CPSC 335 – Project 2 Report

Algorithm 2: String Run Encoding

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Algorithm Design & Implementation:

For the string run encoding problem, we decided that for a string input, we iterate through every character in the string with a for-loop and check for conditions with if-else statements. There is a variable that keeps count of the same characters and a current variable that is initialized to the first character of the string, which is then compared to the next character. If there is a repeating character, the count variable increases by one, after if count is greater than one, the count and the character are added into a new string. If the current character and the next character are not the same, they are added to the new string. Once the function `StrRunEncode()` is finished iterating through the input string, the new string is returned.

```python
def run_length_encode(s: str) -> str:
    """
    Encodes a string using run-length encoding.

    Args:
        s: The input string, containing lower-case letters and spaces.

    Returns:
        The encoded string.
    """
    if not s:
        return ""

    encoded_string = []
    i = 0
    while i < len(s):
        current_char = s[i]
        count = 1
        j = i + 1
        while j < len(s) and s[j] == current_char:
            count += 1
            j += 1

        # Append the count and character to the result list if count > 1
        # or just the character if count is 1. The image examples imply
        # only runs of more than one character are encoded with a count.
        if count > 1:
            encoded_string.append(f"{count}{current_char}")
        else:
            encoded_string.append(current_char)

        i = j

    return "".join(encoded_string)

# Example Usage:
print(f"\"ddd\" becomes \"{run_length_encode('ddd')}\"")
print(f"\"heloooooooo there\" becomes \"{run_length_encode('heloooooooo there')}\"")
print(f"\"choosemeeky and tuition-free\" becomes \"{run_length_encode('choosemeeky and tuition-free')}\"")
print(f"\"hello world\" becomes \"{run_length_encode('hello world')}\"")
```