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Writing Classes and instanciating Objects in Java with BlueJ

Chapter 2 - Section 3

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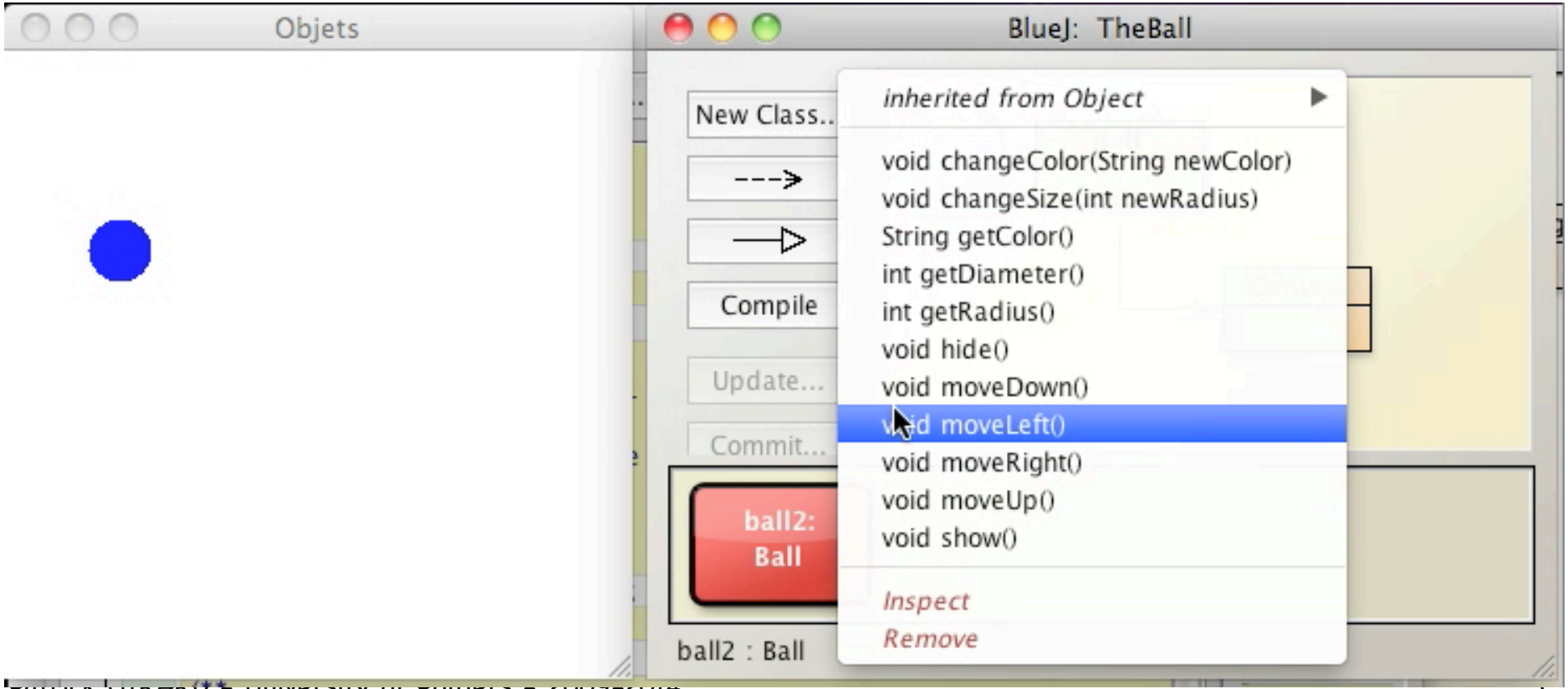
- What are the attributes ?

