

Today: Immutable objects, Extending classes. Maps  
Exam II 'next academic week' ie Wed 7pm  
**Need Conflict? Check your email...**  
**MP5 regraded Friday 8pm (99%);**

Readings:

- 1 What is special about the Object class?
- 2 What is the main difference between String and StringBuffer?
- 3 What is one advantage of using StringBuffer over String?
- 4 Write a program to measure the performance of StringBuffer to create a string of 100000 characters

```
long t = System.currentTimeMillis();
```

5. Let's build a game...

```
public class Sprite {  
    private int x, y, dir, shape;  
    public void setX(int newX) { if (newX > 0) this.x = newX; }  
    public int getX() {return x;}  
    public int getShape() { return shape; }  
    public void move() { if (dir == 1) x ++; ... }  
}
```

```
public void draw() {  
    if (shape == 1) Zen.drawGraphics("InkyGhost.png");  
    if (shape == 2) Zen.drawGraphics("Pacman.png");  
    // ... there has to be a better way...  
}
```

// **Create a constructor to initialize the sprite using a string whose format is *xvalue,yvalue* (i.e. comma-separated values)**

```
}
```

6. Write code to create sprite based on the position data in a file.

```
public class Game {  
    public static void main(String[] ) {
```

**7. Challenge: Design an immutable object to hold a quote (i.e., author and text):**

**8 Write a program to hold a FIFO (first-in-first-out) queue of quote objects. The queue has 'add' 'isEmpty' and 'remove' methods.**