# Static vs. Instance



## **Learning Objectives**

- Understand the difference between static and instance variables and methods
- Learn some uses of static variables and methods



## **Static**

Static is a modifier - it is added to a method or variable

Means that only one copy exists for all objects of that class

All objects share this variable or method



### Counter

In Book class:

```
private static int num;
private int bookID;
```

In the constructor:

```
num++;
bookID = num;
```

Every time a new Book variable is created this count goes up by one.

#### **Constants**

public static final double PI = 3.14159265;

Constant is a value that cannot change.

The variable name is usually typed in all uppercase letters.



### **Static Variables**

In general they are used to:

Create a counter

private static int num;

Create constants

public static final float PI = 3.14159265

## **Example Methods**

public static void main

**static** means you do not need to create an object to use the method



## **Static Methods**

Do not need to create an object to use them

Examples:

Math.random()

You get to these methods by using the Class name and the dot operator (.)



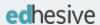
#### **Non-Static Methods**

Must create an object to use them

## Examples:

```
Circle c = new Circle(5);
c.getArea();
```

You get to these methods by using the object name and the dot operator (.)



## **Try It Yourself**

Add a public static method to your Book class, called getNextID().

The method should return the current num + 1.

Practice using this in the U5L8\_template main method to see how you call a static method.

