Object Oriented Programming

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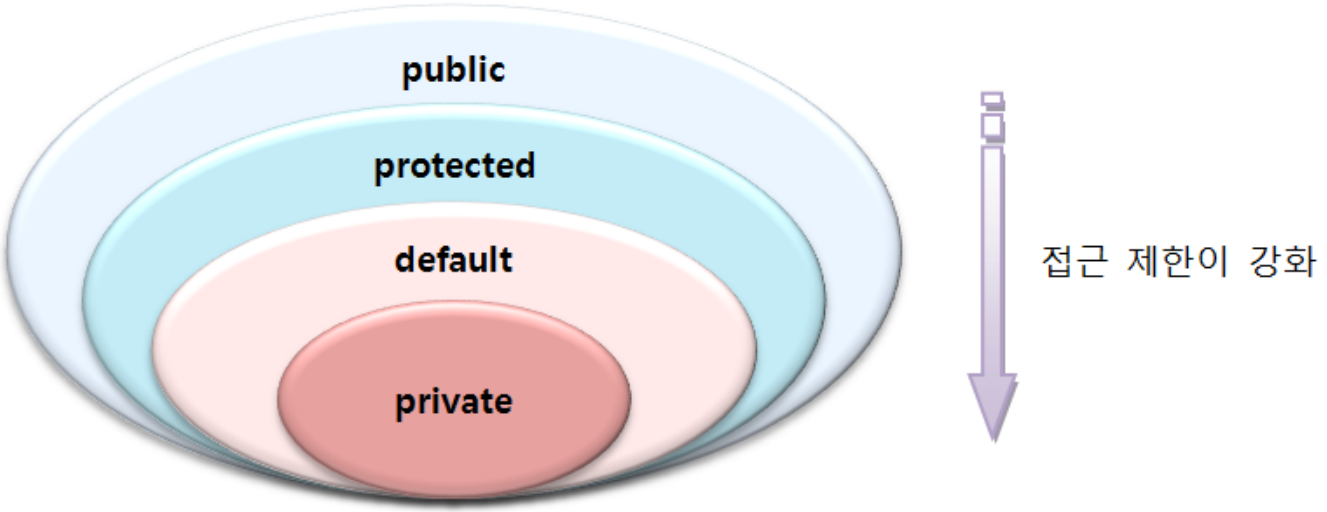
Announcements

- Homework 4 explanation
- Create a ScienceLibrary class that extends Library
- Create a Computer class
- ScienceLibrary has a field – an array of Computers

Access Modifiers in a Picture



접근 제한	적용 대상	접근할 수 없는 클래스
public	클래스, 필드, 생성자, 메소드	없음
protected	필드, 생성자, 메소드	자식 클래스가 아닌 다른 패키지에 소속된 클래스
default	클래스, 필드, 생성자, 메소드	다른 패키지에 소속된 클래스
private	필드, 생성자, 메소드	모든 외부 클래스

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Access Ranges

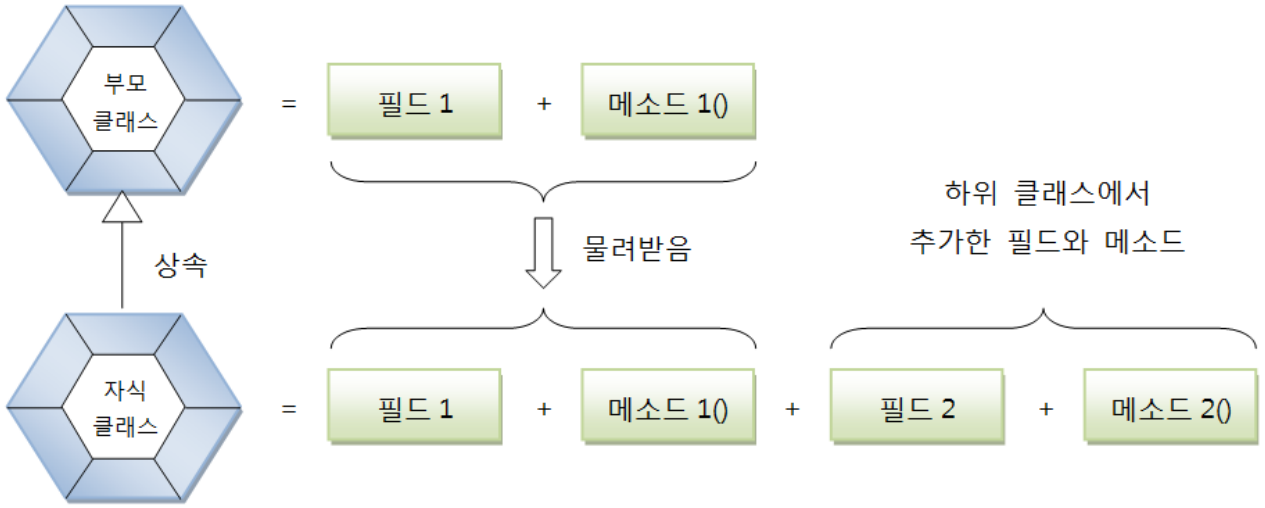
- public
  - All fields and methods can be utilized from any other classes
- protected
  - All fields and methods in a same package can use it
  - All child class can use parent class's members
- default
  - Similar to protected, but a child class from a different package of a parent class cannot access it
- private
  - The fields/methods can be accessed only within the class

