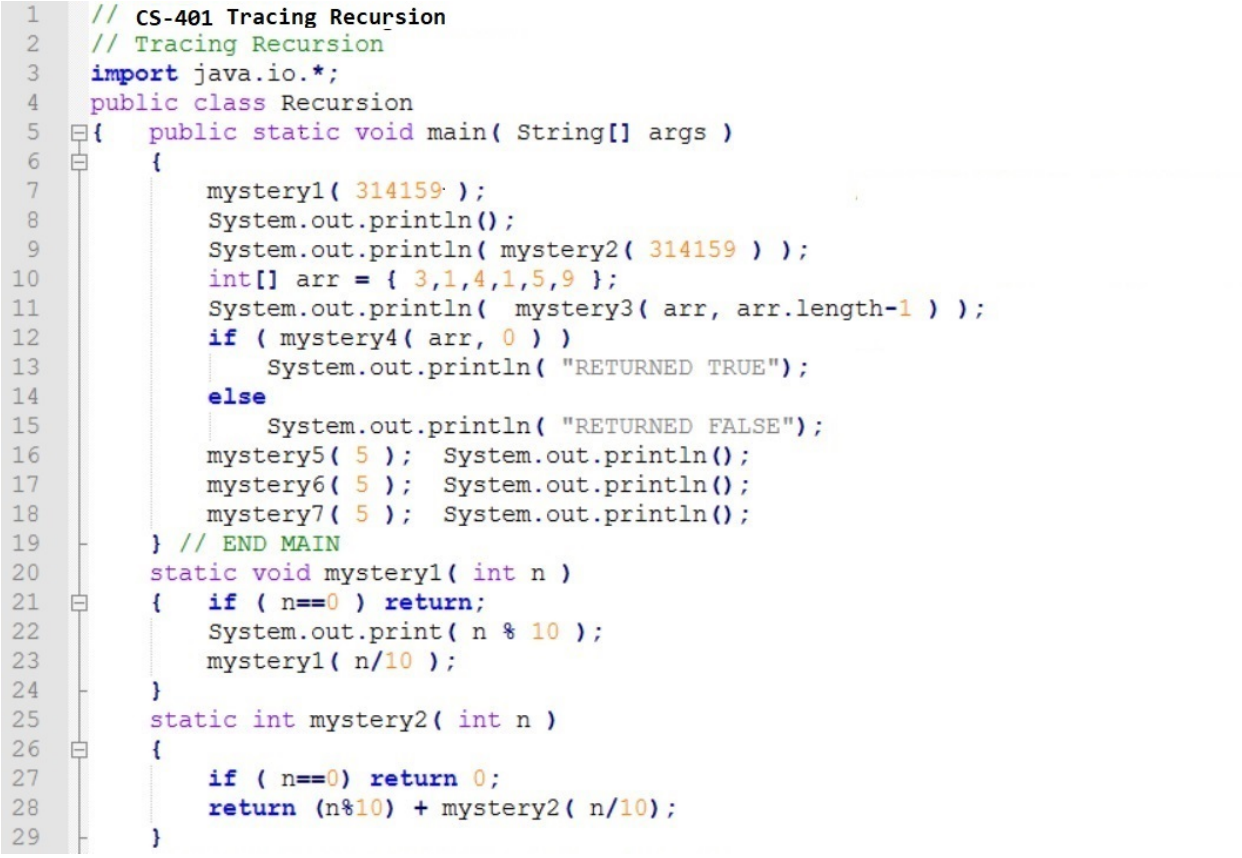
Java – Assignment 4

At the bottom of the page is an image of a program listing that compiles and executes correctly. The main method calls seven methods named mystery1() through mystery7(). These seven methods use recursion to do some task. You job is to read the code and tell what the output of each method is and also describe what that operation that output represents.

