Objects and Classes
COMP SCI / SFWR ENG 2S03

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Real-World Objects

Real-world objects have:

- States or properties
- Behaviours

Real-World Objects: Example

Dog

States/Properties

- Name
- Breed
- Birth Year

Behaviour

- Bark
- Sleep
- Change Name

Java Objects

Java objects have:

- Reference variable (how we refer to the object)
- Reference type (type of object)
- Constructor(s) (how to create an object)
- Field variables (states or properties)
- Instance methods (behaviours and get/set methods)

Java Objects: Example

Field Variables (or Attributes)

```java
public class Dog {

  private String name;
  private int yearBorn;

  ...

}
```

What does private mean here?

Java Objects: Example

Constructors

```java
public class Dog {

  private String name;
  private int yearBorn;
  private static final int CURRENT_YEAR = 2012;

  public Dog () {
    name = "";
    yearBorn = CURRENT_YEAR;
  }

  public Dog (String name, int yearBorn) {
    this.name = name;
    this.yearBorn = yearBorn;
  }

}
```

What does public mean here?

Java Objects: Example

Instance Methods

```java
public class Dog {

  private String name;
  private int yearBorn;
  private static final int CURRENT_YEAR = 2012;

  ...

  public String getName() {
    return this.name;
  }

  public String setName(String name) {
    this.name = name;
  }

}
```

Java Objects: Example

Instance Methods (continued)

```java
public class Dog {

  private String name;
  private int yearBorn;
  private static final int CURRENT_YEAR = 2012;

  ...

  public int getAge() {
    return CURRENT_YEAR - this.yearBorn;
  }

  public void bark() {
    System.out.println(name + " says, \"Bark!\"");
  }

}
```

Java Objects: Example

Using a Class

```
Dog myDog = new Dog ("Sarge", 2000);
```

- Reference type: Dog
- Reference variable: myDog
- Constructor: Dog (String name, int yearBorn)
- Field variables: name, yearBorn