Getter and Setter Method for Fields

- Why setting fields as private and provide public method
  - To guarantee integrity of field value
  - Imagine what happens an external object sets a field (age) as negative? We can avoid such scenario (by sanity checking)
- Getter method
  - Allows an external method to read a private field
  - By convention, getter name starts with ”is” (boolean) or “get” (except boolean)
- Setter method
  - Allows an external method to set a private field
  - Performs sanity check
  - By convention, setter name start with “set”

Inheritance

- In reality, inheritance means handing in legacies from parent to children
- In OOP, it lets fields and methods of parent class to be used in a child class
  - A child class can inherit from a parent class



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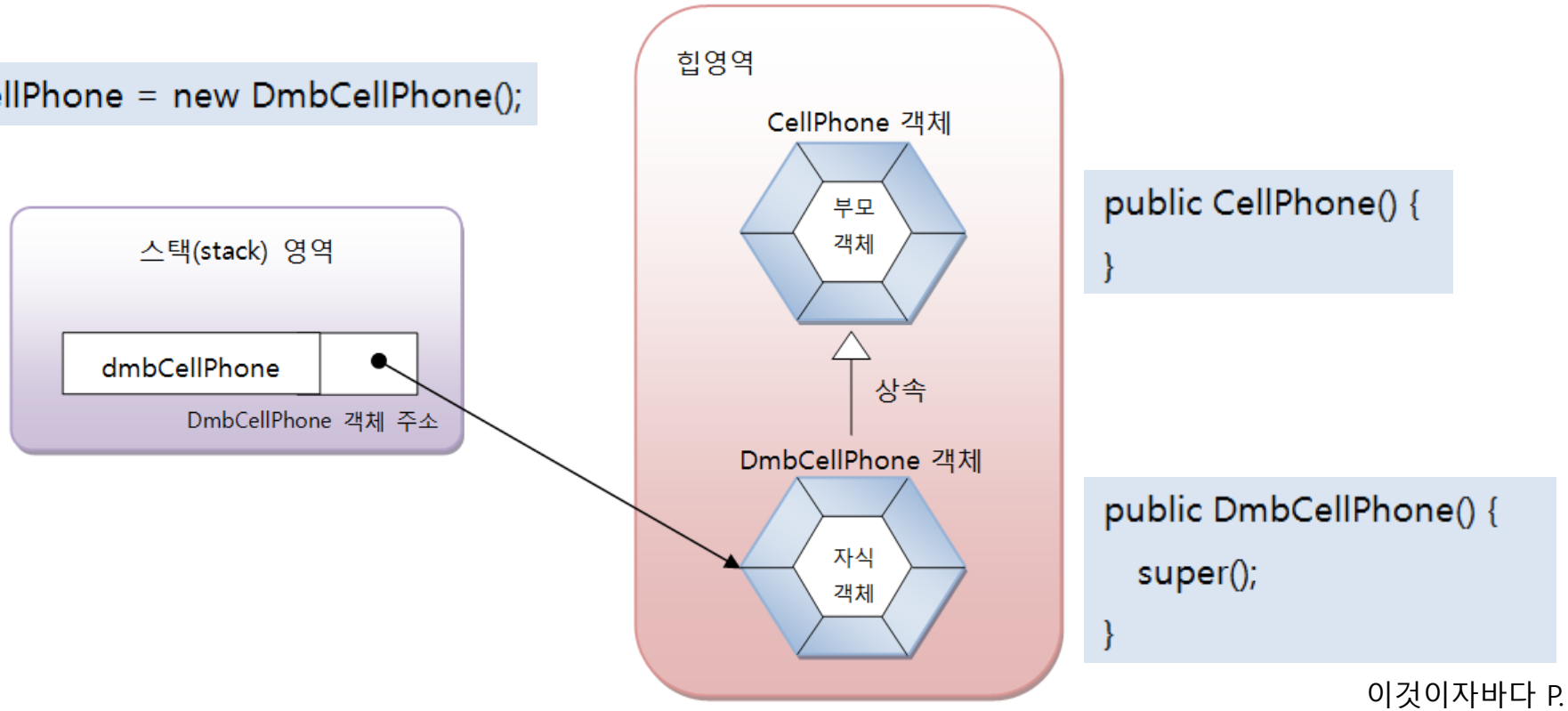
Advantages of Inheritance

