

*Coding Prompt:*

A group of friends is interested in sending messages to each other that cannot be read by others if intercepted. They settle on a system in which messages are sent as a list of characters sorted alphabetically. Each character in the list also has a number associated with it. If the character is the first in the alphabetically sorted list the number represents its position in the message. For each character after that, the number represents its position in the message relative to the previous character. If a character shows up more than once in the message, they should be listed in the same order they appear in the message. For example, the message “Hello World” would be represented as [(“ ”, 5), (“H”, -5), (“W”, 6), (“d”, 4), (“e”, -9), (“l”, 1), (“l”, 1), (“l”, 6), (“o”, -5), (“o”, 3), (“r”, 1)]. Design the algorithm and write the code to encode and decode the messages. Be sure to include the test cases you would use to verify your algorithm.