COMP 110/L Lecture 21

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Outline

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

public/private

`public`

Means it can be accessed from anywhere

public

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```
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.

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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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```
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`.

Called automatically in `String` contexts.

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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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In Memory

What `new` Returns

- `new` returns a *reference* to the created object
- References can be copied just like `int`, `double`, etc.
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```
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int[] arr2 = arr1;
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```

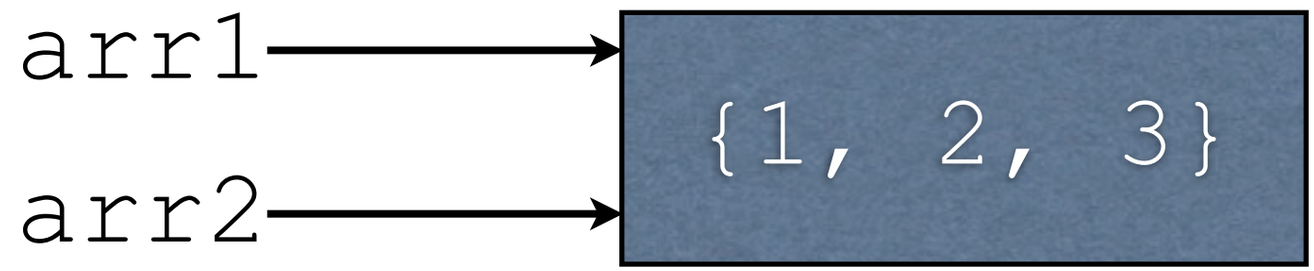

null

`null`

- Special reference value
- Doesn't actually refer to anything
- Can be checked against with ==, !=

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```
int[] arr = null;
if (arr == null) {
   System.out.println("no array");
} else {
   System.out.println("have array");
}
```

Example:

CheckNull.java

`NullPointerException`

Occurs whenever you try to use `null`

as if it were a normal object.

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```
int[] arr = null;
arr[0]; // causes NPE
```

Example:

CausesNPE.java