

1. Vocabulary Terms – Matching [5 pts]

1. _____ Accessor
2. _____ Iteration
3. _____ Array
4. _____ Class
5. _____ Method

- A.** A method that is used to change the value of a local variable.
- B.** 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.
- C.** An anonymous function, most similar to lambda from scheme.
- D.** Using a loop to perform similar operations multiple times.
- E.** 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.
- F.** A paradigm of OO programming in which Objects are grouped together based on similarities in their structure.
- G.** A method that is used to obtain the value of a local variable.
- H.** A method that is used to obtain the value of an instance variable.
- I.** A block of code which has a name, and may be called similarly to functions.
- J.** A blueprint for a data type, from which Objects can be made.
- K.** A static data structure that can hold multiple elements of the same type.

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 recursion ONLY**. If you do not use recursion, or you use any iteration, 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 iteration ONLY**. If you do not use iteration, or you use any recursion, you will receive no credit for this problem.

3. Arrays – Short Coding [15 points]

- 7 (a) Write the method `public int countEvens(int[] data)` which counts how many of the items found in `data` are even, and returns that count. You may assume that `data` is non-null.
- 3 (b) Create a variable `myArray` to be a 3 dimensional array of shorts. Initialize `myArray` to be a 5 by 6 by 3 array of shorts.
- 5 (c) With `myArray` as above, what is the type of `myArray[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) `long myLong = 1.88;`
- 1 (b) `float f = 53;`
- 2 (c) `long wayToRun= 4;`
`int y=wayToRun;`
- 3 (d) `long shot = 12345;`
`short trip = (short) shot;`
`int x = shot;`
- 3 (e) `char coal = 'f';`
`int x = coal;`
- 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 a modifier method for the variable gpa.
- 5 (b) Write an accessor 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 3.5.

6. Basic Commands – Short Answer [15 points]

- 5 (a) What command do you type at the command prompt to run the java class **MyProgram**?
- 5 (b) What command do you type at the command prompt to compile all of the java files in the current directory?
- 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 Tracing6 {
    int myNumber;
    public Tracing6(int n) {
        setMyNumber(n);
        System.out.println("made one with "+getMyNumber());
    }
    public int getMyNumber() {
        return myNumber;
    }

    public void setMyNumber(int v) {
        this.myNumber = v;
    }
    public String toString(){
        return "My # is " + getMyNumber();
    }
    public static void main(String[] args) {
        Tracing6 a=new Tracing6(12);
        Tracing6 b=new Tracing6(33);
        Tracing6 c=new Tracing6(-98);
        Tracing6[] myArray=new Tracing6[3];
        myArray[0]=a;
        myArray[1]=c;
        myArray[2]=b;
        System.out.println("the array:");
        for(int i=0;i<myArray.length;i++)
            {
                System.out.println(myArray[i]);
            }
        System.out.println("and now");
        c.setMyNumber(b.getMyNumber());
        a.setMyNumber(b.getMyNumber());
        System.out.println(c);
        System.out.println(a);
    }//end method main
}//end class Tracing6
```

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(b==6)
{
    System.out.println("whazup?");
}
else if(b==7 || b==9)
{
    k=12;
}
else if(b==4)
{
    k=3;
}
else
{
    System.out.println("outta here");
}
```

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