

CSC 370 Concepts of Programming Languages - Spring 2023

Homework #1

Due: Wednesday, 02/01/2023 (before class)

Submission method: Cardinal Learn

**** Combine all of your answers into a single PDF file. Note: Failure to do so will result in 0**

Run Length Encode

- Many times, certain data file types can consist of large amounts of repeated data. For instance, images can have large runs of the same color. This can be easily compressed using a technique called run length encoding. With run length encoding, large amounts of repeated data are stored as the repeated data and the number of times to repeat it.
- Create a class **RunLengthEncode** that contains the method `encode` which takes one argument: a String to be encoded as described below.
- The return value should be a String which has been encoded with the following algorithm:
- If any character is repeated more than 4 times, the entire set of repeated characters should be replaced with a slash '/', followed by a 2-digit number which is the length of the set of characters, and the character. For example, "aaaaa" would be encoded as "/05a". Runs of 4 or less characters should not be replaced since performing the encoding would not decrease the length of the string.

Notes

- Letters are case sensitive. For example "AaAaAa" cannot be encoded.
- You may only encode repeats of a single character, repeats of multiple characters cannot be encoded. For example "ababababab" cannot be encoded as "/05ab".

Constraints

- input will have between 0 and 50 characters, inclusive.
- input will consist only of letters 'a' - 'z' and 'A' - 'Z', digits '0' - '9', the space character, and the characters in the following string: "{}[>():;'+=.,\". (quotes are for clarity only and cannot be in the input string)

Examples

a) "aaaaa"

- a. Returns: `"/05a"`
- b. The example stated above.

b) "aaaa"

- a. Returns: `"aaaa"`
- b. Remember not to encode runs of length 4 or less.

c) "abcabcabcabcabc"

- a. Returns: `"abcabcabcabcabc"`
- b. Do not encode repeated segments of more than one character

d) "if(a){if(b){if(c){if(d){if(e){5 deeeeeeeep}}}}}"

- a. Returns: `"if(a){if(b){if(c){if(d){if(e){5 d/07ep/05}"`

e) ""

- a. Returns: `""`

Grading Questions:

1. Create a GitHub account (if you have not have one), create a repository for CSC370, and include a viewable URL in your submission.
2. Implement your class **"RunLengthEncode"** using a programming language of your choice (i.e. Python, Java, C++, etc.). When completed, i) upload your code to your CSC370 repository, ii) take a screenshot of your code and include it in your CardinalLearn submission.
3. Implement the class from #2 using a new programming language that you're not familiar with. Feel free to use online resources to help you implementing your solution. When completed, i) upload your code to your CSC370 repository, ii) take a screenshot of your code and include it in your CardinalLearn submission.