

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 any output that would happen before the error, and then write "ERROR".

	Code	Output
a) (5 points)	<pre>int a = 10; int b = 3; double c = 2; System.out.println(((double) a)/b); System.out.println(a/b); System.out.println(b/a); System.out.println(c/b);</pre>	
b) (5 points)	<pre>String g = "giraffe"; String z = "zebra"; System.out.println(g.substring(0,4) + z.substring(3,5) + z.charAt(0));</pre>	
c) (5 points)	<pre>for(int i = 3; i < 10; i++) { System.out.println(i-1); }</pre>	
d) (5 points)	<pre>String[] a = {"cat", "dog", "mouse"}; System.out.println(a[0]); String[] b = a; System.out.println(b[1]); b[1] = "horse"; System.out.println(a[1]); System.out.println(a[4]);</pre>	

1) (Continued)

	Code	Output
<p>e) (5 points)</p>	<pre>boolean flag = true; String word = "antsy"; int len = word.length(); while (flag) { System.out.println(word); word =word.substring(0,len-1); len--; if (len == 0) { flag = false; } }</pre>	
<p>f) (5 points)</p>	<pre>int total = 0, i = 0; while(total < 60) { switch(i) { case 0: total += 20; i = 1; break; case 1: i = 2; total -= 10; case 2: i = 0; total += 10; break; } System.out.println(total); }</pre>	

2) (30 points) The Java class called `Highway` is started below. An object of class `Highway` represents a highway or expressway. This class has four private instance variables:

- `name`, which is a `String` representing the name of the highway.
- `routeNum`, which is an `int` representing the route number of the highway.
- `roadLength`, which is a `double` representing the length of the highway in miles.
- `hasCarPoolLane`, which is a `boolean` representing whether the highway has a car pool lane or not.

```
public class Highway {
    private String name;
    private int routeNum;
    private double roadLength;
    private boolean hasCarPoolLane;

    // your code will go here

}
```

a) (7 points) Write a constructor which takes in a name, route number, road length, and boolean of whether the highway has a car pool lane or not, and assigns those values to the `Highway` object.

b) (8 points) Write a non-static method `equals(Highway otherHW)`, which compares two `Highways` and returns `true` if the highway names and route numbers are the same for both `Highways`, and `false` otherwise.

2) (continued)

c) (5 points) Use your constructor from part (a) to instantiate an object of class `Highway` with name "Major Deegan", route number 87, road length 8.38, and NO car pool lane.

d) (10 points) Write a static method `sumOfRoadLengths`, which takes in an array of `Highway` objects, and returns the sum of the `roadLengths` of the highways in the array. Assume that every element of the array contains a `Highway` object.

3) (10 points) Write a static method called `swap` that swaps two elements of an `String` 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
- a `String` array

The method does not return anything.

4) (20 points) The Java class `Lake` (code below) represents a lake.

a) (6 points) Fill in the code below so that it has the following private attributes:

- the name of the lake (`name`)
- area of the lake in square miles (`area`)
- the state the lake is located in (i.e. NY, NJ, CT) (`state`)

```
public class Lake{  
    //your code goes here
```

```
    public Lake(){  
        name = "no name yet";  
        area = 0.0;  
        state = "unknown location";  
    }  
}
```

b) (4 points) Write the accessor (getter) method for the instance variable `area`.

c) (5 points) Write the mutator (setter) method for the instance variable `area`.
If the input argument is negative, do not change the variable's value.

d) (5 points) Write a `toString` method for the class `Lake` that returns a `String` containing the name, the area, and the state of the `Lake` Object.

Format the returned `String` like this:

Name: Cayuga Lake, Area: 66.41 sq. mi., State: NY

5) (10 points) Write a piece of code that repeatedly asks the user for a word. If the input is "Hello", the program should print out "Hello to you too!" If the input is "quit", the code should end. If the word is anything else, the code should ask the user for another word.