Final exam: 12/19, 8 AM Marcus Hall, room 131.  
**Don’t be late!**

Final projects due Thursday at 5, no exceptions. Lab (LGRT 213) open from 10-5 on Thursday (All work due Thur at 5)

Honors mtg today at 4, my office

Two new OWL assignments - an optional tutorial one on arrays (good practice for final!), and a survey (req, will take < 5 minutes, worth a few points..)
The final is cumulative (how could it not be!!)

We basically did the whole book - so this is all fair game (obviously the emphasis is on topics that showed up explicitly in the second half of the class).

It’s certainly closed book, etc
public class StockItem{
private String name;
private int quantity;
private double cost;
public StockItem(){name = "Unknown";
quantity = 0;
cost = 0.0; }
public StockItem (String what, int count,
        double cst){
    name = what;
    quantity = count;
cost = cst; }
}
public void setName(String newName)
    {name = newName;}

public String getName(){return name;}

public double value(){return quantity*cost; }

public StockItem greatest(StockItem[] s){
    int cur = 0; double big = s[0].value();
    for(int j = 1; j < s.length; s++)
        if (s[j] > big){cur = j;big = s[j].value();}
    return s[cur];}
2. (10) Write a complete program that constructs an array of 100 randomly generated points with coordinates in the range from 0 to 50 and then prints out the contents of the 75th entry in the array. (use the Pt class definition at the end of the exam) Your main method should reside in a class called PtDriver (and so should be separate from the Pt class).
public class Pt{
    private int x;
    private int y;

    public Pt(int a, int b)
    {
        x=a; y=b;
    }

    public int x(){return x;}
    public int y(){return y;}
}

public class PtDriver{
RanPts r = new RanPts(100);
System.out.println((r.getPts())[75]);
}

public class RanPts{
int[] pts;

public RanPts(int size){
pts = new int[size]; fillPts();}

public void fillPts(){
for(int j = 0; j < pts.size; j++) {
pts[j] = new Pt((int)(Math.random()*51), ((int)(Math.random()*51));
}
public Pt[] getPts(){return pts;}

Write method switch() for the Pt class that takes no arguments, and returns a new point with its x and y coordinates reversed. (use the Pt class definition at the end of the exam) Thus if p is the Pt at (3,7), then p.switch() should return a point with coordinates (7,3).

public Pt switch(){Pt p = new Pt(this.y(), this.x());
    return p; }

Java has two kinds of methods, non-static (ordinary) methods, and static methods. In one page of writing at most, compare these two concepts.

Ordinary (non-static) methods characterize object behavior, and are always called by objects, e.g. kid.anotherMonth(). Static methods (e.g. from theMath class aren’t associated with objects, but are tied instead to a class.
1. Write a method that is passed three int values and returns the value in the middle. In case of ties, any intermediate value will do (and thus if the inputs are 5, 3, 3, then your method should return 3; if the inputs are 3 7 1, your method should return 3).

```java
public int middle(int a, int b, int c){
    if (a < b) return Math.min(b, c); else return Math.min(a, c);
}
```
1. Suppose you are given the following driver class:

```java
public class Journey{

    public static void main(String[] args){
        double distance = 400.48;
        double fuel = 21.4;
        AutoTrip myTrip = new AutoTrip(distance, fuel);
        double mpg = myTrip.mpg();
        System.out.println(" my mileage was "+ mpg);
    }
}
```

Create an AutoTrip class that will allow the Journey class to work correctly.
public class AutoTrip{
    double dist; double fuel;
    public AutoTrip(double d, double f){dist = d; fuel = f;}
    public double mpg() { return (dist/fuel);}
}

What does super do inside a constructor? Ans - it embedds a base class object inside an under-construction derived class object

What’s special about the class Object? Ans - all Java classes are derived from it. It implements toString()

What’s wrong with
    public int averageOfTwo(int a, int b) { return (a + b)/2.0;}
Ans: Wrong return type
Informally tell what the following code fragment does:

```java
int n = 1; int ct = 0;
while (n < 1000){
    n = 2*n;
    ct++;
}
System.out.println(ct);
```

Ans: counts number of times n needs to be doubled in order to reach 1000
The TenFlip class has a method called flipper (no arguments), which flips a (fair) coin ten times, and returns the total number of heads that turn up. Using inheritance with the Random class as base class, create a definition for the TenFlip class. (Be sure to provide a definition for the flipper method.)

```java
import java.util.*;

public class TenFlip extends Random{

    public int flipper(){
        int headCount = 0;
        for(int j = 0; j < 10; j++) headCount = headCount + nextInt(2);
        return headCount;
    }
}
```
Questions:

Degree of difficulty of class

Discussion format

Programming assignments - difficulty

How was your TA?

How many of you plan to take another computer class?

Any general comments about how things might go better?