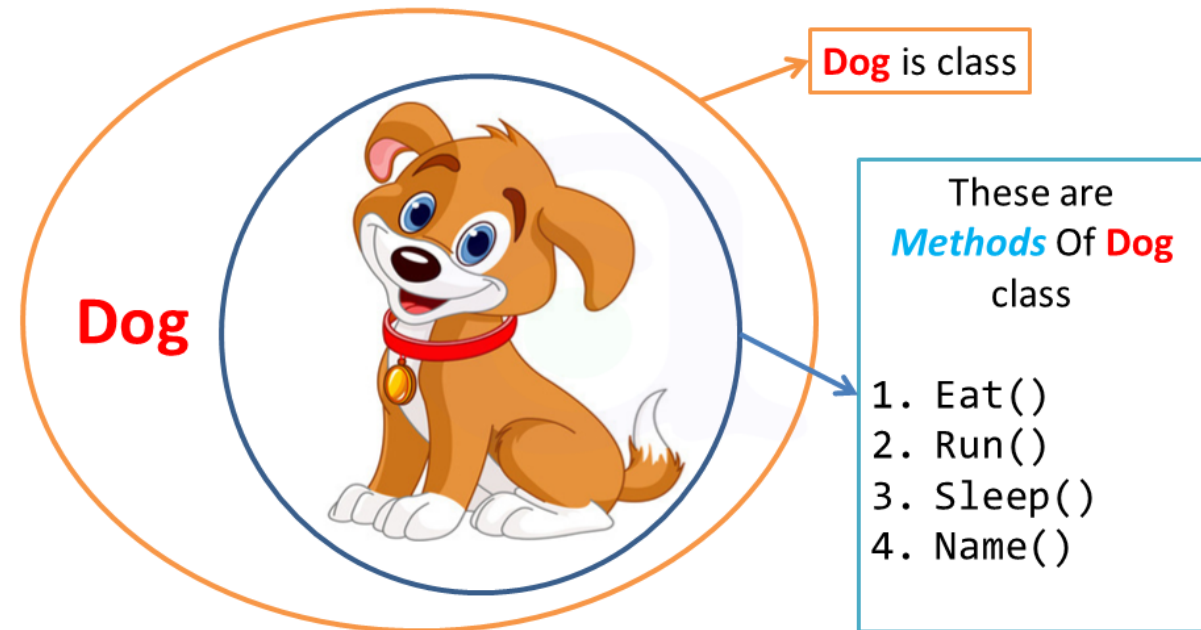
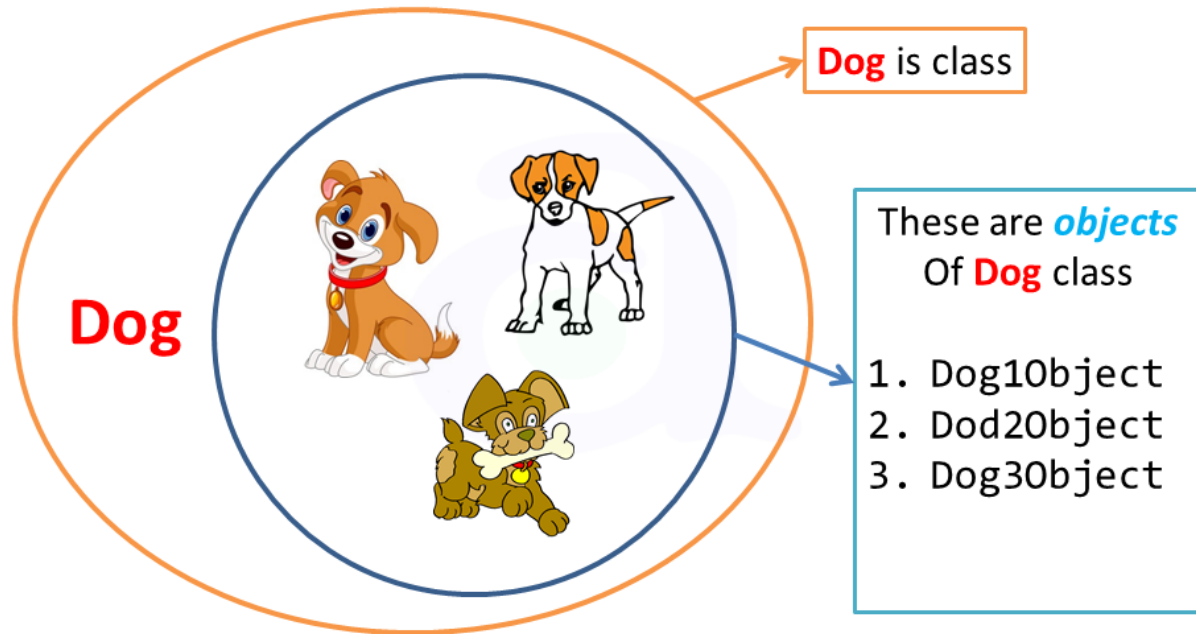


