



# Before class

- Snarf the code for today's class



# Announcements

- APT Set 1 - Due Jan 17
- Hangman assigned - Due Jan 24
- UTAs - we are still waiting



# Announcements

- Exam 1
  - Currently February 13
    - Same day as Duke vs. UNC
  - Change to Friday, February 15?



# Today

- By the end of class you should be able to answer:
  - What is a class?
  - What is an object?
  - What are 4 built-in Java Object types?



# Class

- A blueprint
  - Example: Dog
    - State
      - Height
      - Weight
      - Name
      - Breed
    - Behavior
      - catchBall
      - wagMore





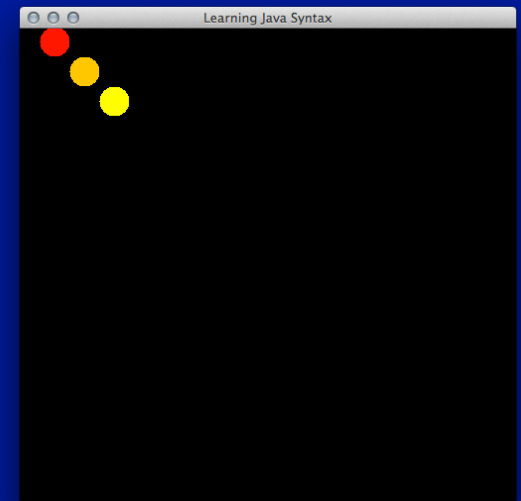
# Object

- A particular instance of a class
  - State
    - Height - 3'
    - Weight - 70 lbs
    - Name - Fido
    - Breed - Boxer
  - Behavior
    - catchBall
    - wagMore



# Example

- Snarf the code for today's class
- Open Circle.java





# Class

```
1 public class Circle {
```

```
2     int myXLocation;  
3     int myYLocation;  
4     Color myColor;  
5     int myDiameter;
```

Instance variables  
(State)

```
6  
7     Circle(int x, int y, Color c, int d)  
8     {  
9         myXLocation = x;  
10        myYLocation = y;  
11        myColor = c;  
12        myDiameter = d;  
13    }
```

Constructor  
(Method called to create  
instance of a class)





# Class

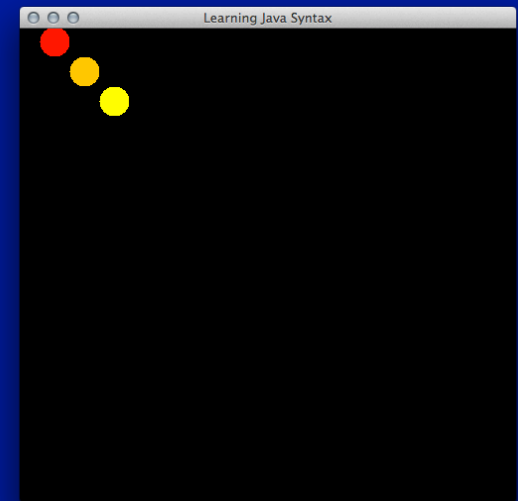
```
14 public Color getColor()
15 {
16     return myColor;
17 }
18
19 public int getLocation()
20 {
21     return myXLocation;
22 }
23
24 public int getYLocation()
25 {
26     return myYLocation;
27 }
```

Methods/Functions  
(Behavior of object)



# Practice

- Look at DrawCircles.java
  - `draw(int numCircles)` creates 3 circle objects
  - Change `draw` to create 50 circle objects
    - Can you make the circles at different locations?
      - The x,y coordinates are [0,500]





# Objects

- Primitives
  - int, char, boolean, double
- Objects -
  - String
  - ArrayList - Expandable array
  - HashSet - List that prevents duplicates -
  - HashMap - A “dictionary” where you associate a key to a value

\*Note: Object types start with capital letters



# HashMap

- HashMap - A “dictionary” where you associate a key to a value
  - Word - definition
  - Letter - # of instances of that letter



# HashMap

- “Able was I ere I saw Elba”

Key	Value
'a'	4
'b'	2
'l'	2
'e'	4



# HashMap Example

- Create a HashMap that maps a Color to the number of circles with that color.

```
HashMap<Color, Integer> aMap = new HashMap<Color,  
Integer>();  
for(Circle c: circleArray){  
    Color circleColor = c.getColor();  
    // your code goes here  
  
}
```



# Today

- Can you answer:
  - What is a class?
  - What is an object?
  - What are 4 built-in Java Object types?