COMP 110/L Lecture 8

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Slides are adapted from Dr. Kyle Dewey

Outline

- `public` / `private`
- "Getters" and "Setters"
- `toString()` method
- Memory representation

public/private

public

Means it can be accessed from anywhere

public

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```java
public class PublicClass {
  public int i;
  public PublicClass(int x) {
    i = x;
  }
  public void printI() {
    System.out.println(i);
  }
}
```

Example

- `PublicClass.java`
- `PublicClassMain.java`

private

Means it can be accessed from **only** within the class

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```
public class PrivateClass {
  private int i;
  private PrivateClass(int x) {
    i = x;
  }
  private void printI() {
    System.out.println(i);
  }
}
```

Example

- `PrivateClass.java`
- `PrivateClassMain.java`

Why `public` / `private`?

- Intentionally allows / disallows certain interactions between objects

- Stove example: perhaps only the stove can turn its burner on - make it `private`

- Commonly used to force changes to instance variables to go through methods (much more predictable)

"Getters" and "Setters"

Getters

Methods that return the value of an instance variable. Generally, the instance variable is `private`.

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```
public class HasGetter {
  private int saved;
  public HasGetter(int x) {
    saved = x;
  }
  public int getSaved() {
    return saved;
  }
}
```

Example:
HasGetter.java

Setters

Methods that change the value of an instance variable. The instance variable is generally `private`.

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```java
public class HasSetter {
  private int saved;
  public HasSetter(int x) {
    saved = x;
  }
  public void setSaved(int to) {
    saved = to;
  }
}
```

Example:
HasSetter.java

Getter / Setter Purpose

- Access to instance variables forced to occur only via `get*` and `set*` methods

- These are the **only** points where change can occur

  - Much easier to predict and debug

toString() Method

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Method used to convert an object to a `String`.
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```
public class HasToString {
  private String held;
  public HasToString(String s) {
    held = s;
  }
  public String toString() {
    return held;
  }
}
```

Example:
`HasToString.java`

Memory Representation

On `new`

Each use of `new` creates a new object in memory.

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```
new Foo();
new Bar();
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In Memory

Foo

Bar

What `new` Returns

- `new` **returns a** *reference* **to the created object**

- **References can be copied just like** `int`, `double`, **etc.**

- **Copying a reference does not copy the underlying object**

-This is the difference between copying a house and copying an address.
- References act like addresses (and some languages even call them addresses!)

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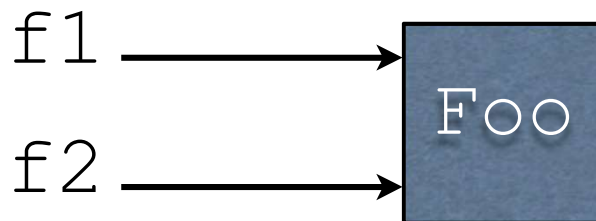- Copying a reference does **not** copy the underlying object

```
Foo f1 = new Foo();
Foo f2 = f1;
```

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f1 ⟶ [Foo]

f2 ⟶ [Foo]

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