# object, arrays, functions

DAY 9

review: objects are specific instances of a class.  
methods are actions an object can perform.



# Why did we do all this stuff in the first place (why object-oriented)?

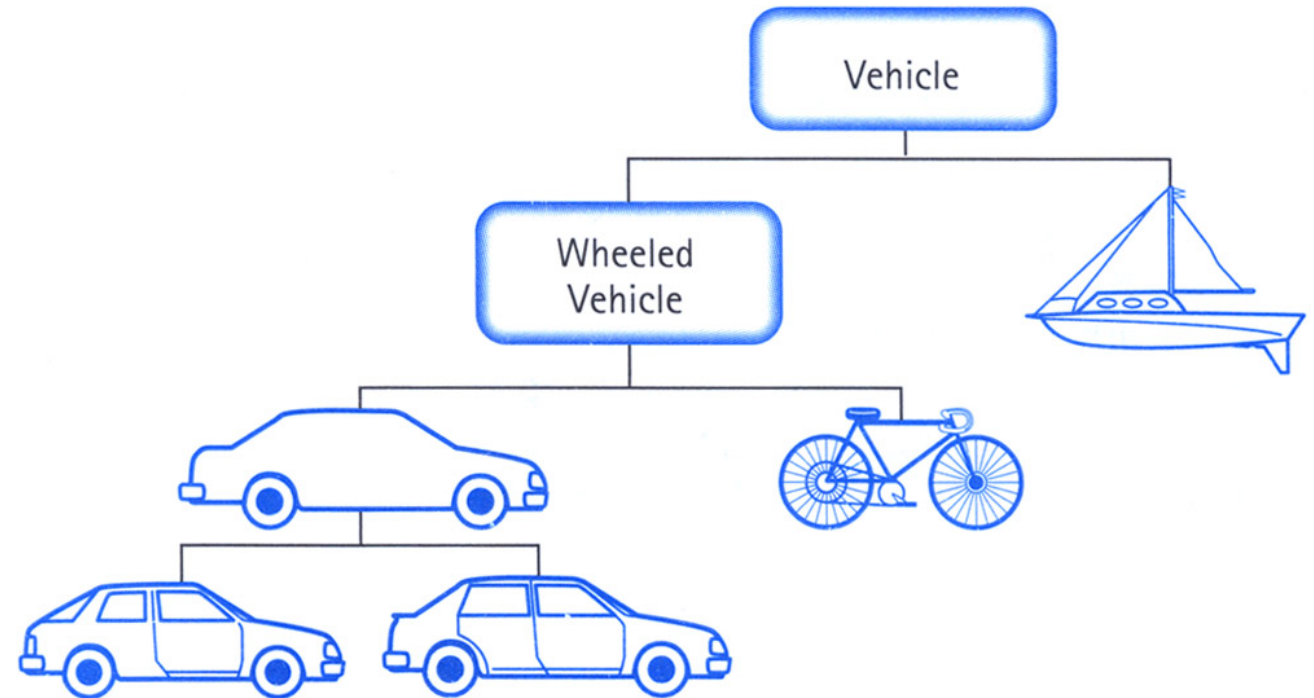
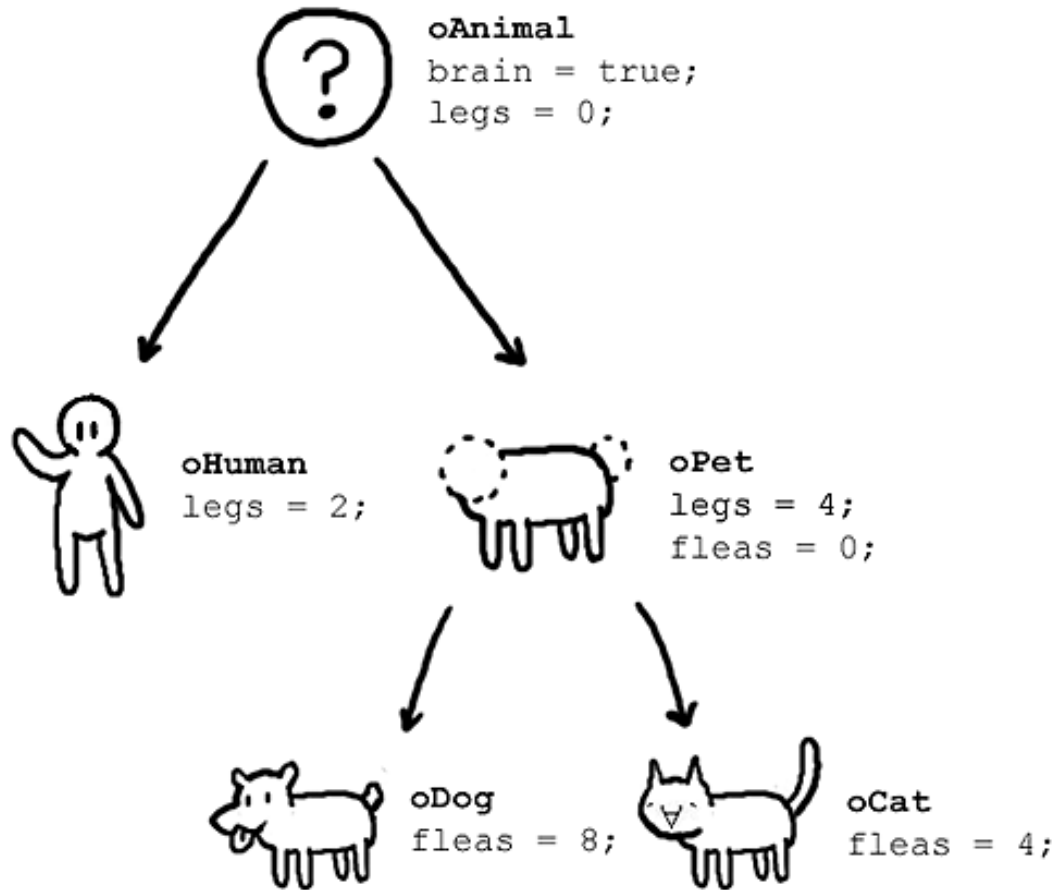
- modularity -> code reuse
- information hiding -> safety when coding
- extensibility -> won't cause disturbance