- A child class reuses methods/fields declared by the parent class
- Avoid code duplication
  - Code reuse
- Good for maintenance
  - Fixing a method from a parent class can be reflected to child classes automatically
- Polymorphism
  - Same signature but different code body

Constructor Execution

- Creating a child class (using new) also inherits a parent class
  - Sequence: Parent class constructor → child class constructor

```
DmbCellPhone dmbCellPhone = new DmbCellPhone();
```




```
public CellPhone() {
}
```

```
public DmbCellPhone() {
   super();
}
```

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Child Class Constructor Execution

- Remember that not adding a custom constructor automatically adds a default constructor
  - If a child class inherits a parent class, the default constructor automatically calls the parent class constructor
- Calling a parent class constructor
  - super
- Calling "super" allows to specify input arguments when calling parent constructor
- The super() should be located at the very first line of child class constructor

```
자식클래스( 매개변수선언, ... ) {
  super( 매개값, ... );
  ...
}
```

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Explicitly Calling Parent Constructor

- If a parent class has a constructor that does not take any arguments, a child class can skip to calling super()
- If a parent class has a constructor with arguments (no empty argument constructor), the child class has to call super with arguments explicitly
- Example
  - People and Student

Method Overriding

- A child class can can use/access parent class method (protected methods)
- Overriding allows rewriting a method that is inherited from a parent class
- If a overridden method is called from an object of child class, the method declaration by a child class is executed

How to Override

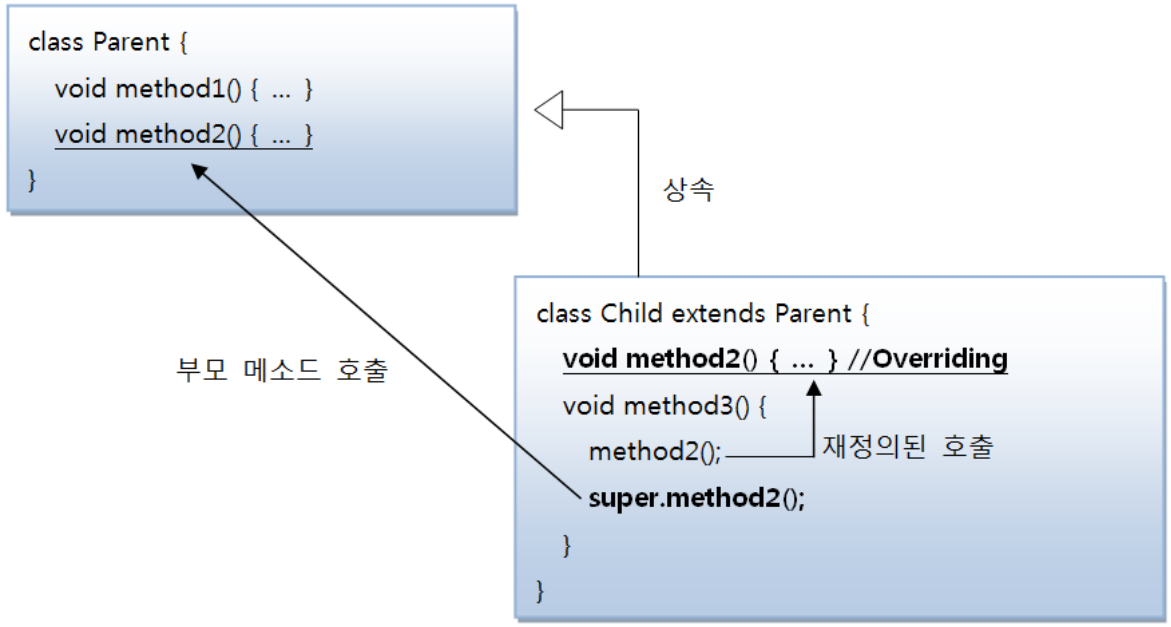
- When overriding a method, the signature should be identical with that of parent class
- The access modifier cannot be set as stricter than original
  - Parent: public, child should be public and private/protected cannot be
  - The reverse is possible
- For a method that you want to override, add @Override annotation

@Override Annotation

- Annotation provide context information (metadata) of methods/fields and it starts from @
- @Annotation
  - Let a compiler to check if signature of a method matches one in the parent class

Calling Parent Method After Override

- After overriding a method from a child class, to access the parent's method, we can use super



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References

- 이것이자바다 – 한빛미디어 2015