Run-length Encoding

1 Introduction

Run-length encoding is a simple method used to compress data in such a way that no information is lost (lossless). The method works by substituting a string of consecutive identical characters (a run) by the character and the length of the run.

2 Objective

The goal of this activity is to develop a function, named `rle`, that computes the run-length encoding of a string. This function will be implemented in Python.

Assume that your Python function will accept as an input a string `s`. It is guaranteed that $1 \leq$ `len(s)`≤ 500 and that the only two characters that appear in the string s are `a` and `b`. The output of your function should be a string containing the run-length encoding of `s`.

3 Example

For the binary string `'aaaabbaabbbabbbbaaaaaaaaaaaabb'`, the run-length encoding is given by the string `'a4b2a2b3a1b4a11b2'`.

4 Additional Notes

1. Consider using a loop to solve this problem. Draw a flowchart before you code to organize your thoughts.
2. Remember that a string can be manipulated using indexing and slicing the way lists can.
3. The Python built-in function `str()` that can convert integers to strings. For example, `str(14)` returns the **string** `'14'`. This will come in handy when constructing your encoding using the string concatenation operator `+`.
4. Make sure your code does not accidentally skip the last character in the input string.

5 Grading Criteria

This project is worth a total of 10 points:

- (3 points) Introduction and Discussion - Introduce the problem and explain how your algorithm/function works.
- (5 points) Algorithm and Implementation - The algorithm designed and implemented in Python solves the problem.
- (2 points) Neatness and Timeliness - Your write-up is neat, clear, and turned in on time. The assignment must be typed (as a Jupyter notebook) and completed by 11:59pm on September 16th.