BUT

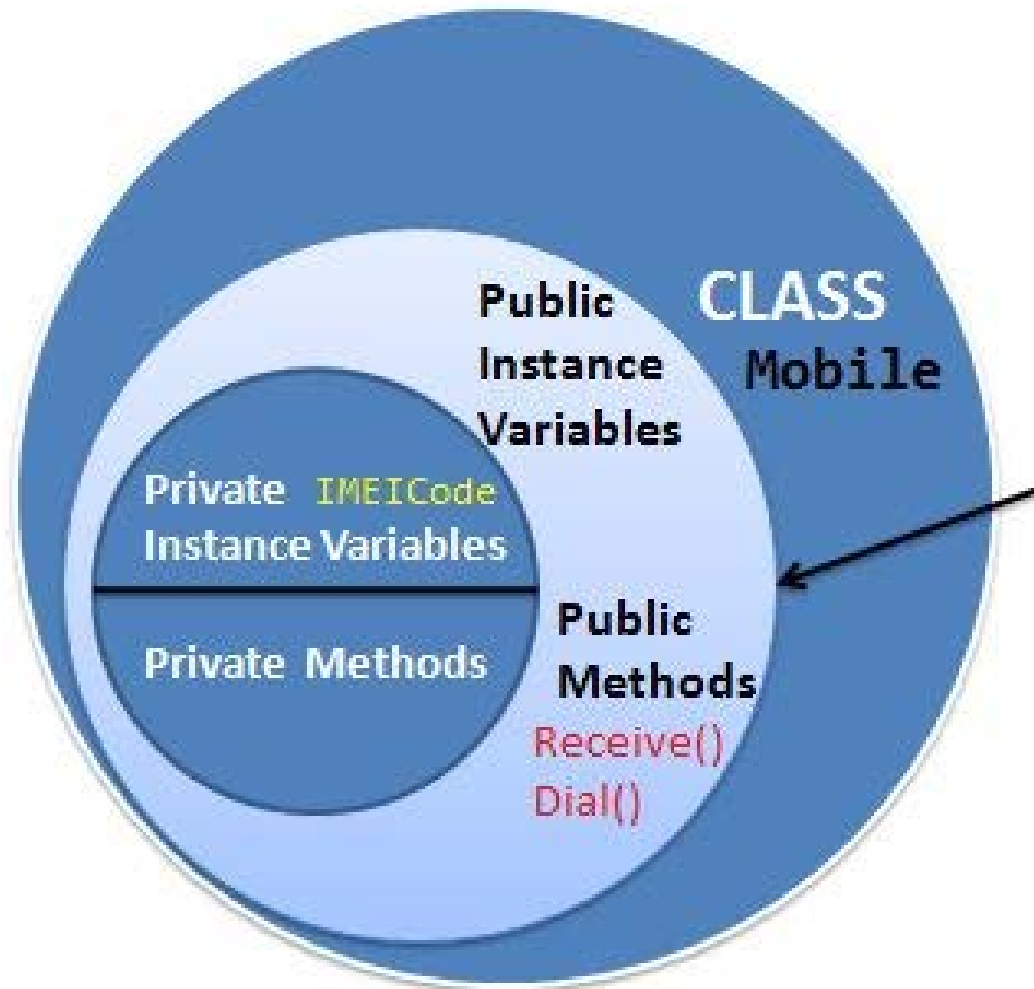
- hard to develop
- problems are procedural
- cumbersome



# principles of object-oriented