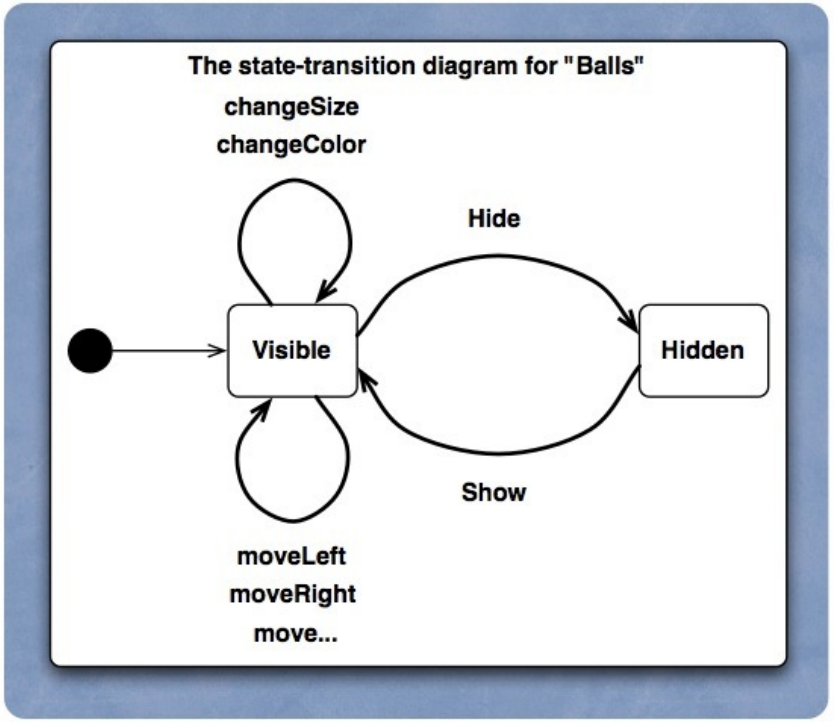


The Ball class

- What are the attributes ?
  - Obvious attributes (see the accessors)
    - color
    - diameter
    - radius

The Ball class

- What are the states ?
  - hidden/shown
    - hide()
    - show()
  - Hidden attribute
    - drawnStatus ?



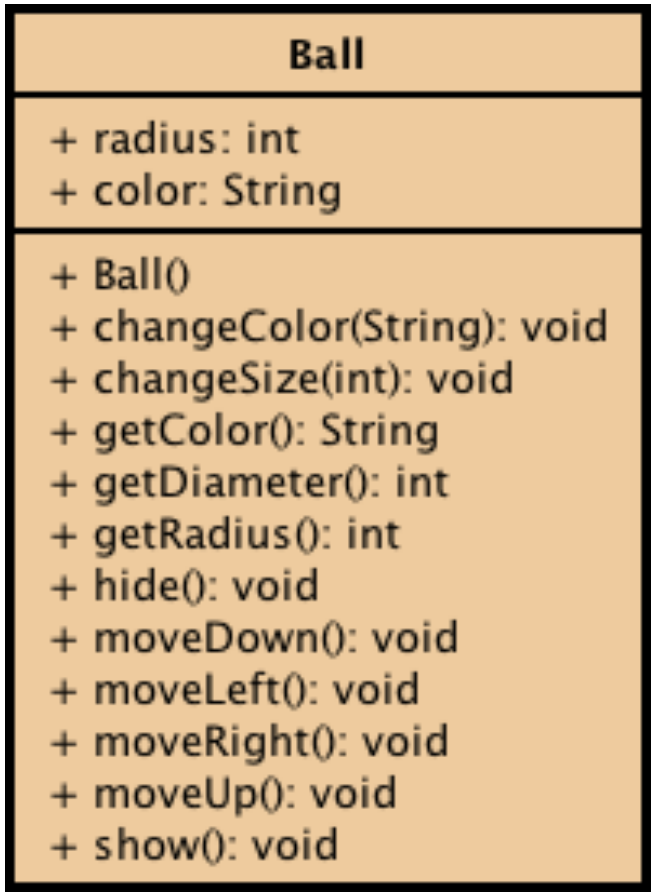
The Ball class

- Questions ?
  - Why is it only one "changeSize" ?
    - Does it change the radius or the diameter ?
  - What is the effect of the moveXxx functions ?
    - How this effect can be stored in the object ?