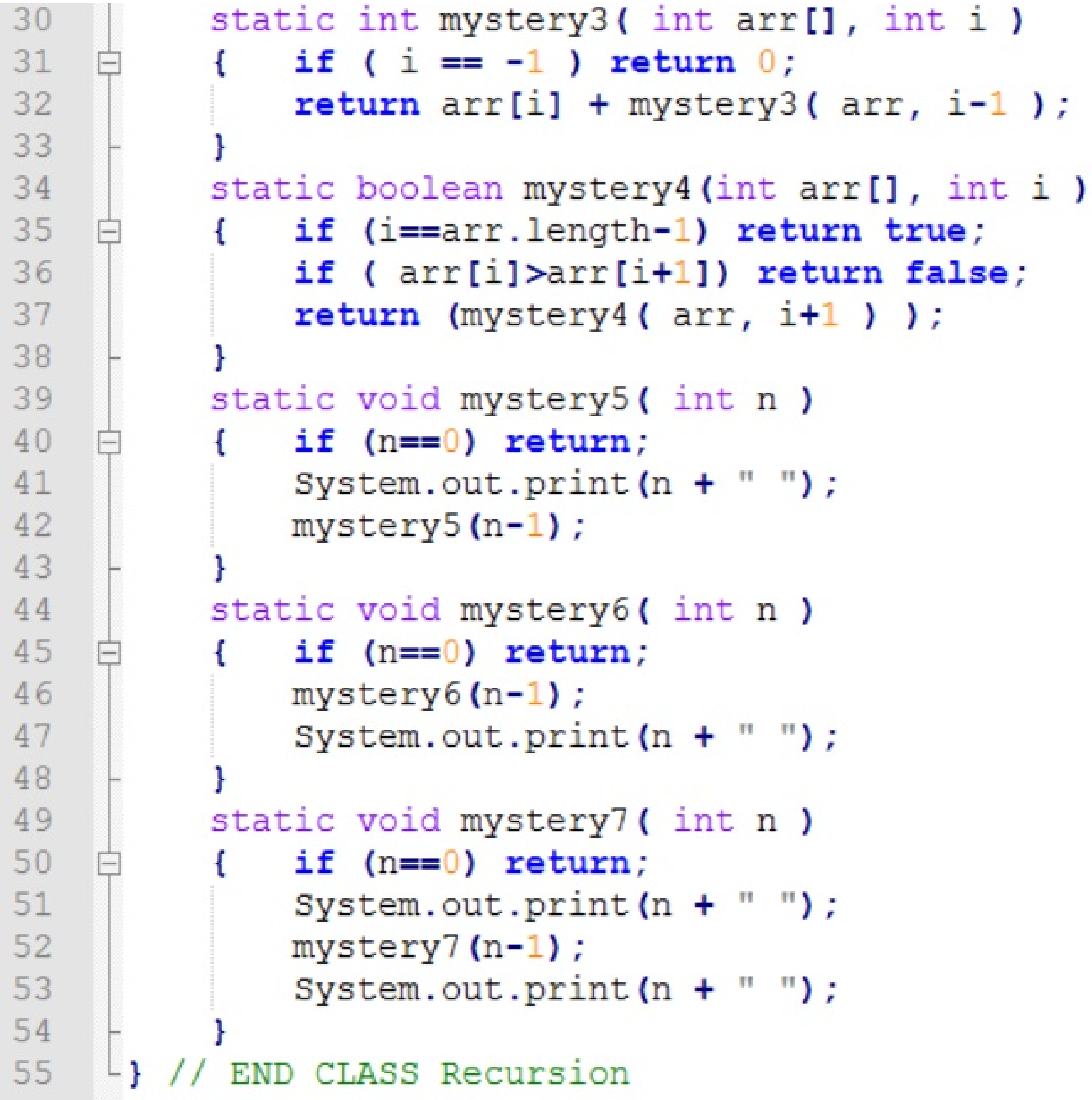
For example if the method adds up all the numbers in an array and divides the sum by the number of elements (i.e. computes the average) You would be expected to write two things:
(1) output=25.2 (2) AVERAGE OF THE ARRAY VALUES
Each answer must be a two part answer: (1) the actual output value (2) very brief description that shows you understood the MEANING of the code
YOU ARE NOT ALLOWED TO TYPE THIS CODE INTO A JAVA FILE OR COMPILE/EXECUTE IT. TRACE IT IN YOUR HEAD OR ON PAPER

You must write the actual outputted answer AND a description of what it does.

```
/*
MYSTERY #1:  (1) output=3.14159          (2) ITS THE DIGITS OF PI
MYSTERY #2   (1) output=11.8769          (2) PRODUCT OF THE SQUARE ROOTS OF EACH DIGIT
MYSTERY #3   (1) output=?????            (2) ????
...
MYSTERY #7   ....
*/
```



```
// CS-401 Tracing Recursion
// Tracing Recursion
import java.io.*;
public class Recursion
{   public static void main( String[] args )
    {
        mystery1( 314159 );
        System.out.println();
        System.out.println( mystery2( 314159 ) );
        int[] arr = { 3,1,4,1,5,9 };
        System.out.println(  mystery3( arr, arr.length-1 ) );
        if ( mystery4( arr, 0 ) )
            System.out.println( "RETURNED TRUE");
        else
            System.out.println( "RETURNED FALSE");
        mystery5( 5 );  System.out.println();
        mystery6( 5 );  System.out.println();
        mystery7( 5 );  System.out.println();
    } // END MAIN
    static void mystery1( int n )
    {   if ( n==0 ) return;
        System.out.print( n % 10 );
        mystery1( n/10 );
    }
    static int mystery2( int n )
    {
        if ( n==0) return 0;
        return (n%10) + mystery2( n/10);
    }
```



```java
    static int mystery3( int arr[], int i )
    {   if ( i == -1 ) return 0;
        return arr[i] + mystery3( arr, i-1 );
    }
    static boolean mystery4(int arr[], int i )
    {   if (i==arr.length-1) return true;
        if ( arr[i]>arr[i+1]) return false;
        return (mystery4( arr, i+1 ) );
    }
    static void mystery5( int n )
    {   if (n==0) return;
        System.out.print(n + " ");
        mystery5(n-1);
    }
    static void mystery6( int n )
    {   if (n==0) return;
        mystery6(n-1);
        System.out.print(n + " ");
    }
    static void mystery7( int n )
    {   if (n==0) return;
        System.out.print(n + " ");
        mystery7(n-1);
        System.out.print(n + " ");
    }
} // END CLASS Recursion
```