programming: inheritance



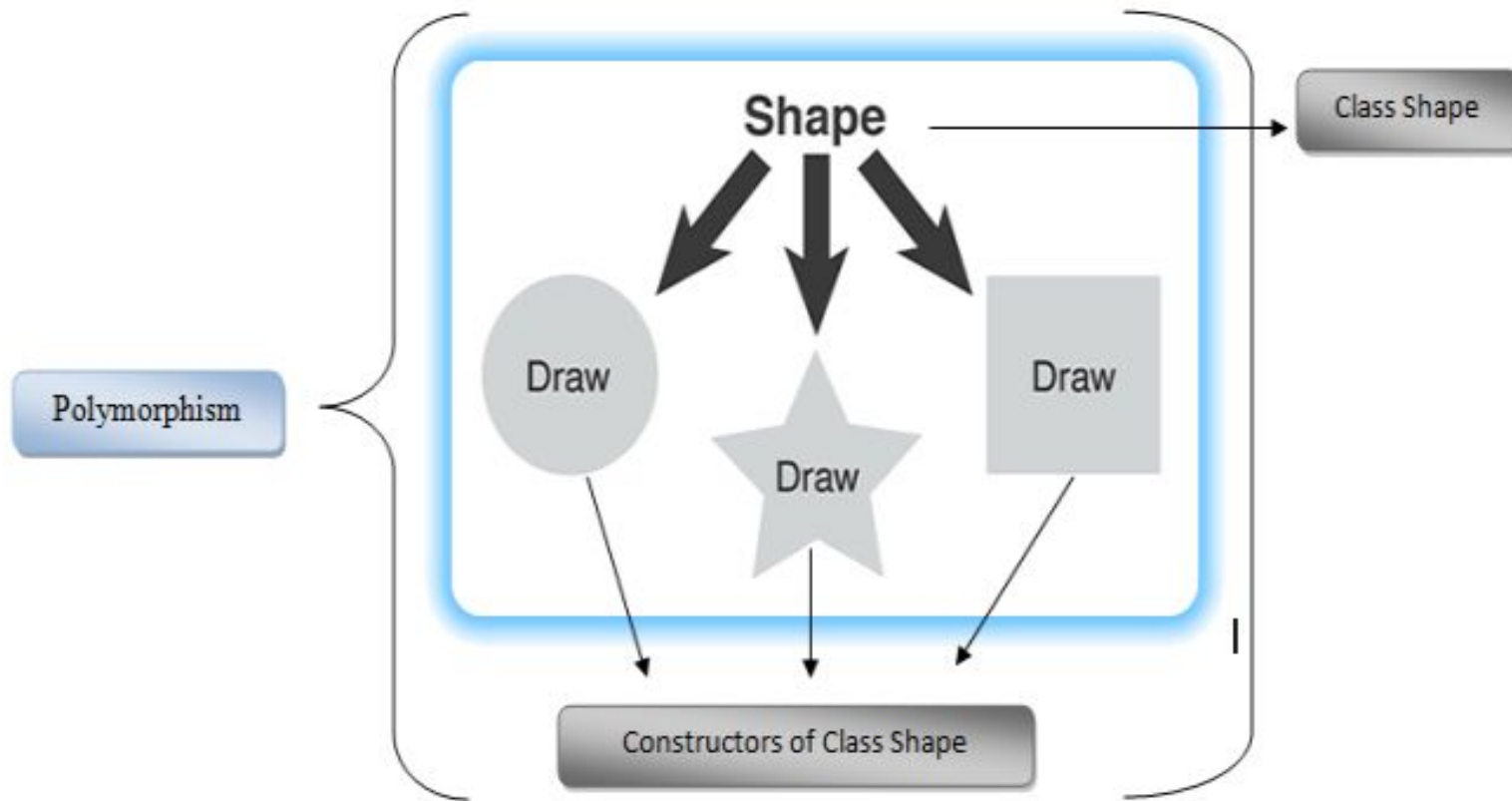
# principles of object-oriented programming: encapsulation



