

IS 247 Test One

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Closed Book, Closed Notes, No Electronics

1. (10 points): Clearly mark each of the following true or false, **T** or **F**.
 - (a) An array of size n is indexed from one to n .
 - (b) Every Java class has a `toString()` method, either within the class or inherited from its parent.
 - (c) If **A** is a subclass of **B**, then we can say that an **A** is-a **B**.
 - (d) If class **X** is the parent class of **Y**, we say that **X** is a subclass of **Y**.
 - (e) Inheritance is a mechanism to derive a new class from an existing one.

2. (10 points): Write a Java method that takes two integer parameters and returns an array containing the integers from the first to the second parameter, inclusive. For example, if the parameters are (3, 7), the array would contain the integers 3, 4, 5, 6, and 7. The size of the array should be exactly the number of integers in the array, e.g., the array returned above would contain 5 elements.

3. (10 points): What output is generated by the following program? Show your work for possible partial credit.

```
public class T1a {

    private int[] a;

    public T1a(int start, int stop, int step) {
        a = new int[stop];
        for (int index = 0; index < stop; ++index)
            a[index] = index;
        for (int index = start; index <= stop; index += step)
            a[index] = 0;
    } // constructor

    public void run() {
        for (int index = 1; index < a.length; ++index)
            a[index] = a[index] + a[index-1];
    } // run()

    public String toString() {
        String result = "a: " + a[0];
        for (int index = 1; index < a.length; ++index)
            result = result + ", " + a[index];
        return result;
    } // toString()

    public static void main(String[] args) {

        T1a t = new T1a(2, 10, 3);
        t.run();
        System.out.println(t);

    } // main()
} // class T1a
```

4. (10 points): What output is generated by the following program? Show your work for possible partial credit.

```
public class T1b {

    protected int a;

    public T1b(int aIn) {
        a = aIn;
    } // constructor

    public int f(int b, int c) {
        return a * b / c;
    } // f()

} // class T1b

class D extends T1b {

    protected int third;

    public D(int a) {
        super(a + 1);
        third = a / 3;
    } // constructor

    public int g(int x) {
        return f(x, x/2);
    } // g()
} // class D

class E extends D {
    public E(int z) {
        super(z);
    } // constructor

    public int f(int b, int c, int d) {
        return super.f(b, c) + g(d);
    } // f()

    public static void main(String[] args) {
        E e = new E(5);
        System.out.println(e.f(8, 4, 2));
    } // main()
} // class E
```

5. (10 points): Consider class P:

```
public class P {  
  
    public String toString() {  
        return "Class P";  
    } // toString()  
  
} // class P
```

Write a class called C that extends P. C's `toString()` method should call `toString()` in its parent class to help it return the string *Class C: Class P*.