Question 1 ................................................................. (5 points)
    - How many bits in a Java byte?
    - How many bytes in a Java int?
    - How many bytes in a Java short?
    - How many bytes in a Java float?
    - How many bytes in a Java double?

Question 2 ................................................................. (5 points)
    Name two Java classes that you would use to read a binary file.
    Name a Java exception that you might catch when reading a binary file.

Question 3 ................................................................. (15 points)
    Complete the following method to flip an image upside down. For each image pixel x[i][j], assume that i is the column index and j is the row index. Also assume that every image column contains the same number of pixels.

    // Flips the specified image x upside down.
    // Returns a new image; does not modify the image x.
    public static float[][] flipUpsideDown(float[][] x) {
Question 4 .................................................. (10 points)
(a) [5 points] What is printed by the following Java statements?
    int count = 0;
    while (count<5) {
        System.out.println(count);
        ++count;
    }
(b) [5 points] Rewrite (simplify) the code fragment above using a for loop.

Question 5 .................................................. (10 points)
(a) [5 points] What is printed by the following program fragment?
    double degC = 100; // at which water at sea level boils
    double degF = 9/5*degC + 32;
    double degC = degF-32 * 5/9; // hint: 32*5 = 160, 17*9 = 153
    System.out.println("degC = "+degC);
    System.out.println("degF = "+degF);
(b) [5 points] Show how you would fix this program so that it computes and prints the correct (expected) answers.

Question 6 .................................................. (10 points)
    Write a complete Java method that computes and returns the average of a 1D array of floats.
Question 7 .................................................................................................................. (25 points)
Implement all methods for the following class:

```java
/**
 * A waypoint (geographic location) has a name, latitude and longitude.
 */
public class Waypoint {

    /**
     * Constructs a waypoint with specified name and zero lat and long.
     */
    public Waypoint(String name) {

    }

    /**
     * Sets the location for this waypoint.
     */
    public void setLocation(double latitude, double longitude) {

    }

    /**
     * Gets the name for this waypoint.
     */
    public String getName() {

    }

    /**
     * Gets the latitude for this waypoint.
     */
    public double getLatitude() {

    }

    /**
     * Gets the longitude for this waypoint.
     */
    public double getLongitude() {

    }

}
/**
 * Determines whether this waypoint equals the specified waypoint.
 * Two waypoints are equal if they have the same name and location.
 */
public boolean equals(Waypoint wp) {

}

/**
 * Returns a copy of this waypoint with the specified name.
 * The copy may (or may not) have a different name, but it
 * has the same latitude and longitude as this waypoint.
 */
public Waypoint copy(String name) {

}

// declare
// private
// fields
// here

/**
 * Using (calling) the methods defined above,
 * (1) constructs a waypoint for a location named "Home",
 * (2) sets the location of the Home waypoint,
 * (3) creates a copy of Home named "Mines", and
 * (4) prints whether waypoints for Home and Mines are equal.
 */
public static void main(String[] args) {

}
Question 8 ........................................................................................................ (20 points)

(a) [10 points] What is printed by the following program?

```java
public class PrintsSomething {
    public static int[] method1(int[] x) {
        int n = x.length;
        int[] y = new int[n];
        for (int i=0, j=0; i<n/2; ++i, j+=2)
            y[j] = x[i];
        for (int i=n/2, j=1; i<n; ++i, j+=2)
            y[j] = x[i];
        return y;
    }

    public static int[] method2(int[] x) {
        int n = x.length;
        int[] y = new int[n];
        for (int i=0, j=0; i<n/2; ++i, j+=2)
            y[i] = x[j];
        for (int i=n/2, j=1; i<n; ++i, j+=2)
            y[i] = x[j];
        return y;
    }

    public static void main(String[] args) {
        int[] x = {1,2,3,4,5,6};
        int[] y = method1(x);
        int[] z = method2(y);
        for (int i=0; i<y.length; ++i)
            System.out.print(y[i]);
        for (int i=0; i<z.length; ++i)
            System.out.print(z[i]);
    }
}
```

(b) [5 points] Provide better (more descriptive) names for the first two methods.

(c) [5 points] Describe the intent of the two Java keywords `public` and `static` in the declarations of the methods above.