CSCI 261J
2nd Midterm Exam
April 11, 2014 **Name:** _____

Question:	1	2	3	4	5	Total
Points:	10	5	5	20	10	50
Score:						

Question 1 . . . . . (10 points)

Consider the following Java statement:

```
float[][] a = new float[3][4];
```

(a) What is the value of `a[0][0]`?

(b) What is the type of `a[0][0]`?

(c) What is the type of `a[0]`?

(d) What is the type of `a`?

(e) Sketch a representation of this array in computer memory. In your sketch, label the variables `a`, `a[0]`, and `a[0][0]`.

(f) Write Java for-loops to set all values in the array `a` to π.

Question 2 ..... (5 points)

Complete the following method, which returns a new image with pixels copied from the specified image, but flipped horizontally. Assume that `x[0]` is the first (vertical) column of the image.

```
public static float[][] flipImageHorizontal(float[][] x) {









}
```

Question 3 ..... (5 points)

Complete the following methods, each of which returns true, if the two specified arrays have equal lengths and values; false, otherwise. *Call the first method in your implementation of the second method.*

```
public static boolean equalArrays(float[] x, float[] y) {









}
public static boolean equalArrays(float[][] x, float[][] y) {









}
```

Question 4 . . . . . (20 points)

(a) Give an example of a standard Java class that extends `Object`.

(b) Give an example of a standard Java class that extends some other class.

(c) Give an example of a standard Java class that extends `RuntimeException`.

(d) Give an example of a standard Java class that *does not* extend `RuntimeException`.

(e) What is special about classes that extend `RuntimeException`?

(f) Write a single Java statement that might cause an `OutOfMemoryError`.

(g) Write a single Java statement that will cause an `ArithmeticException`.

(h) How many bytes are in a binary file containing one `int` and three `float`s?

(i) List two reasons to use a binary file instead of a text file.

(j) Why should you close a file after you are done writing to it?

Question 5 ..... (10 points)

Consider the following Java interface:

```
public interface Shape {
  public double area();
  public boolean contains(double x, double y);
}
```

(a) Specify a complete Java class `Circle` that implements this interface. Include in your class a constructor with three parameters, the radius `r` and coordinates `xc` and `yc` of the center of the circle.

(b) Suppose that someday you need a class `Ellipse`, in addition to your class `Circle` specified above. Considering inheritance, would you make `Circle` a subclass of `Ellipse` or vice-versa? Explain your reasoning.