

CS225 Homework 2

Counting Occurrences and Longest Increasing Sequence Problem

DELIVERABLES: One Java file. You do not need to include the file containing the data. A separate one will be used to grade your work. File naming convention (required!): *yourusernameHW2.java*

Only electronic documents submitted via Canvas are acceptable. Do not submit a hard copy of your assignment. Do not email your assignment to the course instructor or grader. Important: Late assignments will not be graded.

SOURCE CODE: Provide your source code with the features described below.

- Code Quality, Naming Conventions: Your Java file shall be named based on your ERAU email username – *yourusernameHW2.java*.
- Code Quality, In-Code Documentation: Code shall begin with the header shown in Figure 1. Variations are allowed as long as the required information is present. In addition, variable declarations and method (function) definitions must also be commented.
- Code Quality, Formatting: Code should follow standard formatting styles as discussed in class. For example, indentation of code blocks, use and position of brackets.
- Code Quality, Descriptive Component Names: Variable and function names shall be named in a manner to suggest their role in a program and improve clarity of code in general. Example: *innerRadius* and *outerRadius* are preferable to *r1* and *r2*. Exceptions may be made for incidental variables. For example, due to the history of programming languages, it is considered standard to use the variables *i*, *j*, and *k* for loop counters.
- Compilation: Points are based on success/failure of compilation.
- Correctness: Points are awarded based on correct program behavior.

```
/* *****  
* File_name.java  
* Assignment Number: Title  
* Author: Firstname Lastname  
* Collaborations: List any persons collaborating with you.  
* Date: mmddyyyy  
*|  
* variable List: List each variable with name, type, and role in the program.  
*  
* Methods List: List each method with inputs, outputs, and role in the program.  
* ***** */
```

Figure 1: Block Comment Format

PROBLEM DESCRIPTION: This assignment involves two common problems that occur with data sets. The first is to find how many times a particular value occurs in the set, and the second is to find the longest sequence in which the values occur in sorted order from low to high. Problem statements are given below.

Counting Occurrences: Given some data set, *D*, and some key value, *k*, determine how many times *k* appears in *D*.

Longest Increasing Sequence: Given some data set, $D = d_1, d_2, d_3, \dots, d_n$, determine the longest sequence in *D* such that elements $d_i < d_{i+1}$. For this exercise, use strictly “less than” as opposed to “less than or equal.” For

example, given D = 1, 2, 5, 2, 67, 4, 8, 12, 42, 10, the longest increasing sequence is the sequence of length four that includes 4, 8, 12, 42 .

The Random.java file has been provided with this assignment as an example of how to get data from a file into an array. You are free to copy/paste the relevant portions of the Random.java file into your solution.

REQUIREMENTS: Your solution must contain the following:

1. A method that receives input from the user via console for an integer value, and then prints out the number of times that value occurs in the data.
2. A method that prints out the longest increasing sequence in the data.
3. Output to console: Your name, the request for input from the user for a key value, the number of times the key occurs in the data, the longest increasing sequence in the data.

RUBRIC: Per that grading rubric below (See Homework 0 for definitions and instructions.)

Deliverable	Points	Awarded
Code quality (remember initial comments!)	10	
Code compilation	5	
Code outputs required items	5	
Correctness (Counting Occurrences)	10	
Correctness (Longest Increasing Sequence)	10	
Totals	40	