

1. Vocabulary Terms – Matching [5 pts]

1. _____ Method
2. _____ Class
3. _____ Recursion
4. _____ Modifier
5. _____ Constructor

- A.** A method that is used to change the value of a local variable.
- B.** When a method calls its self.
- 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.** An anonymous function, most similar to lambda from scheme.
- F.** A block of code which has a name, and may be called similarly to functions.
- G.** A paradigm of OO programming in which Objects are grouped together based on similarities in their structure.
- H.** A method that is used to change the value of an instance variable.
- I.** 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.
- J.** A special type of method that is used to initialize new instances.
- 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 geomTerm(int a, int r, int t)** which returns the t^{th} term of the geometric series with initial term **a** and ratio **r**. Remember that the first term of a geometric series is **a** and that subsequent terms are obtained by multiplying the previous term by the ratio, **r**. 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 **int fib(int x)** which computes the **x**th Fibonacci number. Recall the the n^{th} Fibonacci number is the sum of the $(n-1)^{\text{th}}$ and the $(n-2)^{\text{th}}$ Fibonacci numbers, and that $\text{fib}(0)=1$, $\text{fib}(1)=1$. 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 product(double[] data)** which computes the product of the items found in **data**. You may assume that **data** is non-null.
- 3 (b) Create a variable **myArray** to be a 3 dimensional array of chars. Initialize **myArray** to be a 3 by 8 by 4 array of chars.
- 5 (c) With **myArray** as above, what is the type of **myArray[2][0]**?

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) `float f = 5;`
- 1 (b) `short s = 1.4;`
- 2 (c) `long wayToRun= 4;`
`int y=wayToRun;`
- 3 (d) `long shot = 12345;`
`short trip = (short) shot;`
`int x = shot;`
- 3 (e) `char c = 'z';`
`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 Student
{
    private double gpa;
    //YOUR CODE WOULD GO HERE
} //end class Student
```

- 5 (a) Write an accessor method for the variable gpa.
- 5 (b) Write a modifier method for the variable gpa.
- 5 (c) Declare a variable **aStudent** of type **Student**, and initialize it to a new instance of **Student**, then use the appropriate method to set **aStudent**'s gpa to be 4.0.

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 Tracing5 {
    int myNumber;
    public Tracing5(int n) {
        setMyNumber(n);
        System.out.println("A tracing with "+getMyNumber());
    }
    public int getMyNumber() {
        return myNumber;
    }

    public void setMyNumber(int v) {
        this.myNumber = v;
    }
    public String toString(){
        return getMyNumber() + " is my number";
    }
    public static void main(String[] args) {
        Tracing5 a=new Tracing5(2);
        Tracing5 b=new Tracing5(3);
        Tracing5 c=new Tracing5(-12);
        Tracing5[] myArray=new Tracing5[3];
        myArray[0]=b;
        myArray[1]=a;
        myArray[2]=c;
        System.out.println("printing");
        for(int i=0;i<myArray.length;i++)
            {
                System.out.println(myArray[i]);
            }
        System.out.println("something different");
        a.setMyNumber(c.getMyNumber());
        b.setMyNumber(a.getMyNumber());
        System.out.println(a);
        System.out.println(b);
    } //end method main
} //end class Tracing5
```

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 4:
        z=4;
    case 5:
        System.out.println("hello world");
        break;
    case 7:
    case 8:
        k=9;
        break;
    default:
        System.out.println("w00t!");
}
```

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