# Inheritance

Mr. Poole
Java

# Introducing Inheritance

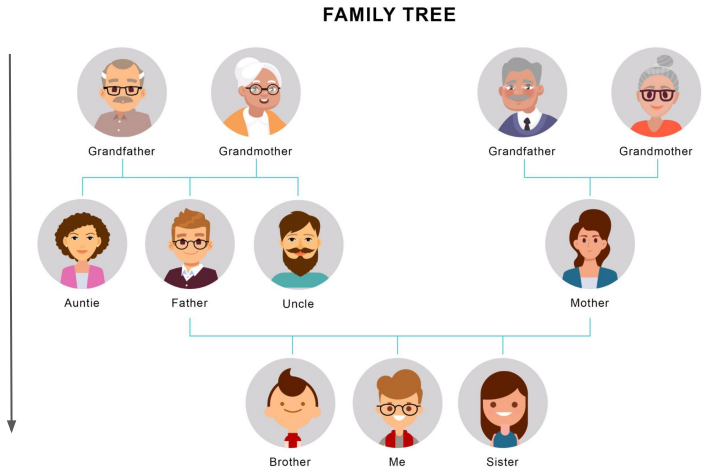
**Inheritance** allows us to **pass methods and values down** from the inherited class.

Passing information down helps **reduce the amount of code**!

It’s just like family inheritance.

Parents pass traits down to their children.

Let’s go over an example.



# Inheritance Example

Let’s imagine we have these two classes.

Compare them!

What’s different and what’s the same?

Greyhound Class
- String color = “grey”;
- void bark();
- boolean isFast();

Corgi Class
- String color = “golden”;
- void bark();
- boolean hasSmallLegs();

# Inheritance Example

First off, they're **both dogs**!

They have different colors and different methods.

They have the **same bark method** though!

Greyhound Class
- String color = "grey";
- void bark();
- boolean isFast();

Corgi Class
- String color = "golden";
- void bark();
- boolean hasSmallLegs();

# Inheritance Example

Since they’re similar, let’s make a general Dog class that can be inherited!

Dog class
- void bark();

Greyhound Class
- String color = “grey”;
- void bark();
- boolean isFast();

Corgi Class
- String color = “golden”;
- void bark();
- boolean hasSmallLegs();

# Inheritance Example

Now to inherit the Dog's traits, we must say **extends** in our **subclasses**.

Dog class
- void bark();

Greyhound Class **extends Dog**
- String color = "grey";
- ~~void bark();~~
- boolean isFast();

Corgi Class **extends Dog**
- String color = "golden";
- ~~void bark();~~
- boolean hasSmallLegs();

We can now delete the bark method from both classes since it's passed down!

# Inheritance Example

These are our new classes! We've written the bark method one time less but all it adds up!

Dog class
- void bark();

bark() is passed down to the subclasses.

Greyhound Class **extends Dog**
- String color = "grey";
- boolean isFast();

Corgi Class **extends Dog**
- String color = "golden";
- boolean hasSmallLegs();

# Now let’s look at this in code.

Dog class
- void bark();

Greyhound Class **extends Dog**
- String color = “grey”;
- boolean isFast();

Corgi Class **extends Dog**
- String color = “golden”;
- boolean hasSmallLegs();

# Inheritance - Corgi Class

As interfaces uses *implements*
Inheritance uses ***extends***

This Corgi class ***extends*** the Dog class.

This means that ANYTHING that's defined in the Dog class can be used by the Corgi class

```
public class Corgi extends Dog{
    String color;

    public Corgi(){
        color = "golden";
    }
}
```

# Inheritance - Dog Class

The Dog class is pretty generic.

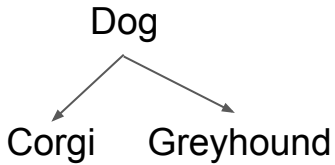
**It's just a class.**
It has constructors and methods.
Unlike interfaces,
this class expands the methods.

```
public class Dog{
    String name;

    public Dog(){
        name = "Doggo";
    }

    public void bark(){
        System.out.println("Bark!");
    }
}
```

# Inheritance - In combination




Now, we can see that Corgi doesn't have a **bark()** method.

