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COMP90041

Programming and Software Development

Tutorial 4 The Anatomy of Classes & Methods

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Overview

1. Classes & Objects
2. Methods
3. Exercises & Lab

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1. Classes & Objects

Classes & Objects

Class (Template)

A class holds operations and data related to one concept.

Object (Instance)

An object(instance) is created based on template (a class's definition)

Create an object

Constructor

A special method that lives in the class instantiates an object(instance)

```
Classname myObject = new Classname(…);
```

Java Class

```
public class Dog {
    //-------------- All instance variables ------------------
    private String name;
    private int age;
    private String breed;

    //--------------------- Constructor ----------------------
    public Dog(String name) {
        this.name = name;
    }

    //-------------- All method definitions ------------------
    public void bark(){
        System.out.println("The dog " + name + " is barking");
    }

    public void wagTail(){
        System.out.println("The dog is waging tail");
    }
}
```

Create an Object

```
public class Dog {
    //-------------- All instance variables ------------------
    private String name;
    private int age;
    private String breed;

    //--------------------- Constructor -----------------------
    public Dog(String name) {
        this.name = name;
    }

    //-------------- All method definitions ------------------
    public void bark(){
        System.out.println("The dog " + name + " is barking");
    }

    public void wagTail(){
        System.out.println("The dog is waging tail");
    }
}
```

```
Dog myDog = new Dog("Bella");
```

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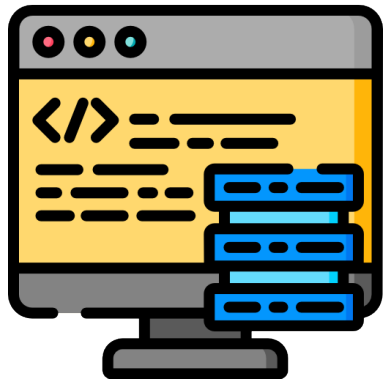
2. Methods

Methods

- `Static` method
- `Non-static` method



Java Class

```
public class SampleClass {

    public static void method1(){
        method2();
    }

    public void method2(){
        method1();
    }
}
```

Call a static method

```
SampleClass.method1();
```

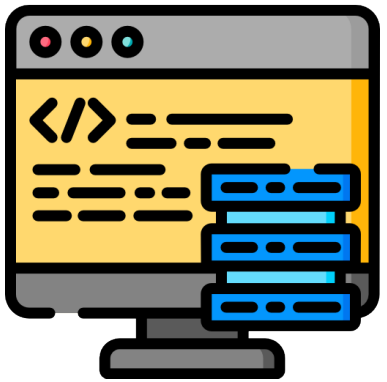
Call a non-static method

```
SampleClass myObject = new SampleClass();

myObject.method2;
```

Methods

- Return
- No return



Methods

Return a result

- `public double computeGPA(double sub1, double sub2)`

Just doing something

- `public void enrollStudent(int studentID)`

Use a returned value

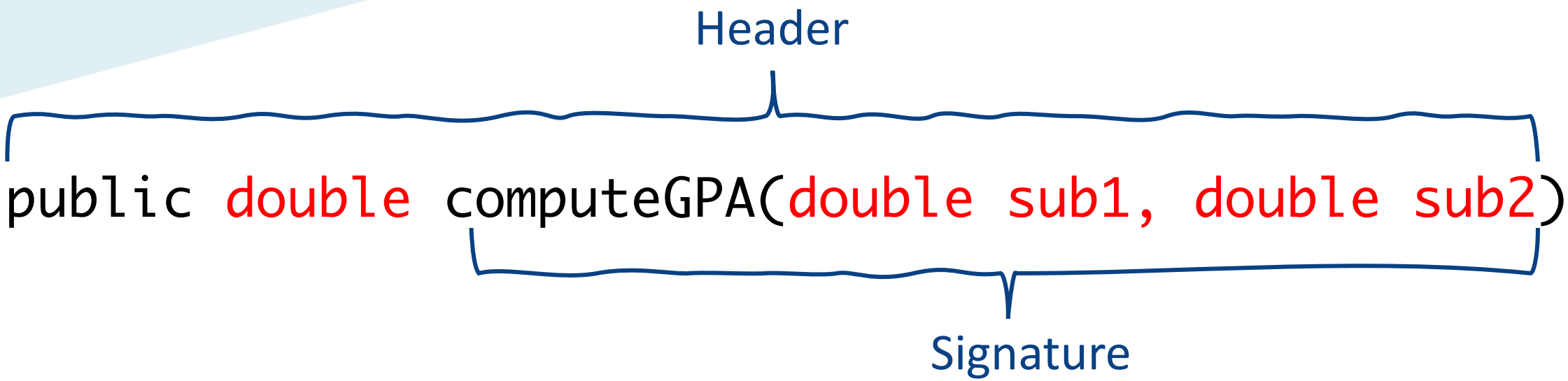
```
public double computeGPA(double sub1, double sub2){
        return System.out.println( (sub1 + sub2) / 2 );
}
```

Callee

```
public void showGrade(){
        double result = computeGPA(80.2, 75.6);
        if (result >= 80){
                System.out.println("h1");
        }
}
```