Outside Class



# principles of object-oriented programming: polymorphism



# On the last episode of Bouncing Ball...

- inefficient
- hard to read
- if you're repeating, there's something to automate

```
Bouncing_Ball_Main_Program  BouncingBall_Class
//Main BouncingBall Program

//Declared
BouncingBall myBall;
BouncingBall myBall1;
BouncingBall myBall2;
BouncingBall myBall3;
BouncingBall myBall4;

//Initializes
void setup() {
  size (600,600);
  smooth();
  myBall = new BouncingBall (400,400);
  myBall1 = new BouncingBall (10,400);
  myBall2 = new BouncingBall (20,40);
  myBall3 = new BouncingBall (300,40);
  myBall4 = new BouncingBall (200,200);
}

//Functionality
void draw () {
  background (0);
  myBall.run();
  myBall1.run();
  myBall2.run();
  myBall3.run();
  myBall4.run();
}
```

```
//Main BouncingBall Program

//Declared
BouncingBall myBall;

//Initializes
void setup() {
    size (600,600);
    smooth();
    myBall = new BouncingBall (400,400);
}

//Functionality
void draw () {
    background (0);
    myBall.run();
}
```

Make an array of 20  
BouncingBalls  
and initialize.



```
//Main BouncingBall Program
```

```
//Declared
```

```
BouncingBall myBall;
```

```
//Initializes
```

```
void setup() {  
    size (600,600);  
    smooth();  
    myBall = new BouncingBall (400,400);  
}
```

```
//Functionality
```

```
void draw () {  
    background (0);  
    myBall.run();  
}
```

```
//Main BouncingBall Program
```

```
//Declared
```

```
BouncingBall[] BouncingBallCollection = new BouncingBall [20];
```

```
//Initializes
```

```
void setup() {  
    size (600,600);  
    smooth();  
    for (int i = 0; i < 20; i++){  
        BouncingBallCollection[i] = new BouncingBall (400,400);  
    }  
}
```

```
//Functionality
```

```
void draw () {  
    background (0);  
    for (int i = 0; i < 20; i++){  
        BouncingBallCollection[i].run();  
    }  
}
```

```
//Main BouncingBall Program
```

```
//Declared
```

```
BouncingBall[] BouncingBallCollection = new BouncingBall [100];
```

```
//Initializes
```

```
void setup() {
```

```
    size (600,600);
```

```
    smooth();
```

```
    for (int i = 0; i < BouncingBallCollection.length; i++){ //<---ADJUSTED HERE
```

```
    BouncingBallCollection[i] = new BouncingBall (random(0,width),random (0,height));
```

```
    }
```

```
}
```

```
//Functionality
```

```
void draw () {
```

```
    background (0);
```