The Ball class

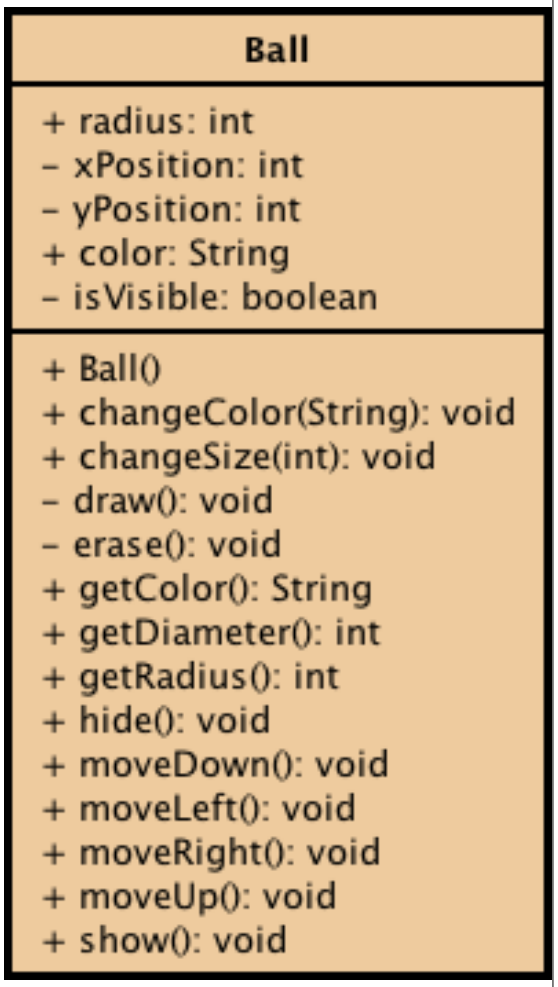
- Public attributes
  - radius
  - color

  - no diameter ?



The Ball class

- Public and Private attributes
  - Obvious attributes (public)
    - radius
    - color
  - Calculated attribute (virtual)
    - diameter
  - Hidden attributes (private)
    - xPosition, yPosition
    - isVisible



The Ball class

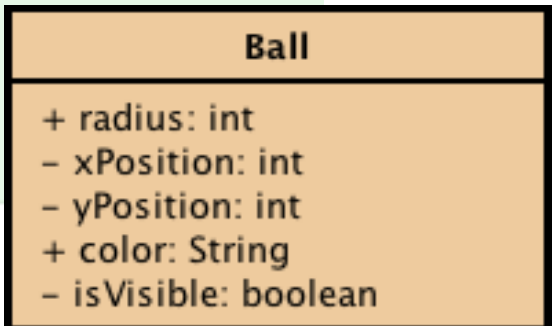
- The Java code for concrete atributes

```
/**
 * A ball that can be manipulated and that draws itself on a canvas.
 *
 * @author  Michael Kolling and David J. Barnes, P. Girard
 * @version 1.0  (22 August 2006)
 */

public class Ball
{
    public int radius;
    private int xPosition;
    private int yPosition;
    public String color;
    private boolean isVisible;
```

moveXxx

hide()/show()



The Ball class

+ getColor(): String
+ getDiameter(): int
+ getRadius(): int

The Java code for atributes

```
/**
 * Return the radius of the ball
 *
 * @return     the radius of the ball
 */
public int getRadius()
{
    return radius;
}
```

```
/**
 * Return the color of the ball
 *
 * @return     the color of the ball
 */
public String getColor()
{
    return color.toUpperCase();
}
```

```
/**
 * Return the diameter of the ball
 *
 * @return     the diameter of the ball
 */
public int getDiameter()
{
    return radius * 2;
}
```

