

CS1083 Assignment # 7 - Fall 2024

Due: Wednesday, 30 October before 4:30pm in the Desire2Learn dropbox. (See submission instructions below).

The purpose of this lab is to practice work more with File I/O and write recursive methods.

1. Adjacent Digit Counter

Write a static recursive method that takes a single *long* integer calculates the number of times two of the same digits appear adjacent to one another in that long integer. This method must use direct recursion. For example:

`adjacentDigitCounter(955133366) = 4`
because: 955133366

Write a basic driver to test this method. Write at least 3 unique test cases.

2. Caesar Cipher

A Caesar cipher is a style of message encryption that has existed for many centuries. For a Caesar cipher to work, it requires a message and a key. Each letter of the message is then shifted forwards in the alphabet by the key. For example:

"ABCDE" encrypted with the key, 3, would be: "CDEFG"

"TEST TEST" encrypted with the key of, 6, would be: "ZKYZ ZKYZ"

"-X?" encrypted with the key, 5, would be: "-C?" as when a letter goes beyond 'Z' it wraps back around to 'A'

For more information on Caesar cipher, you may wish to do a bit of research.

Write a direct recursive function that takes a string of uppercase characters and a key (0-25) and returns the message encrypted using Caesar cipher. If the string

contains any non-uppercase alphabetic characters, you can simply add them in their original position to the encrypted string, unchanged.

File I/O

Imagine that you have been given a .txt file that contains an integer followed by a comma, and then a string of text. You may assume that this text will contain only uppercase alphabetic characters, spaces, and no additional special characters.

In a main method, read in this data line by line, and use the key to encrypt the message. For each message and key combo, write its encrypted version to an output txt file called "Encrypted.txt" (one per line).

For this assignment, only an electronic submission is required.

Your electronic submission (submitted via Desire2Learn) will consist of two files:

- i. A single pdf file containing your written answer to questions in parts 1 and 2, including the code for decoding the three files and for calculating the series.

This written report should be prepared using a word processor. (Copy & paste your java source code & output into the report document and add appropriate headings.) The report document should then be stored as a SINGLE pdf file and submitted to the appropriate drop box on Desire2Learn. (This pdf will allow the marker to write comments directly on your work to give you better feedback.)

Note: Please name this report as follows:

YourName_As7_Report.pdf

- ii. an archive file (.zip or .tar) that contains the programs from question 1 and question 2. Include the file "Msgs.txt" as well.

Note: Please name this archive file as follows:

YourName_As7_Archive.zip or **YourName_As7_Archive.tar**