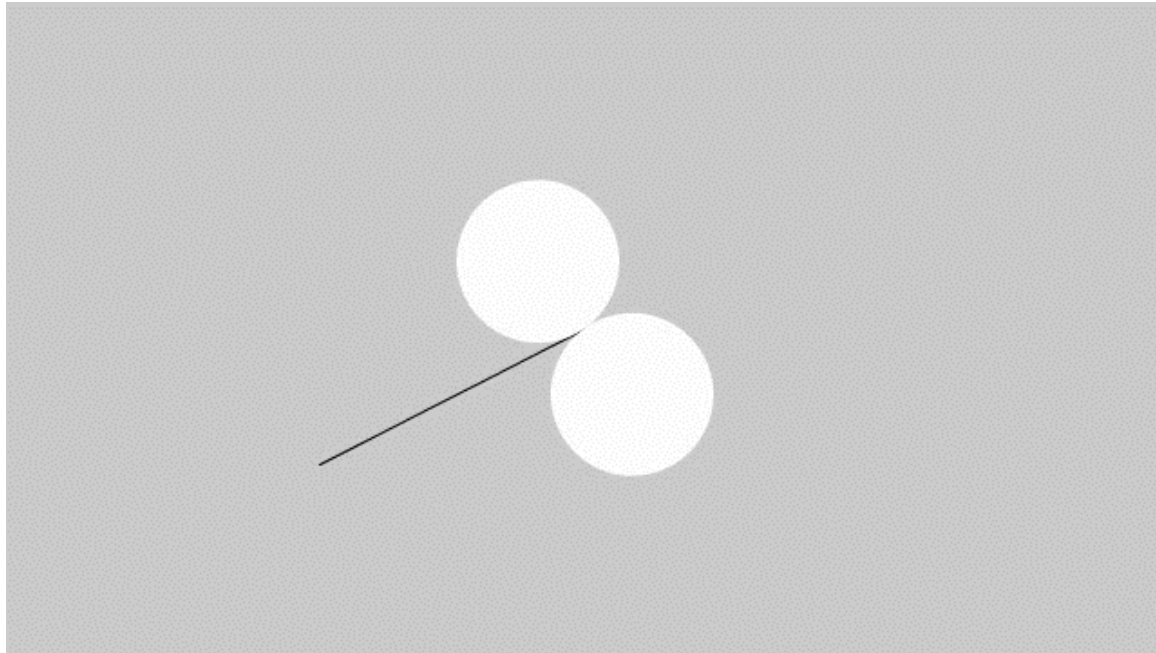
```
    for (int i = 0; i < BouncingBallCollection.length; i++){ //<---ADJUSTED HERE
```

```
    BouncingBallCollection[i].run();
```

