CS 1101 – Introduction to Computer Science
Spring 2022
In Lab Activity

Objective: The goal of this assignment is to practice **methods, loops,** and **recursion**.

Problems from Coding Bat.

Assignment:

Create a program with the following methods, refer to the java file *March21_InLabActivity.java* to follow the structure of this assignment.

sumDigits: [20 points]
Given a non-negative int n, return the sum of its digits recursively (no loops). Note that mod (%) by 10 yields the rightmost digit (126 % 10 is 6), while divide (/) by 10 removes the rightmost digit (126 / 10 is 12).

sumDigits(126) → 9

sumDigits(49) → 13

sumDigits(12) → 3

changeXY: [20 points]
Given a string, compute recursively (no loops) a new string where all the lowercase 'x' chars have been changed to 'y' chars.

changeXY("codex") → "codey"

changeXY("xxhixx") → "yyhiyy"

changeXY("xhixhix") → "yhiyhiy"

allStar: [10 points]
Given a string, compute recursively a new string where all the adjacent chars are now separated by a "*".

allStar("hello") → "h*e*l*l*o"

allStar("abc") → "a*b*c"

allStar("ab") → "a*b"

stringClean: [20 points]
Given a string, return recursively a "cleaned" string where adjacent chars that are the same have been reduced to a single char. So "yyzzza" yields "yza".

stringClean("yyzzza") → "yza"

stringClean("abbbcdd") → "abcd"

stringClean("Hello") → "Helo"

mirrorEnds: [10 points]

Solve using a loop.

Given a string, look for a mirror image (backwards) string at both the beginning and end of the given string. In other words, zero or more characters at the very begining of the given string, and at the very end of the string in reverse order (possibly overlapping). For example, the string "abXYZba" has the mirror end "ab".

mirrorEnds("abXYZba") → "ab"

mirrorEnds("abca") → "a"

mirrorEnds("aba") → "aba"

closeFar: [20 points]

Given three ints, a b c, return true if one of b or c is "close" (differing from a by at most 1), while the other is "far", differing from both other values by 2 or more. Note: Math.abs(num) computes the absolute value of a number.

closeFar(1, 2, 10) → true

closeFar(1, 2, 3) → false

closeFar(4, 1, 3) → true

Deliverables: You are expected to submit one file in Blackboard:

March21_InLabActivity _Lastname.java --- the java file of your program.

Late submission: [**-10**] points for every day submitted after the deadline.