THE UNIVERSITY OF MELBOURNE

Lab4（week6）

COMP90041 Programming and software development

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Methods

- static methods
- instance methods/ non-static methods

demo1

static methods

call methods

- Form: `Class.method(expr1, expr2, ...)`
- The `expr`s, called arguments, provide data for the method to use

- General form (for now):

```
public static type name(type1 var1,type2 var2,...) {
    ⋮
}
```

- Each `var` is called a parameter
- Then body (⋮ part) of method is executed
- Types of corresponding arguments and parameters must match
- `type` is type of result returned

void

- `main` is a class method we've been defining
- Java executes the `main` method when running an application
- Begins with:

```
public static void main(String[] args) {
```

- Ends with:

```
}
```

headers and Signatures

demo1

- First part of method definition (up to {) is called the method header
- Method name plus number and types of arguments together are called the method signature

header

```
public static double calint(int a, double b) {
    return a + b;
}
```

signature

overloading

- Overloading: when a method name has multiple definitions, each with different signature
- Java automatically selects the method whose signature matches the call
- You cannot overload based on return type, only parameter types

wrong!

```
int    bad(int x, double y) {...}
double bad(double x, int y) {...}
```

defining constants

- Form:

```
public static final type name = value;
```

- *E.g.*:

```
public static final int DAYS_PER_WEEK = 7;
public static final int CARDS_PER_SUIT = 13;
```

- Best practice: don't sprinkle mysterious numbers in your code, define constants instead

x % 2 == 0

magic number!

local variable

demo2

- Variables declared inside methods are local to the method (cannot be used outside)
- Local variables cannot be declared `public` or `private`

class variables (static)

- Class variable is a variable that is local to a class
- Can be declared either `public` or `private`
- It should almost always be `private`
  - Difficult to control if every method can modify it

instance variable

- Instance variables, which hold the data of an object

Form: `private type name;`

```
public class Person {
    private String familyName;
    private String givenName;
    ⋮
}
```

- Local variables live in a method; class variables live in a class; instance variables live in an object

Call a static method

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

Call a non-static method

```
SampleClass myObject = new SampleClass();

myObject.method2;
```

instance(non-static) methods

- (Instance) methods, which define the operations (code) of an object

objects

- Each object is an instance of some class

template!

demo2

A class holds operations and data related to one concept.

creating objects

- When creating an object, its instance variables need to be initialised to appropriate values
- Constructors are special methods responsible for this

```
public ClassName(type1 var1,...) {
    ⋮
}
```

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

```
public class SampleClass {

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

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

1

2

toString method

dog demo

if p is a Person object

- What should `System.out.print(p)` print?
- Define a public method `String toString()`

```
public String toString() {
    return givenName + " " + familyName;
}
```

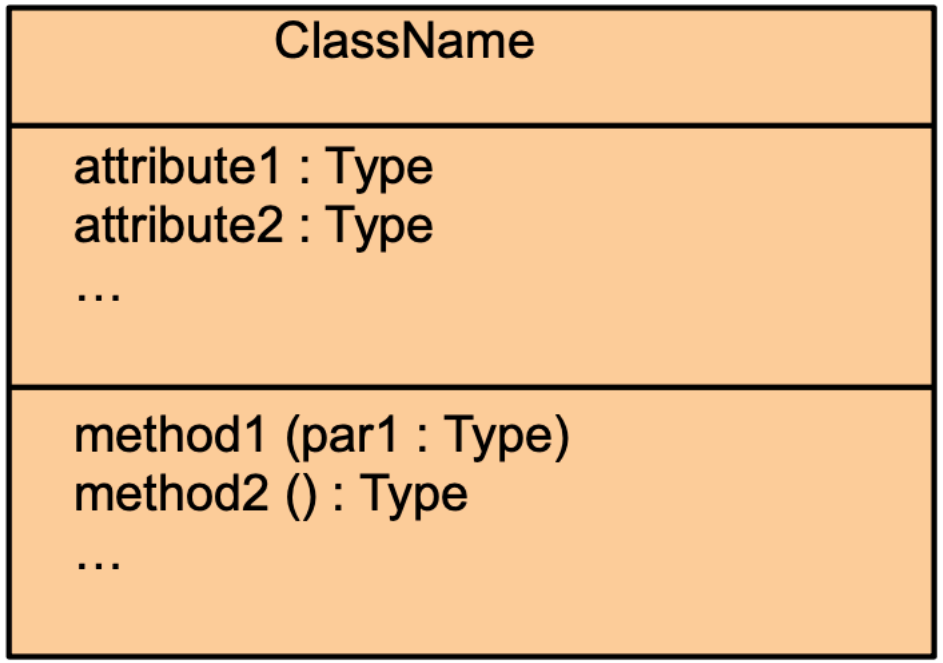
getter//setter

```java
public class Person {
  private String name; // private = restricted access

  // Getter
  public String getName() {
    return name;
  }

  // Setter
  public void setName(String newName) {
    this.name = newName;
  }
}
```

UML



- Each name is preceded by a character that specifies its access type:
  - A minus sign (-) indicates private access
  - A plus sign (+) indicates public access
  - A sharp (#) indicates protected access
  - A tilde (~) indicates package access

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Thank you