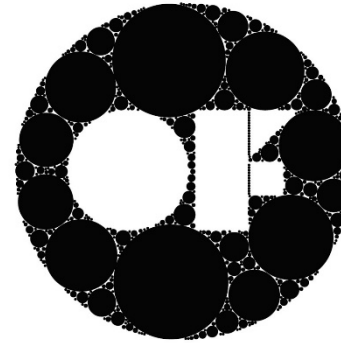
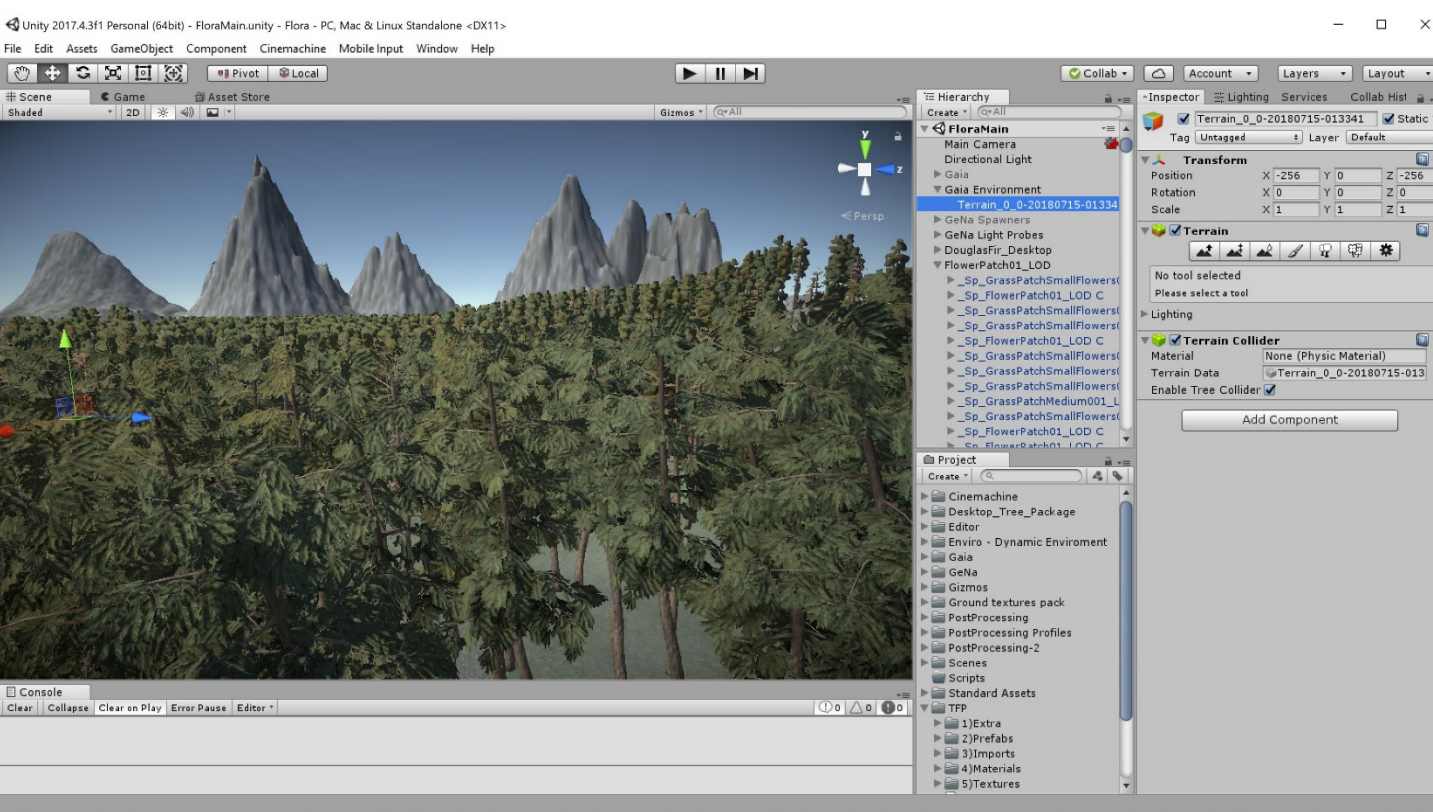
```
}
```

```
}
```

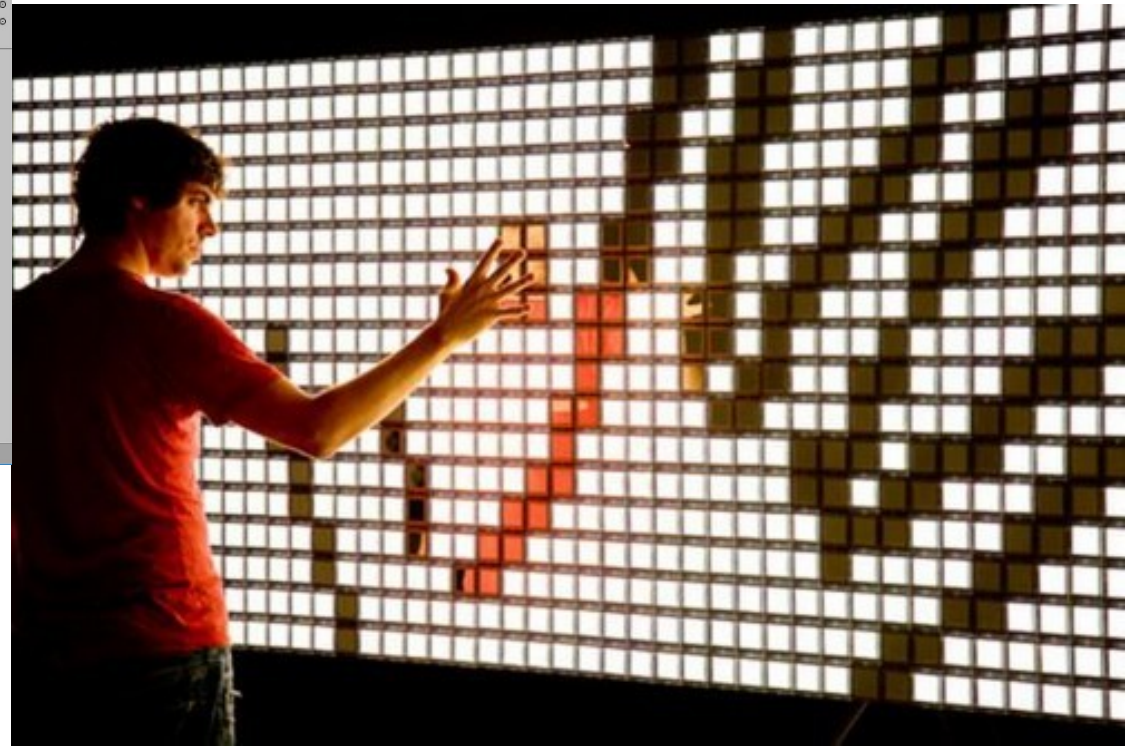
an example with inheritance:  
Spin, SpinArm, SpinSpots.



