# Unit 2—Lesson 4:
# Classes, Inheritance

```swift
class Person {
  let name: String

  init(name: String) {
    self.name = name
  }

  func sayHello() {
    print("Hello there!")
  }
}

let person = Person(name: "Jasmine")
print(person.name)
person.sayHello()

Jasmine
Hello there!
```

# Inheritance

| | |
|---|---|
| Base class | `Vehicle` |
| Subclass | `TandemBicycle` |
| Superclass | `Bicycle` |

# Inheritance

## Defining a base class

```
class Vehicle {
   var currentSpeed = 0.0

   var description: String {
     "traveling at \(currentSpeed) miles per hour"
   }

   func makeNoise() {
      // do nothing - an arbitrary vehicle doesn't necessarily make a noise
   }
}

let someVehicle = Vehicle()
print("Vehicle: \(someVehicle.description)")
```

```
Vehicle: traveling at 0.0 miles per hour
```

# Inheritance

## Create a subclass

```
class SomeSubclass: SomeSuperclass {
    // subclass definition goes here
}
```

```
class Bicycle: Vehicle {
    var hasBasket = false
}
```

# Inheritance

## Create a subclass

```
class Bicycle: Vehicle {
    var hasBasket = false
}

let bicycle = Bicycle()
bicycle.hasBasket = true

bicycle.currentSpeed = 15.0
print("Bicycle: \(bicycle.description)")
```

```
Bicycle: traveling at 15.0 miles per hour
```

# Inheritance

## Create a subclass

```
class Tandem: Bicycle {
    var currentNumberOfPassengers = 0
}
```

# Inheritance

## Create a subclass

```
class Tandem: Bicycle {
    var currentNumberOfPassengers = 0
}

let tandem = Tandem()
tandem.hasBasket = true
tandem.currentNumberOfPassengers = 2
tandem.currentSpeed = 22.0
print("Tandem: \(tandem.description)")
```

```
Tandem: traveling at 22.0 miles per hour
```

# Inheritance

## Override methods and properties

```
class Train: Vehicle {
    override func makeNoise() {
        print("Choo Choo!")
    }
}

let train = Train()
train.makeNoise()
```

```
Choo Choo!
```

# Inheritance

## Override methods and properties

```
class Car: Vehicle {
    var gear = 1
    override var description: String {
        super.description + " in gear \(gear)"
    }
}
```

# Inheritance

## Override methods and properties

```
class Car: Vehicle {
    var gear = 1
    override var description: String {
        super.description + " in gear \(gear)"
    }
}

let car = Car()
car.currentSpeed = 25.0
car.gear = 3
print("Car: \(car.description)")
```

```
Car: traveling at 25.0 miles per hour in gear 3
```

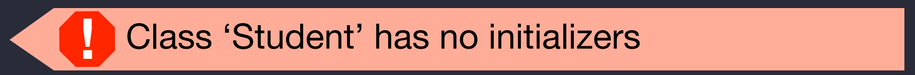
# Inheritance

## Override initializer

```
class Person {
  let name: String

  init(name: String) {
    self.name = name
  }
}

class Student: Person {
  var favoriteSubject: String
}
```



# Inheritance

## Override initializer

```
class Person {
  let name: String

  init(name: String) {
    self.name = name
  }
}

class Student: Person {
  var favoriteSubject: String
  init(name: String, favoriteSubject: String) {
    self.favoriteSubject = favoriteSubject
    super.init(name: name)
  }
}
```

# References

- When you create an instance of a class:
  - Swift returns the address of that instance
  - The returned address is assigned to the variable
- When you assign the address of an instance to multiple variables:
  - Each variable contains the same address
  - Update one instance, and all variables refer to the updated instance

```swift
class Person {
  let name: String
  var age: Int

  init(name: String, age: Int) {
    self.name = name
    self.age = age
  }
}

var jack = Person(name: "Jack", age: 24)
var myFriend = jack

jack.age += 1

print(jack.age)
print(myFriend.age)
```

```
25
25
```

```swift
struct Person {
  let name: String
  var age: Int
}

var jack = Person(name: "Jack", age: 24)
var myFriend = jack

jack.age += 1

print(jack.age)
print(myFriend.age)
```

```
25
24
```

# Memberwise initializers

- Swift does not create memberwise initializers for classes
- Common practice is for developers to create their own for their defined classes

# Class or structure?

- Start new types as structures
- Use a class:
  - When you’re working with a framework that uses classes
  - When you want to refer to the same instance of a type in multiple places
  - When you want to model inheritance

# Unit 2, Lesson 4

## Lab: Classes.playground

Open and complete the exercises in `Lab - Classes.playground`