Problem Solving & Coding – Level I
[Data Structure Foundations]
(Map Applications)

Solve the following problems using computer with help of Python/C++/Java/C# language as means of communication.

Problem 1: Text Messaging

On some basic cell phones, text messages can be sent using the numeric keypad. Because each key has multiple letters associated with it, multiple key presses are needed for most letters. Pressing the number once generates the first letter on the key. Pressing the number 2, 3, 4 or 5 times generates the second, third, fourth or fifth character listed for that key.

Key	Symbols
1	. , ? ! :
2	A B C
3	D E F
4	G H I
5	J K L
6	M N O
7	P Q R S
8	T U V
9	W X Y Z
0	*space*

Create a function *countKeyPressesForText* that takes string/text as input and returns the total number of key presses that must be made to get that text. Ensure that your logic handles both uppercase and lowercase letters. Ignore any characters that aren't listed in the table above such as semicolons and brackets. Include a main program to test your function.

Input: Hello
Output: 13

Problem 2: Roman to Integer

Given a roman numeral, convert it to an integer. For more details on the conversion process, you can refer the link given below.

Input: "LVIII"
Output: 58
Explanation: L = 50, V= 5, III = 3.
Source: https://leetcode.com/problems/roman-to-integer/description/

Problem 3: Letter Frequencies

One technique that can be used to help break some simple forms of encryption is frequency analysis. This analysis examines the encrypted text to determine which

characters are most common. Then it tries to map the most common letters in English, such as E and T, to the most commonly occurring characters in the encrypted text.
Create a function named *letterFrequency* that takes filename as input and returns the frequencies of all letters in a file. Ignore spaces, punctuation marks, and digits as you perform this analysis. Your program should be case insensitive, treating a and A as equivalent.

Write a main program to test your function.