# real world programming is done with object-oriented code.

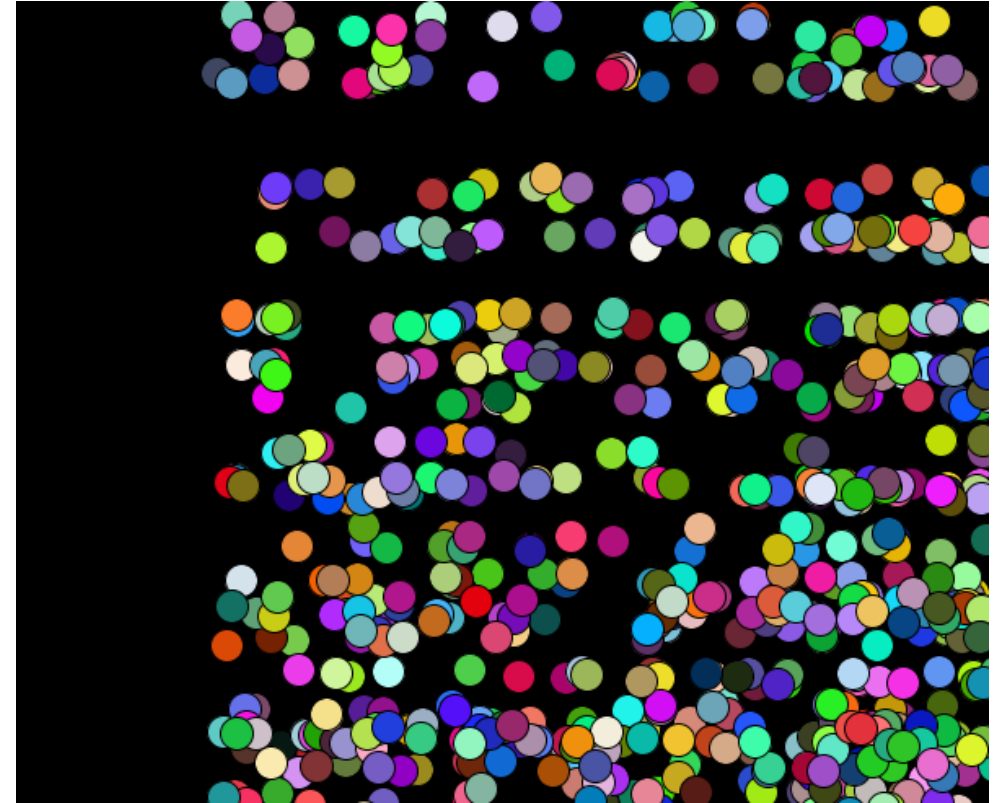


Random International  
“You Fade to Light” in  
Openframeworks



# Exercises (for fun)

- Make an array of 500 BouncingBalls with random colors by changing arguments to the constructor.
- Make other shapes that extends Spin with different sizes and speeds using inheritance.



# object, arrays, functions

DAY 9