CS 2003: Fundamentals of Algorithms and Computer Applications

Lab 4: Recursive problem solving

Recursive program to find largest/smallest elements in an ArrayList: Write a program that reads a data file of doubles into an ArrayList and prints the elements and the number of items read in.

1. The name of the data file should be provided interactively. *Do Not* hard code the name of the data file.

2. Write a recursive function that returns the largest and smallest elements in the ArrayList and the corresponding indices. To return these four items, you need to return an object that is an instance of an *inner class* called `MinMaxObject` that you will define to contain four private variables *max, min, maxPos, minPos* of types double, double, int and int respectively.

Use dataset `Lab4.dat` (from `~class_sandip/2003/`) to test your program. You should use appropriate Java features including the Scanner class for reading in data, ArrayList of Doubles, enhanced for loop, etc.

Demonstration of Towers of Hanoi: You do not need to do any coding for this part. Rather, you will use the coded solution for the Towers of Hanoi problem. The code includes graphical display of the algorithm at work.

1. Log in to your linux.ens account and copy the directory `Towers` and all its contents from the directory `~class_sandip/2003/`.

2. Compile the code and run the applet either by using applet viewer or a browser. You may need to "slow down" (find out how!) the code so you can see the disks move.

You should read the code in `TowersApp.java` to understand the recursive problem solving used.

All labs and programs that you turn in should include your name, student ID, and lab section.