Spring 2018 CMP 326 Final Exam V2

125 points total

Name:_____   Date:_____

(24 points / 2 points each) **Trace the code and write the result (Write ERROR if there is an ERROR)**

Code	Method Call	Results
1 ```public static int q1(int a, int b) { if (a == 0) { return b; } else { return q1(a - 1, b + 1); } }```	q1(5,0);	
	q1(0,3);	
	q1(3,4);	
	q1(1,4);	
2 ```public static void q2(boolean a, boolean b) { if (a && b) { System.out.println("apples"); } else if (a || b) { System.out.println("bananas"); } else { if (!b) { System.out.println("bicycles"); } else { System.out.println("elephants"); } } }```	q2(true, true);	
	q2(false, true);	
	q2(false, false);	
	q2(true, false);	
3 ```public static void q3(int [] arr, int i, int x){ try{ arr[i] = x; System.out.println("YES! " + x); }catch(IndexOutOfBoundsException e){ System.out.println("BOO! "); }catch(Exception e){ System.out.println("GEN EXC! "); } }```	int [ ] a = {7,2,9,10}; q3(a, 3, 5);	
	int [ ] a = {7,2,9,10}; q3(a, 2, 11);	
	int [ ] a = {7,9,10,2}; q3(a, 4, 3);	
	int [ ] a = null; q3(a, 3, 5);	

4 (25 points / 5 points each) **Create the Java class Person that has the following private attributes:**

- **name : String**
- **age : int**
- **gender : char**

a. Create a **default constructor** that initializes all 3 attributes to the following values

name	"unknown"
age	0
gender	'u'

b. Create an **overloaded constructor** that takes in values for all 3 attributes and assigns them.
c. Create **getter** and **setter** methods for all 3 attributes.
d. Create the **equals** method.
   Two Person objects are equal when their age and gender are the same. (Disregard the names)
e. Create the **toString** method so that it returns a well formatted String including all attributes.

```
// write your answer here
```

```
// write your answer here
```

5 (20 points / 5 points each) Create the Java class Student that inherits from the Person class.

The Student class has the following private attributes:

- **id : int**
- **gpa : double**
- **major : String**

a. Create a **default constructor** that calls the parent constructor and initializes all 3 attributes to the following values

id	-1
gpa	-1.0
major	"undeclared"

b. Create an **overloaded constructor** that takes in values for all 3 attributes and assigns them.

c. Create the **equals** method. Remember to include the super class's equals method.
   Two Student objects are equal when their id is the same. (Disregard the other attributes)

d. Create the **toString** method so that it returns a String including all attributes from both classes.
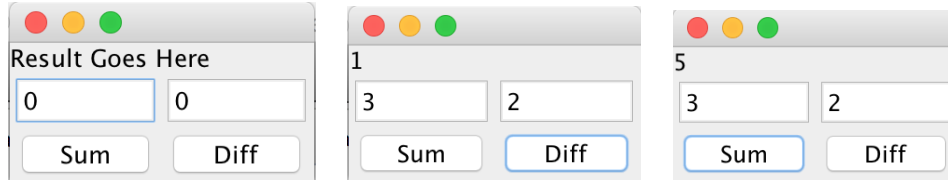
// write your answer here

// write your answers here

6 (30 points) **Create a GUI for a simple calculator that contains the following elements**:
   • Two JTextField's (both start with a 0 as their text)
   • Two JButtons (one called "sum" the other called "diff")
   • One JLabel to display the result
The user should be able to use your GUI to enter two numbers using the JTextFields .
If the user presses the Sum button, your GUI should add the two numbers and display the result in the JLabel.
If the user presses the "Diff" button, your GUI should subtract one number from the other and display the result in the JLabel. Remember to catch exceptions (Hint: When a user enters a non-numeric value in a text field it cannot be converted to an int)

Result Goes Here		1		5	
0	0	3	2	3	2
Sum	Diff	Sum	Diff	Sum	Diff

// write your answer here

// write your answer here

7 (10 points) Remember the iterative Sorting algorithm BubbleSort.
Create a method that takes in an array of ints and sorts the values in ascending order.

```
//write your answer here
```

8 (16 points) Write a recursive method to calculate factorial of a number n.
The method should take in an int parameter and return the int factorial of that number.
      Example: factorial(5); returns 120
      Remember: factorial(0); returns 1

```
//write your answer here
```