CSDS 293
Software Craftsmanship
2024 Fall Semester

Programming Assignment 1

Due at the beginning of your discussion session on

TBD

Quiz

In addition to the following topics, the quiz syllabus includes any material covered in the lectures:

- Chapter 2: "Software Construction: Building Software" in Code Complete

- Table 3.1, "Choosing Between Iterative and Sequential Approaches", Sections 3.3 and 3.5 in Code Complete

- Section 4.3 in Code Complete

Programming

In this assignment, you will write a method that finds the longest alternating subsequence in two lists:

```
static <T extends Comparable<? super T>> List<T>
longestAlternatingSubsequence(List<T> a, List<T> b,
Comparator<T> cmp)
```

An alternating subsequence is a subsequence where elements alternate between the two input lists, and each element is greater than the previous one in the subsequence. The method is supposed to return the alternating subsequence of maximum length. Here are some examples:

a	b	Longest alternating subsequence
1, 3, 5	2, 4, 6	1, 2, 3, 4, 5, 6
5, 2, 8	1, 3, 7	1, 2, 7, 8
1, 2, 3	4, 5, 6	1, 2, 4

| 3, 1, 4 | 1, 5, 9 | 1, 4, 5 |

To make the assignment more exciting:

- If your CWRU network id ends with a 0, 3, 6, or 9, then your code should use Iterators or ListIterators.
- If your CWRU network id ends with a 1, 4, or 7 then your code can use recursion but cannot use any type of loop (while, do, for, for-each, Iterator, ListIterator, Streams, etc.)
- In all other cases, your code should use Streams, but cannot use any other type of loop (while, do, for, for-each, Iterator, ListIterator, etc.) or recursion, and should avoid programming loops "into" Stream.

Optional Work

The following two work items are given as an option and are not required as a part of the assignment.

Your implementation can optionally include a main. If you opt to include a `main`, read two strings from standard input and print on standard output their longest alternating subsequence. The program will convert the strings into lists and use the appropriate version of the generic `longestAlternatingSubsequence`. Create your own input data and run your program on it.

Canvas Resource

The Course Document page contains links to some of the Java features that are helpful for this assignment, such as collections and streams.

Submission

Submit an electronic copy of your program to canvas.

Grading Guidelines

The first assignment is required but not graded.