CMP 326 Midterm Spring 2014   Name: _____

There is a blank page at the end of the exam if you need more room to answer a question.

1) (30 points) Write the output of each piece of code. If the code gives an error, write "ERROR".

	Code	Output

a)
 	
(5 points)
	```int a = 5;```
	```int b = 2;```
	```double c = 2;```
	
	```System.out.println(a/b);```
	```System.out.println(```
	``` ((double) a)/b);```
	```System.out.println(a/c);```	

b)
 	
(5 points)
	```String a = "aadvark";```
	```String e = "elephant";```
	
	```System.out.println(```
	``` a.substring(0,4) +```
	``` e.substring(3,8));```	

c)
 	
(5 points)
	```for(int i = 0; i < 5; i++) {```
	``` System.out.println(i*2);```
	```}```	

d)
 	
(5 points)
	```String[] a = {"one", "two",```
	``` "three"};```
	
	```System.out.println(a[0]);```
	```String[] b = a;```
	```System.out.println(b[1]);```
	```System.out.println(a[4]);```	

	Code	Output

e)
 	
(5 points)
	``java
	boolean flag = true;
	int n = 8;
	int k = 2;
	while (flag) {
	      System.out.println("n = "
	            + n + "; k = " + k);
	
	      n = n - 3 * k;
	      if (n < 0) {
	            flag = false;
	      }
	}
	``	

f)
 	
(5 points)
	``java
	int total = 0, i = 0;
	while(total < 90) {
	   switch(i) {
	      case 0:
	            total += 30;
	            i = 1;
	            break;
	      case 1:
	            i = 2;
	            total -= 15;
	      case 2:
	            i = 0;
	            total += 15;
	            break;
	   }
	   System.out.println(total);
	}
	``	

2) (30 points) The Java class called `Song` is started below. An object of class `Song` is a piece of music. This class has four instance variables:
- `title`, which is a `String` representing the title of the song
- `artist`, which is a `String` representing the performer of the song.
- `length`, which is an `int` representing the length of the song in seconds.
- `composer`, which is a `String`, representing the composer of the song.

```
public Song {
     private String title;
     private String artist;
     private int length;
     private String composer;

     // your code will go here

}
```

a) (7 points) Write a constructor which takes in a title, artist, length, and composer, and instantiates an object `Song` with those values.

b) (8 points) Write a method `artistIsComposer` which returns true if the artist and the composer are the same for the Song, and false otherwise.

2) (continued)
c) (5 points) Use your constructor from part (a) to instantiate an object of class `Song` with title "Halo", artist "Beyonce", composer "Ryan Tedder", and length 261 seconds.

d) (10 points) Write a static method `totalLength`, which takes in an array of `Song` objects, and returns the sum of the lengths of the songs in the array. You may assume that every element of the array contains a `Song` object.

3) (10 points) Write a static method called `swap` that swaps two elements of an `int` array.
The method should accept three input parameters:
- an `int` representing the index of one element being swapped
- an `int` representing the index of the other element being swapped
- an `int` array

The method does not return anything.

4) (20 points) Consider the Applet below that contains 2 TextFields, 1 Label, and 2 Buttons:

```
public class SumApplet extends JApplet implements ActionListener{
      JTextField tf1 = new JTextField("num1");
      JTextField tf2 = new JTextField("num2");
      JButton btnSum = new JButton("SUM");
      JButton btnDiff = new JButton("DIFFERENCE");
      JLabel lbl = new JLabel("output goes here");

      // other methods in the class, including the
      // initialization method, are not shown here

      public void actionPerformed(ActionEvent e){
          // your code will go here
      }
 }
```

a. (5 points) What is one of the methods that is called by default when an Applet is loaded?

b. (15 points) Define the body of the `actionPerformed` method as follows:
  - if the button labeled `SUM` is clicked, then `JLabel lb1` is set to be the sum of the numbers in `JTextField`s `tf1` and `tf2`,
  - if the button `DIFFERENCE` is clicked, then `JLabel lb1` is set to be `JTextField tf1` minus `TextField tf2`.

5) (10 points) Write code that asks for keyboard input and validates it. This code should ask the user if they want to continue, "yes" or "no." The code should continue to ask for input until the user answers "no." That is, the code is validating that the input is "no."

This page is intentionally left blank.