Caller

Overloading




```
public double computeGPA(int studentID)
```

Access modifier

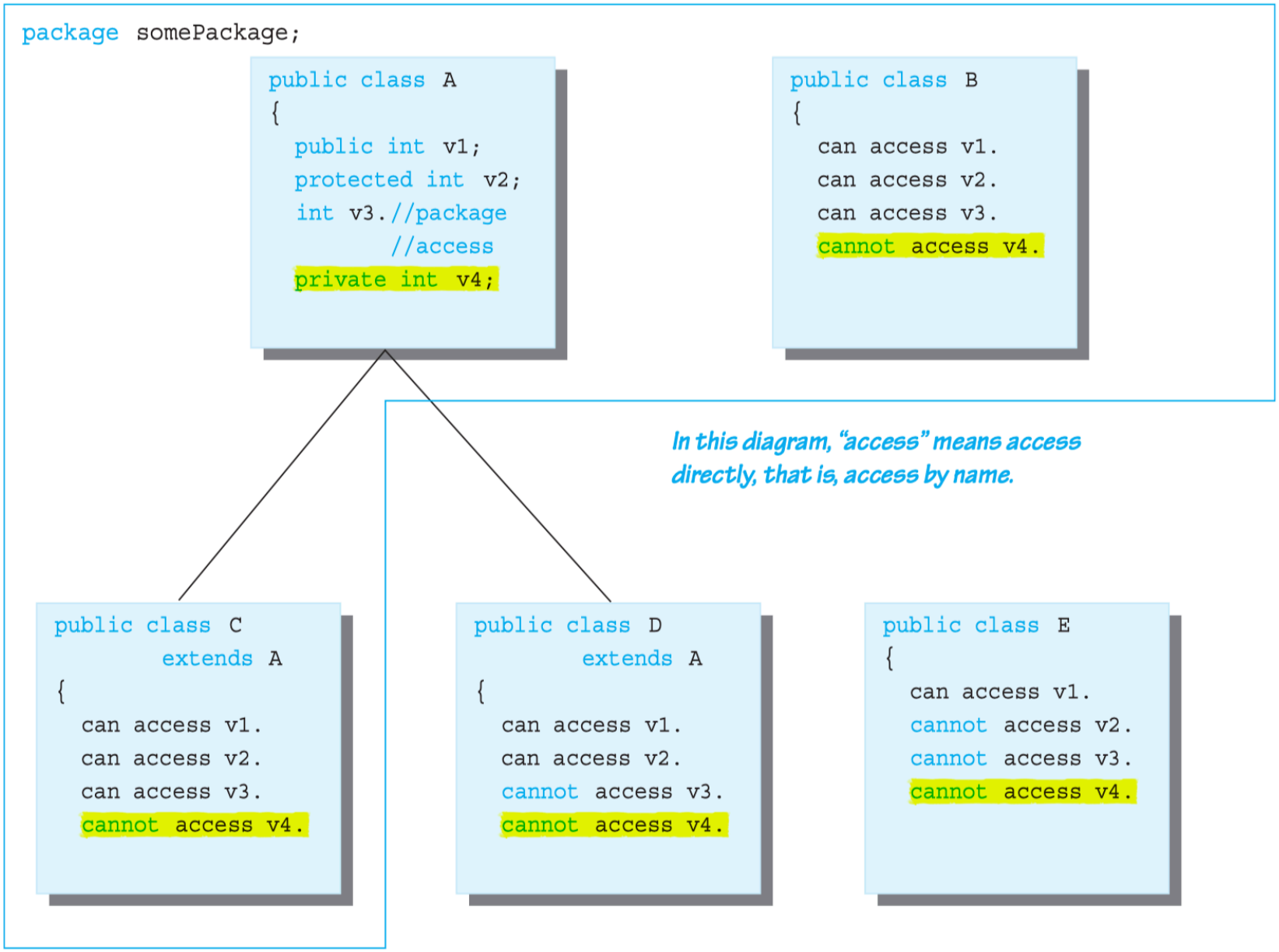
- `public`

no restrictions on where the instance variable/method can be used

- `private`

the instance variable/method cannot be accessed by name outside of the class definition.

Access modifier



Referenced from book <Absolute Java> P489

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4. Exercise

Tutorial Exercise

1. Write a class method called `printMovies` that prints a list of your top 5 personal favourite movies. The output of this method should be in a numbered list, as follows:

   ```
   1. The Avengers
   2. Iron Man
   3. ...
   ```

2. *Overload* your `printMovies` method to accept two arguments - an integer and a `String`, which represent the rank and title of someone's favourite movie. Your method should then print the movie, with its rank, as above. For example, `printMovies(3, "Guardians of the Galaxy")` should output

   ```
   3. Guardians of the Galaxy
   ```

   Revise your solution to Exercise 1 to use your method for this exercise to print out your 5 favourites.

Homework

3. Write a class method called `isAFavourite` which accepts a single `String` argument, and returns `true` if the argument is one of the movies contained in your list of favourites, and false otherwise.

   Hint: Store your list as a single `String`

   Hint: The `String` method `contains(arg)` returns `true` if the argument is contained in the string. For example, `"hello".contains("hell")` will return `true`.

4. **Challenge:** *Overload* your `printMovies` method again to accept a single `String` argument, where the string is a list of movies separated by commas. Your method should then print each movie on a separate line, numbered by the order you print it.
   For example, `printMovies("The Avengers, Iron Man, Thor")` should output

   ```
   1. The Avengers
   2. Iron Man
   3. Thor
   ```

   Again revise your solution to Exercise 1 to use this new method for print out your 5 favourites.

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Thank you