CSN-103: Fundamentals of Object Oriented Programming

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Overloading Methods

- When an overloaded method is invoked
  - Java uses the type and/or number of arguments to determine which overloaded method to call
- Overloaded methods may have different return type
  - The return type alone is **insufficient** to distinguish two overloaded methods
  - Return type **doesn't play** a role in overload resolution

Overloading Methods

- When an **overloaded** method is called:
  - Java **first** looks for an exact match between the **arguments** and **method's parameters**
    - **Number and type is matched**
  - if exact match method is unavailable
    - **Automatic type conversion → Overload resolution**

Overloading Constructor

- Similar to methods, constructors can also be overloaded

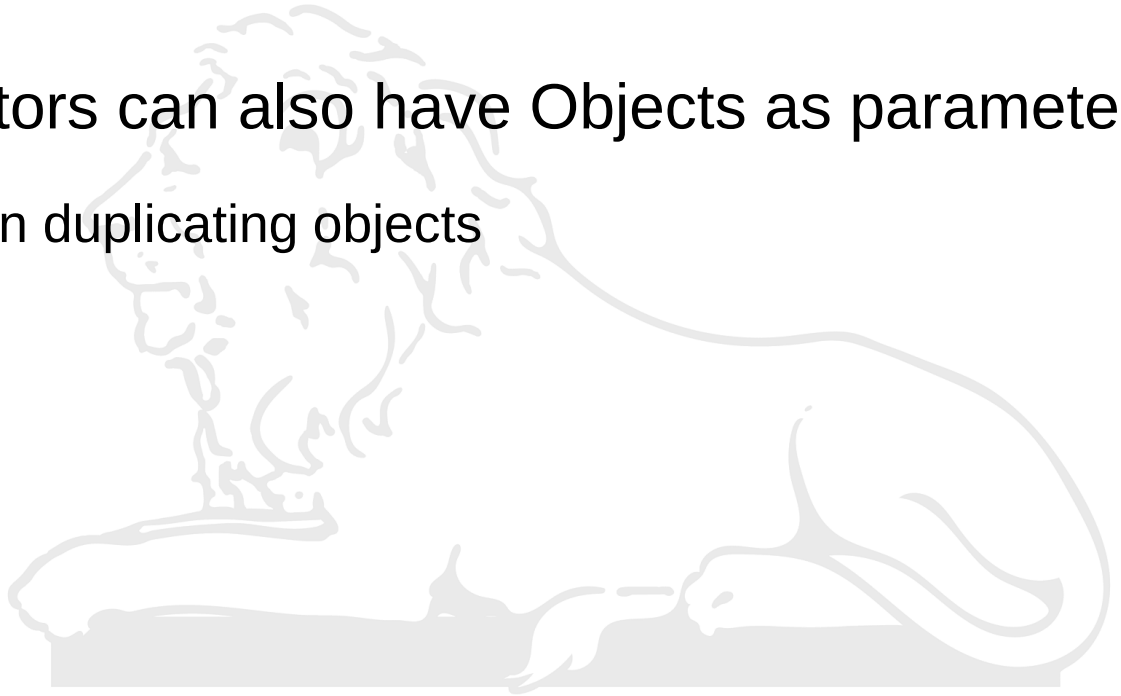
```
class Box {
    double width;
    double height;
    double depth;

Box(double w, double h, double d) {
    width = w;
    height = h;
    depth = d;
    }
}
```

```
class Overload3 {
public static void main(String args[]) {
    Box mybox1 = new Box();
    }
}
```

```
Overload3.java:15: error: constructor Box in class Box cannot
be applied to given types;
    Box mybox1 = new Box();
                 ^
  required: double,double,double
  found: no arguments
  reason: actual and formal argument lists differ in length
1 error
```

Objects as Parameters

- Just like primitive types, objects can also be used as **parameters** to methods
- Constructors can also have Objects as parameters
  - Useful in duplicating objects



Argument Passing

- Two ways:
  - Call-by-value: **Value** of argument passed to the parameter of subroutine

    Changes made to the parameter don't affect the argument
  - Call-by-reference: Reference to an argument is passed to the parameter of subroutine

    Changes made to the parameter will affect the argument
- In Java,
  - Primitive types: Call-by-value
  - Objects: Call-by-reference

Example: Call-by-value

```
class Test {
      void meth(int i, int j) {
      i *= 2;
      j /= 2;
      }
}

class CallByValue {
      public static void main(String args[]) {
      Test ob = new Test();
      int a = 15, b = 20;
      System.out.println("a and b before call: " + a + " " + b);
      ob.meth(a, b);
      System.out.println("a and b after call: " + a + " " + b);
      }
}
```

OUTPUT:

a and b before call: 15 20

a and b after call: 15 20

Example: Call-by-reference

```
class Test {
      int a, b;

      Test(int i, int j) {
       a = i;
       b = j;
       }

      void meth(Test o) {
      o.a *= 2;
      o.b /= 2;
      }
}
class CallByRef {
      public static void main(String args[]) {
      Test ob = new Test(15, 20);
      System.out.println("ob.a and ob.b before call: " + ob.a + " " + ob.b);
      ob.meth(ob);
      System.out.println("ob.a and ob.b after call: " + ob.a + " " + ob.b);
      }
}
```

OUTPUT:

ob.a and ob.b before call: 15 20

ob.a and ob.b after call: 30 10

Returning Objects

- Methods can return any primitive type and **class type** you create
- Note:
  - If an object created **anywhere** inside the program **will continue to exist** as long as there is a reference to it **somewhere** in the program
  - Create a temporary object inside a function and return its reference to use it in future