CS110 – Spring 2012

Problem Set 6 (Due Tuesday 4/24. Bring a hardcopy to class.)

Name: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**String Manipulation**

1. (10pts) Write a function frac that takes an two integers , a numerator and a denominator and returns a float which is the corresponding fraction. For example: println(frac(1/4)); will print 0.25.

float frac(int num, int denom) {

 return float(num)/float(denom);

}

1. (18 pts) Write a program that splits the numbers in the given myNums String, converts them to floats, and prints them to the console.

void setup() {

 String myNums = "1.2, 2.3, 3.4, 4.5, 5.6";

 // Add your code here

 String[] sNums = split(myNums, ",");

 float[] fNums = new float[sNums.length];

 for (int i=0; i<sNums.length; i++) {

 fNums[i] = float(sNums[i]);

 println(fNums[i]);

 }

}

1. (18 pts) Finish the following program, which was designed to count and print the number of duplicate Strings in the myArray String array.

// Count and print the number of duplicate strings in myArray

String [] myArray = {"A", "B", "C", "D", "A", "F", "C"};

void setup() {

 int count = 0;

 // Add code here

 for (int i=0; i<myArray.length-1; i++) {

 for (int j=i+1; j<myArray.length; j++) {

 if (myArray[i].equals(myArray[j])) {

 count++;

 }

 }

 }

 println("There are " + count + " duplicates.");

 }

**Functions and Multidimensional Arrays**

1. (18 pts) Declare a 2D ragged float array that matches the following triangular shape and fill it with random numbers.

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void setup() {

 float[][] tri = new float[5][];

 for (int i=5; i>0; i--) {

 tri[5-i] = new float[i];

 }

 for (int i=0; i<tri.length; i++) {

 for (int j=0; j<tri[i].length; j++) {

 tri[i][j] = random(100);

 println( i + ", " + j + "= " + tri[i][j]);

 }

 }

}

**Recursion**

1. (18 pts) Add a recursive function named recursiveDigitSum () to the following program. The new function should compute and returns the sum of the digits in a string myDigits.

void setup() {

 String myDigits = "123456789";

 println( recursiveDigitSum( myDigits ) );

}

int recursiveDigitSum( String s ) {

 int d = int(s.substring(0, 1));

 if ( s.length() == 1 ) {

 return d;

 } else {

 String theRest = s.substring( 1 );

 return d + recursiveDigitSum( theRest );

 }

}

**ArrayLists**

1. (18 pts) Write a short program that (i) creates an ArrayList, (ii) adds to the ArrayList the numbers 0 through 9, (iii) then removes the odd numbers, and (iv) prints out all remaining items in the ArrayList.

ArrayList al;

void setup() {

 al = new ArrayList();

 for (int i=0; i<10; i++) {

 al.add(i);

 }

 for (int i=1; i<al.size(); i++) {

 al.remove(i);

 }

 for (int i=0; i<al.size(); i++) {

 println(al.get(i));

 }

}