COMP 110/L Lecture 8

Maryam Jalali

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

Means it can be accessed from anywhere

```
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

private

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

```
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
- If you allow your objects to have public states, then any piece of code can change your state!

- 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`.

Getters

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

```
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`.

Setters

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

```
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**

`toString()`

Method used to convert an object to a `String`.

Called automatically in `String` contexts.

`toString()`

Method used to convert an object to a `String`.

Called automatically in `String` contexts.

```
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.

On `new`

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

```
new Foo();
new Bar();
```

On `new`

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

```
new Foo();
new Bar();
```

In Memory

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!)

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

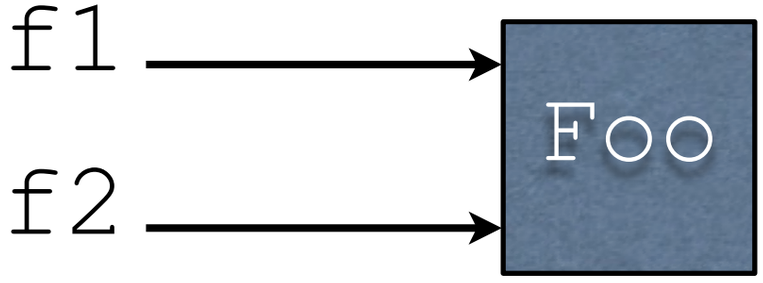
```
Foo f1 = new Foo();
Foo f2 = f1;
```

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

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

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



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