Virtual

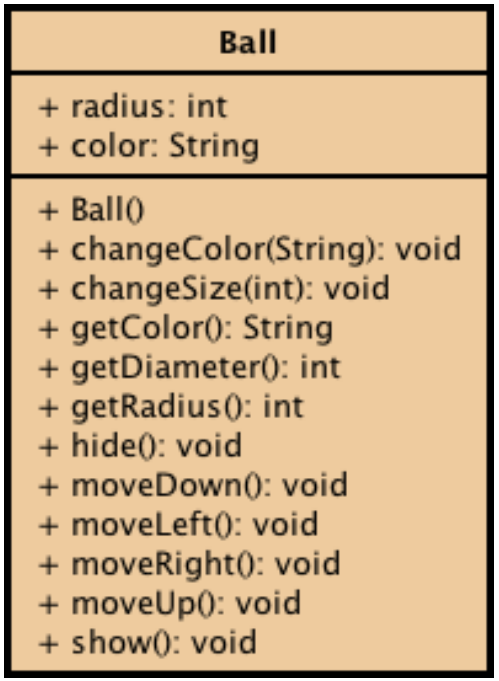
The Ball class

The Java code for atributes : modifiers

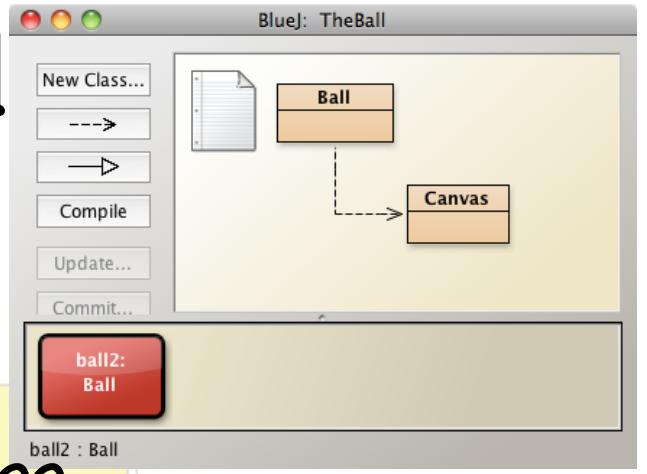
```
/**
 * Change the size to the new size (in pixels). Size must be >= 0.
 */
public void changeSize(int newRadius)
{
    erase();
    radius = newRadius;
    draw();
}

/**
 * Change the color. Valid colors are "red", "yellow", "blue", "green",
 * "magenta" and "black".
 */
public void changeColor(String newColor)
{
    color = newColor;
    draw();
}
```

draw ???



The Ball cl



The private methods

```
/*
 * Draw the ball with current specifications on screen.
 */
private void draw()
{
    if(isVisible) {
        Canvas canvas = Canvas.getCanvas();
        canvas.draw(this, color, new Ellipse2D.Double(xPosition, yPosition,
                                                      getDiameter(), getDiameter()));
    }
}
```

canvas ???

```
/*
 * Erase the ball on screen.
 */
private void erase()
{
    if(isVisible) {
        Canvas canvas = Canvas.getCanvas();
        canvas.erase(this);
    }
}
```

isVisible ???

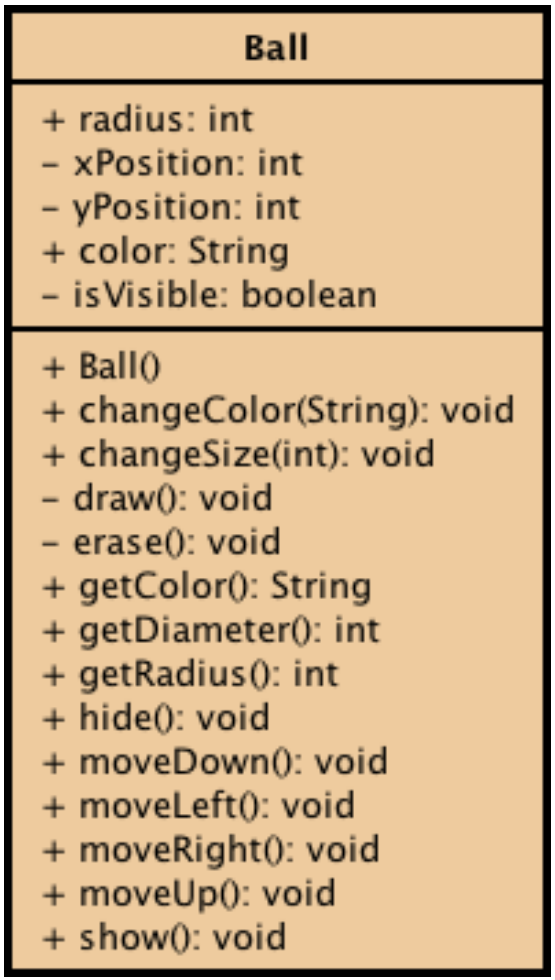
Ball
+ radius: int + color: String
+ Ball() + changeColor(String): void + changeSize(int): void + getColor(): String + getDiameter(): int + getRadius(): int + hide(): void + moveDown(): void + moveLeft(): void + moveRight(): void + moveUp(): void + show(): void

