



**1. Vocabulary Terms – Matching [ 5 pts ]**

1. \_\_\_\_\_ Method
2. \_\_\_\_\_ Class
3. \_\_\_\_\_ Constructor
4. \_\_\_\_\_ Recursion
5. \_\_\_\_\_ Modifier

- A.** A method that is used to change the value of a local variable.
- B.** A paradigm of OO programming in which Objects are grouped together based on similarities in their structure.
- C.** The term that describes the delayed evaluation of a functions arguments in a functional language, as opposed to the immediate evaluation found in an OO language.
- D.** A blueprint for a data type, from which Objects can be made.
- E.** A block of code which has a name, and may be called similarly to functions .
- F.** When a method calls its self.
- G.** The term that describes the delayed evaluation of a functions arguments in an OO language, as opposed to the immediate evaluation found in a functional language.
- H.** A special type of method that is used to initialize new instances.
- I.** A method that is used to change the value of an instance variable.
- J.** An anonymous function, most similar to lambda from scheme.
- K.** A method that is used to obtain the value of a local variable.

## 2. Short Coding [ 10 pts ]

- 5 (a) Write the method **public int sum(int x)** which returns the sum of all of the integers from 1 to **x** (inclusive). For example,  $\text{sum}(5)=1+2+3+4+5=15$ . For this method, you **MUST use iteration ONLY**. If you do not use iteration, or you use any recursion, you will receive no credit for this problem.
- 5 (b) Write the method **public int factorial(int x)** which returns **x** factorial. Remember that the factorial of **x** is the product of all numbers from 1 to **x** (inclusive). Also, remember that 0 factorial is 1. For this method, you **MUST use recursion ONLY**. If you do not use recursion, or you use any iteration, you will receive no credit for this problem.

### 3. Arrays – Short Coding [ 15 points ]

- 7 (a) Write the method **public double average(double[] data)** which computes the average of the items found in **data**. You may assume that there is at least one element in **data**.
- 3 (b) Create a variable **myArray** to be a 3 dimensional array of floats. Initialize **myArray** to be a 4 by 7 by 2 array of floats.
- 5 (c) With **myArray** as above, what is the type of **myArray[2][3]**?

#### 4. Datatype and Casting – Short Answer [ 20 points ]

For each of the following, determine if the given code fragment is legal syntactically (you do not need to try to figure out if it does what the programmer meant). If the code fragment is legal, write **OK**, otherwise write **ERROR** and rewrite the code fragment correctly. You may **NOT** change the declared types of any variables when you rewrite the code, instead you must apply proper casting.

- [1] (a) `double d = 1;`
- [1] (b) `int x = 1.4;`
- [2] (c) `int aNumber = 3;`  
`double someDouble=aNumber;`
- [3] (d) `long shot = 12345;`  
`short trip = (short) shot;`  
`int x = shot;`
- [3] (e) `char c = 'a';`  
`int x = c;`
- [5] (f) Write the method **public double quadratic(double x, int a, int b, int c)** that computes  $a * x^2 + b * x + c$  and returns that value (as on **P0**). You should only cast WHERE NEEDED. Do not make any unneeded casts.
- [5] (g) Explain why each of the casts that you made were needed above, or if you did not cast anywhere, explain why no casts were needed.

## 5. Simple Objects – Short Coding [ 15 pts ]

Given the following incomplete class:

```
public class Person
{
    private int age;
    //YOUR CODE WOULD GO HERE
} //end class person
```

- 5 (a) Write an accessor method for the variable age.
- 5 (b) Write a modifier method for the variable age.
- 5 (c) Declare a variable **myPerson** of type **Person**, and initialize it to a new instance of **Person**, then use the appropriate method to set **myPerson**'s age to be 23.

## 6. Basic Commands – Short Answer [ 15 points ]

- 5 (a) What command do you type at the command prompt to compile all of the java files in the current directory?
- 5 (b) What command do you type at the command prompt to run the java class **MyProgram**?
- 5 (c) What command do you type at the command prompt to generate html documentation files from the comments in your program for all java files in the current directory?

## 7. Simple Tracing – Tracing [ 10 pts ]

Given the following code:

```
public class Tracing1 {
    int myNumber;
    public Tracing1(int n) {
        setMyNumber(n);
        System.out.println("Made a Tracing1 with number "+getMyNumber());
    }
    public int getMyNumber() {
        return myNumber;
    }
    public void setMyNumber(int v) {
        this.myNumber = v;
    }
    public String toString(){
        return "I am a Tracing1 with number "+ getMyNumber();
    }
    public static void main(String[] args) {
        Tracing1 a=new Tracing1(5);
        Tracing1 b=new Tracing1(6);
        Tracing1 c=new Tracing1(-3);
        Tracing1[] myArray=new Tracing1[3];
        myArray[0]=b;
        myArray[1]=c;
        myArray[2]=a;
        System.out.println("Lets print the array...");
        for(int i=0;i<myArray.length;i++) {
            System.out.println(myArray[i]);
        }
        System.out.println("Now for something else...");
        b.setMyNumber(c.getMyNumber());
        c.setMyNumber(a.getMyNumber());
        System.out.println(b);
        System.out.println(c);
    } //end method main
} //end class Tracing1
```

Write the output when the above class is run below:

**8. Switch/case versus if/else – Short Coding [ 10 pts ]**

Given the following code fragment:

```
switch(x)
{
    case 1:
    case 3:
        System.out.println("hello!");
        break;
    case 4:
        System.out.println("world");
    case 2:
        System.out.println("what?");
        break;
    default:
        System.out.println("done");
}
```

Write equivalent code that uses if-else instead of switch-case