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));

}

}