The Ball class

- The isVisible attribute

```
/**
 * Hide the circle.
 */
public void hide()
{
    erase();
    isVisible = false;
}

/**
 * Show the circle.
 */
public void show()
{
    isVisible = true;
    draw();
}
```



The Ball class

moving...

```
/**
 * Move the circle a few pixels to the right.
 */
public void moveRight()
{
    xPosition += 20;
    draw();
}
```

```
/**
 * Move the circle a few pixels to
 */
public void moveLeft()
{
    xPosition-= 20;
    draw();
}
```

```
/**
 * Move the circle a few pixels up.
 */
public void moveUp()
{
    yPosition -= 20;
    draw();
}
```

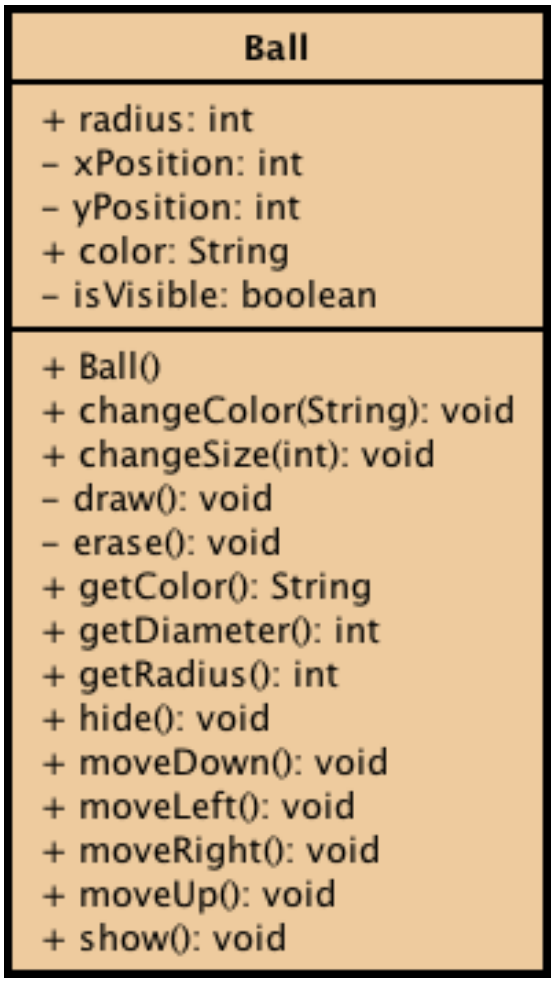
```
/**
 * Move the circle a few pixels down.
 */
public void moveDown()
{
    yPosition += 20;
    draw();
}
```

Ball
+ radius: int - xPosition: int - yPosition: int + color: String - isVisible: boolean
+ Ball() + changeColor(String): void + changeSize(int): void - draw(): void - erase(): void + getColor(): String + getDiameter(): int + getRadius(): int + hide(): void + moveDown(): void + moveLeft(): void + moveRight(): void + moveUp(): void + show(): void

The Ball class

- The last (first) step...
  the constructor

```
/**
 * Create a new ball at default position with default color.
 */
public Ball()
{
    radius = 15;
    xPosition = 20;
    yPosition = 60;
    color = "blue";
    isVisible = true;
    draw();
}
```



Some questions ?

- How to choose between the private and the public status ?
- How to choose between concrete and virtual attributes ?