BUT since Dog does, we can use it!

```
public class Corgi extends Dog{
    String color;

    public Corgi(){
        color = "golden";
    }
}
```

```
public class Dog{
    String name;

    public Dog(){
        name = "Doggo";
    }

    public void bark(){
        System.out.println("Bark!");
    }
}
```

# Inheritance - In combination

Given the previous slide, what does this code do?

```
Corgi a = new Corgi();
a.bark();
```

# Inheritance - In combination

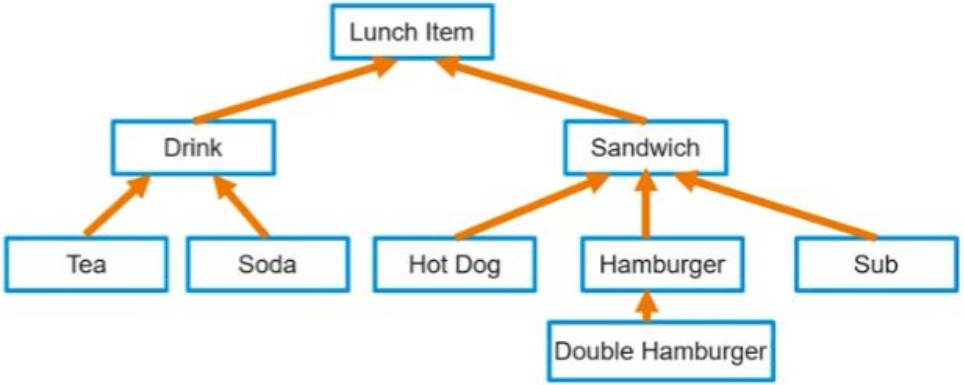
Given the previous slide, what does this code do?

```
Corgi a = new Corgi();
a.bark();
```

It outputs “Bark!”.
Even though Corgi doesn’t have a bark method. It uses the Dog bark();

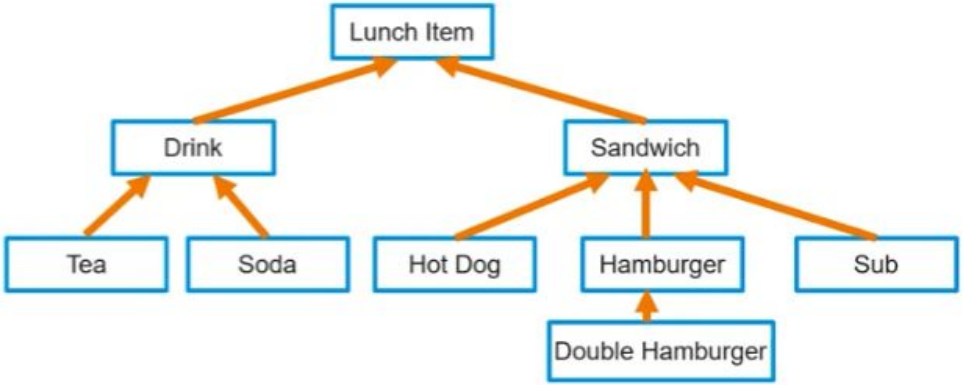
```
Bark!
```

# Let’s practice. Which are valid?




- public class Hamburger extends Sandwich
- public class Tea extends Drink
- public class Drink extends LunchItem
- public class Sandwich extends HotDog
- public class DoubleHamburger extends Sandwich
- public class Soda extends LunchItem
- public class DoubleHamburger extends Hamburger

# Let’s practice. Which are valid?




- public class Hamburger extends Sandwich ✓
- public class Tea extends Drink ✓
- public class Drink extends LunchItem ✓
- public class Sandwich extends HotDog ✗
- public class DoubleHamburger extends Sandwich ✗
- public class Soda extends LunchItem ✗
- public class DoubleHamburger extends Hamburger ✓

That’s about it for Inheritance!
Methods and values can be passed down from inherited classes.

# Lab: Inheritance

- Look at the code given in basecode.
- Become familiar with the inheritance structure.
- Review Classes & Methods