CS 1322 Test 2 - A March 2, 2004

Name: _____

GT Number (email one): _____

TA and Section: _____

Commenting your code on this test is optional, however it may help the grader understand your code better. Other style issues such as using good variables names and using abstraction are still required. Write your gt number in the spaces provided and color in the corresponding numbers and letters.

gt	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	d	e	f	g	h	0	1	2	3	4	5	6	7	8	9	-	-	-	-	-	-	-	-	-	-	-
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	0	1	2	3	4	5	6	7	8	9	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	a	b	c	d	e	f	g	h	i	j	k	l	m	n	o	p	q	r	s	t	u	v	w	x	y	z

Problem	Points Possible	Points Received	Graded By
1 True/False	14		
2 Declarations	16		
3 Parameter Passing	7		
4 Arrays	18		
5 Visbility and Scope	15		
6 Coding and Arrays	18		
7 Tracing	12		
TOTAL	100		

Please remember: Any academic misconduct (including, but not limited to, the list below) could result in a 0 (zero) on the exam and/or an F grade in the course:

- Communication with anyone other than a proctor for ANY reason in ANY language in any manner.
- Sharing of ANYTHING (e.g. pencils, paper, erasers).
- Writing on paper that is not given to you by a proctor.
- Failure to follow directions given by the proctor.
- Use of cell phones, beepers, handheld computers, calculators, during the exam.
- Using books or other reference material.
- Disruption of the exam setting.

By taking this exam, you signify that it is your work and that you have neither given nor received inappropriate help during the taking of this exam in compliance with the Academic Honor Code of Georgia Tech.

Signature: _____

(you must sign this for your exam to be graded!)

1. True/False [14 pts]

Answer the following questions True or False. Be sure to write out True and False, NOT just a T or F.

2 (a) A JPanel or a JApplet is always the top level component of a Swing-enabled Graphical User Interface (GUI).

2 (b) Any object that has not had a method called in the previous 125 milliseconds is eligible for garbage collection.

2 (c) We build a GUI by creating components. Components generate events. To handle events, we must write listeners and associate them with the appropriate component.

2 (d) A class whose definition is contained entirely inside another class will generate a syntax error in Java.

2 (e) The Java reserved word `null` represents an empty reference. It may be passed as a parameter anywhere the compiler expects an object reference.

2 (f) All parameter passing in Java is done through the call-by-reference methodology.

2 (g) The formal parameters to a method are placeholders that receive actual values passed in by a caller.

2. Declarations [16 pts]

4 (a) Consider a class Student with a method getClassRank that will compute and return the student's class rank (Freshman, Sophomore, etc.):

```
public String getClassRank() { .. }
```

Assume that you have a variable s1 that holds a reference to an instance of the Student class. Write the code to properly get s1's class rank (i.e., how would you call the getClassRank method using the s1 reference?).

4 (b) Write the code to specify an interface called Lockable that requires methods setLock( ) and isLocked( ). The isLocked method returns a boolean that represents whether there is a lock on the class or not and setLock returns nothing. The interface also contains an integer constant MAX_LOCKS whose value is 10.

4 (c) Write the first line of a class definition for a class named MyClass that will provide the services specified in the Comparable interface

4 (d) Write the method signature for the random method in the java.lang.Math class. Recall that random takes no parameters, returns a double between 0-1, and is a class method.

3. Parameter Passing [7 pts]

```
public class MyAdder {

  public static void total(int x, int sum) {
    sum+=x;
  }//end method total

  public static void main(String[] args){
    int sum=0;
    total(7,sum);
    total(-4,sum);
    total(2,sum);
    System.out.println("The total is: "+sum);
  }//end main method

}//end class MyAdder
```

The programmer expected the output to say: The total is: 5.

7 (a) Which of the following actually occurs with the code above:

1. The code compiles without error and produces the expected output.
2. The code compiles without error, but produces some other output.
3. The code causes a compiler error.

4. Arrays [18 pts]

Consider the following set of integers: 4, 15, 6, 2, 7, 1.

[4] (a) Write a declaration for an array named arr that is initialized to these values.

[4] (b) What is the value of arr.length?

[4] (c) What is the value of arr[3]?

[6] (d) Write a simple for loop that will add 1 to every element of the array arr.

5. Visibility and Scope [15 pts]

Consider the Dog and Cat classes below. At each commented position, determine whether the access operation is legal or not. If illegal, give brief reason why. Write "Yes" or "No" in the numbers that follow the code (one for each Position) and explain the illegality for each "No" response.

```
public class Dog{
  private String name;
  private Cat chaseObject;

  public Dog(Cat c, String n) {
    this.name = n;//_____________________________Position 1
    chaseObject=c;
  }//end constructor Dog

  public void printChaseObjectName(){
    System.out.println(chaseObject.name);//______Position 2
  }//end method printChaseObjectName

  private void chase(){
    //some other code here
    chaseObject.run();//_____________________________Position 3
  }//end method chase
  public static void main(String[] args) {
    Cat c = new Cat("Fluffy");
    Dog d = new Dog(c,"Brutus");
    c.tormentor=d;//_____________________________Position 4
    d.printChaseObjectName(); //_____________Position 5
    chase();//_____________________________Position 6
    System.out.println(Cat.LIVES);//_____________Position 7
  }//end main method
}//end class Dog

public class Cat{
  public Dog tormentor;
  private String name;
  public static final int LIVES = 9;
  int lives;

  public Cat(String n){
    name=n;
    lives=Cat.LIVES;//_____________________________Position 8
  }//end constructor Cat

  public static int getLives(){
    return lives;
  }//end method getLives
```

```
  public void run(){
    /*some code here*/
  }//end method run

  public static void main(String[] args) {
    Cat c = new Cat("Fluffy");
    c.getLives();//_______________________________Position 9
    c.tormentor = new Dog(c,"Barky");
  }//end main method
}//end class Cat
```

1. Legal?

2. Legal?

3. Legal?

4. Legal?

5. Legal?

6. Legal?

7. Legal?

8. Legal?

9. Legal?

6. **Coding and Arrays [18 pts]**

Write the code for the method findMax(int[] x) that returns an integer that is the largest value in the array of integers passed in. This should be made a class method since it does not use any instance data.

7. Tracing[12 pts]

What is printed by the following code.

```
public class ABC {
   private int A=0;
   private static int B=0;
   private int C=0;

   public void increment() {
     int C=0;
     A++;
     B++;
     C++;
   }

   public void display() {
     System.out.println(A+" "+B+" "+C);
   }

   public static void main(String[] args){
     ABC x = new ABC();
     ABC y = new ABC();

     x.increment();
     y.increment();
     x.increment();

     x.display();
     y.display();
  }
}
```

Output: