



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

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

- A.** An anonymous function, most similar to lambda from scheme.
- B.** A paradigm of OO programming in which Objects are grouped together based on similarities in their structure.
- C.** A method that is used to change the value of a local variable.
- 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 a functional language, as opposed to the immediate evaluation found in an OO language.
- H.** 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.
- I.** A method that is used to change the value of an instance variable.
- J.** A method that is used to obtain the value of a local variable.
- K.** A special type of method that is used to initalize new instances.

## 2. Short Coding [ 10 pts ]

- 5 (a) Write the method `int multiply(int x, int y)` which returns `x * y`, without use of the `*` operator. Remember that multiplication can be expressed as repeated addition. For this method, you **MUST use iteration ONLY**. If you do not use iteration, if you use any recursion, or if you use the `*` operator you will receive no credit for this problem.
- 5 (b) Write the method `int arithTerm(int a, int d, int t)` which returns the  $t^{\text{th}}$  term of the arithmetic series with initial term `a` and difference `d`. Remember that the first term of an arithmetic series is `a` and that subsequent terms are obtained by adding `d` to the previous term. For example, the arithmetic sequence with `a=1` and `d=2` goes 1,3,5,7,... so `arithTerm(1,2,4)` would equal 7. 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 max(double[] data)` which finds and returns the maximum 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 ints. Initialize `myArray` to be a 6 by 9 by 3 array of ints.
- 5 (c) With `myArray` as above, what is the type of `myArray[2][1]`?

**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 = 2;`
- [1] (b) `int x = 4.5;`
- [2] (c) `int aNumber = 34;`  
`double someDouble=aNumber;`
- [3] (d) `double trouble= 147.29998;`  
`int rouble = (short) trouble;`
- [3] (e) `char c = 'q';`  
`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 Car
{
    private String model;
    //YOUR CODE WOULD GO HERE
} //end class Car
```

- 5 (a) Write an accessor method for the variable `model`.
- 5 (b) Write a modifier method for the variable `model`.
- 5 (c) Declare a variable `myCar` of type `Car`, and initialize it to a new instance of `Car`, then use the appropriate method to set `myCar`'s `model` to be "BMW".

## 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 Tracing3 {
    int myNumber;
    public Tracing3(int n) {
        setMyNumber(n);
        System.out.println("I have "+getMyNumber());
    }
    public int getMyNumber() {
        return myNumber;
    }

    public void setMyNumber(int v) {
        this.myNumber = v;
    }
    public String toString(){
        return "My Number is "+ getMyNumber();
    }
    public static void main(String[] args) {
        Tracing3 a=new Tracing3(1);
        Tracing3 b=new Tracing3(45);
        Tracing3 c=new Tracing3(-98);
        Tracing3[] myArray=new Tracing3[3];
        myArray[0]=a;
        myArray[1]=c;
        myArray[2]=b;
        System.out.println("printing the array");
        for(int i=0;i<myArray.length;i++)
            {
                System.out.println(myArray[i]);
            }
        System.out.println("something else");
        a.setMyNumber(c.getMyNumber());
        c.setMyNumber(b.getMyNumber());
        System.out.println(c);
        System.out.println(a);
    }//end method main
}//end class Tracing3
```

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:

```
if(y==3)
{
    x=4;
}
else if(y==2)
{
    x=7;
}
else if(y==7 || y==10)
{
    x=9;
}
else
{
    x= 37;
}
```

Write equivalent code that uses switch-case instead of if-else. Use the “Fallthrough” technique where appropriate.