

COMP 250

INTRODUCTION TO COMPUTER SCIENCE

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Week 3-3: OOD2 Constructors, this

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FROM LAST VIDEO

- Packages
- Fields
- Modifiers

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MODIFIERS REVIEW – OUTER CLASS

Dog.java

```
package animals;  
  
public class Dog {  
    :  
}
```

Farm.java

```
package buildings;  
import animals.Dog;  
  
public class Farm {  
    Dog d;  
    :  
}
```

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Does the compiler allow this?

➤ Yes

MODIFIERS REVIEW – OUTER CLASS

Dog.java

```
package animals;  
  
class Dog {  
    :  
}
```

Farm.java

```
package buildings;  
import animals.Dog;  
  
public class Farm {  
    Dog d;  
    :  
}
```

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Does the compiler allow this?

- No, the class `Dog` is visible only within its package!

MODIFIERS REVIEW – FIELDS

Dog.java

```
package animals;
```

```
public class Dog {
```

```
    public String name;
```

```
    :
```

```
}
```

Farm.java

```
package buildings;
```

```
import animals.Dog;
```

```
public class Farm {
```

```
    Dog d;
```

```
    public void f() {
```

```
        d = new Dog();
```

```
        d.name = "Jessie";
```

```
    }
```

```
}
```

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Does the compiler allow this?

- Yes (but remember, as a general rule fields should be declared private)

MODIFIERS REVIEW – FIELDS

Dog.java

```
package animals;

public class Dog {
    String name;
    :
}
```

Beagle.java

```
package animals;

public class Beagle {
    Dog d;

    public void f() {
        d = new Dog();
        d.name = "Buddy";
    }
}
```

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Does the compiler allow this?

- Yes, the field `name` is visible within the package `animals`.

MODIFIERS REVIEW – FIELDS

Dog.java

```
package animals;

public class Dog {
    private String name;
    :
}
```

Beagle.java

```
package animals;

public class Beagle {
    Dog d;

    public void f() {
        d = new Dog();
        d.name = "Buddy";
    }
}
```

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Does the compiler allow this?

- No, name is visible only within the class Dog.

WARM-UP

- We would like to define a new data type that represents a hospital Patient.
- In this class we'd like to have the following fields:
 - A field to store the name of the patient
 - A field to store the age of the patient
 - A field to store the body temperatures of the patient since the day they were admitted to the hospital
 - A field to store the body temperature considered to be a possible fever.

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INITIAL VALUES

One thing we noticed is that the initial values of the attributes are all set by default (based on their type) when an object is created.

For example

```
Patient x = new Patient();  
System.out.println(x.name); // prints null  
System.out.println(x.age); // prints 0  
System.out.println(x.temps); // prints null
```

If we want to specify the initial values to be something other than this, we should add a method to our class called constructor.

WHAT ARE WE GOING TO DO IN THIS VIDEO?



OOD2

- Constructors
- Keyword `this`

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CONSTRUCTORS

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STEP 2

```
public class ClassName {
```

```
// some data declared here
```

```
<modifier> <type> <variable_name>;
```

Data

```
public ClassName () {
```

```
//constructor
```

```
}
```

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Method to create an object

```
// declare other methods
```

Other methods

```
}
```

File name: **ClassName.java**

CREATING OBJECTS

- Remember how we created objects:

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```
Random g = new Random();  
Random gen = new Random(123);
```

- We now need to write the code to create our object.

CONSTRUCTORS

A method that is executed when a new object of that class is created. The syntax for constructors is similar to that of other methods, except:

- The name of the constructor method **must** be the same as the name of the class.
- It has no return type (not even void!)
- It is non-static

CONSTRUCTORS

If you don't write a constructor, the default constructor for a class looks like:

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```
public class Main() {
```

```
}
```

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If you write your own constructor, you no longer have access to the default constructor.

TRY IT!

1. Let's write a constructor for the Patient class that takes no input and prints out "Creating a new patient".

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2. Add now another constructor to the class. This constructor should take the name of the patients and their age as input and assigns them to the corresponding attributes attributes.

THE `this` KEYWORD

- `this` is a keyword that refers to the object on which the method have been called. In the case of a constructor, `this` refers to the current object being created.
- It allows Java to distinguish between attributes and local variables that have the same name.
- You can use `this` the same way you use the name of any other object. For example, you can pass `this` as an argument to other methods.
- NOTE: You do not declare `this`, and you can't make an assignment to it.

EXAMPLE

```
public class Patient {  
    private String name;  
    private int age;  
  
    public Patient(String name, int age) {  
        this.name = name;  
        this.age = age;  
    }  
}
```

Attributes!

Local variables!

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```
public class Patient{
    private String name;
    private int age;

    public Patient(String name, int age) {
        this.name = name;
        this.age = age;
    }

    public void printName() {
        System.out.println(this.name);
    }

    public static void main(String[] args) {
        Patient x = new Patient("John", 43);
        x.printName();
    }
}
```

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this refers to the object currently being created

this refers to the object on which the method was called.

THE THIS KEYWORD AND STATIC

It **never** makes sense to use the **this** keyword in a static method.

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A static method (or attribute) is associated to the entire class. The **this** keyword refers to an instance of the class.

OMITTING THIS

You can leave out `this` if there is no naming conflict:

```
public Patient(String name, int age) {  
    this.name = name;  
    this.age = age;  
}
```

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```
public Patient(String patientName, int patientAge) {  
    name = patientName;  
    age = patientAge;  
}
```

OVERLOADING

- In java, we can **overload** methods. This happens when we write two methods in the same class, with the same name, but different parameters.
- You cannot overload a method by just changing the return type/modifiers.

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```
public void someMethod(int x) { ...  
public void someMethod(int x, double y) { ...  
public void someMethod(String s) {...
```



```
public void someMethod(int x) { ...  
public int someMethod(int y) {...
```



WHY OVERLOADING?

```
System.out.println("Welcome!");
```

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```
System.out.println(123);
```

```
System.out.println(1.2);
```

```
System.out.println('c');
```

- The `println` method is overloaded! We can call the method and pass values with different types as input, and it always compiles.

WHY OVERLOADING?

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```
Random gen1 = new Random();
```

```
Random gen2 = new Random(123);
```

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- We cannot choose the name of the constructor. But we might want a constructor to sometimes take inputs and others not. In this case, we need to overload it.

TRY IT!

- In the `Patient` class, overload the constructor by adding another one that takes as input the name, age, and temperatures of the new patient.

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Does it make a difference if we copy the elements of the input array, or just the address directly?



Coming Soon

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In the next video:

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- Other methods

- Mutable vs Immutable

- Final variables