person:Person):void
+getPeople():ArrayList<Person>
+getNumPeople():int
+addCourse(course:Course):void
+getNumCourses():int
+getCourses():ArrayList<Course>
+getName():String
*
Student
-courses:ArrayList<Course>
-major:String
+Student(id:int, name:String, major:String)
+addCourse(course:Course):void
+getCourses():ArrayList<Course>
+getMajor():String
*
Course
-name:String
-number:int
+Course(number:int, name:S
+getName():String
+getNumber():int
*
Instructor
-course:Course
+Instructor(id:int, name:String)
+setCourse(course:Course):void
+getCourse():Course
1

Implementation: Is-a vs Has-a

- Inheritance (is-a):
  - Use *extends* keyword in the definition of the class
  - Use *super* keywords to refer to methods and properties defined by the superclass

- Composition (has-a):
  - No special keywords
  - But: includes object references as instance variables

Lab 4 Preparation

- Download lab4-initial.zip
- Import into your Eclipse project

(details of how to do this are in the lab specification)

Lab 4

- Create each class in the UML diagram
  - Watch spelling and casing
  - Use the default package
- Implement attributes and methods
  - Classes are dependent on each other, so you will have temporary errors while you implement
- Expand on the given test class to make sure it all works

Submission

- Submit only one file: lab4.zip (casing matters)
- Due date: Friday, September 18th @11:59pm
- Submit to lab4 dropbox on D2L

Notes

- Rubric for each lab and project tells you what we are specifically looking for when we are grading your assignments
- Don’t forget to:
  - Add documentation where appropriate
  - Run javadocs **after** your documentation is complete
- Be sure that you are submitting your completed lab, and not the downloaded file that you started with. To decrease the chances of confusion, the zip file that you download will be called *lab4-initial.zip*