

#### 4. [30%] Keypad translation



The diagram below shows the layout of a mobile phone keypad. Each letter in the alphabet corresponds to a unique sequence of keystrokes. For example, the keystroke sequence 2 gives the letter 'a', 22 gives the letter 'b', and 222 gives the letter 'c'. To write "HI THERE", the sequence of keystrokes is 44144408443377733, where 1 means a pause, and 0 represents a space. The two keys \* and # will give the letters '\*' and '#', respectively.



Note that sometimes a user would like to output consecutive characters which make use of the same key. E.g., to output the message "HI", the procedure is as follow: the user should first press the key 4 twice then the key 1 once to indicate that there is a pause to output the character 'H' for the "44". Then, the user should press the key 4 thrice to output the character 'I'. So, to output the message of "HI", the user should enter 441444 in the phone keypad.

**Assume that the input message will not start with 0 and the length of the input message always consists of 17 digits.** Write a program to read a sequence of non-empty keystrokes and output the translated message and the number of characters typed. Note that the "space" should be counted as a character in the output. Sample inputs and outputs are given below.

#### **Input is underlined.**

Sample 1
Please enter the message: <u>44144408443377733</u>
HI THERE
Count: 7
Sample 2
Please enter the message: <u>22244489998804455</u>
CITYU HK
Count: 7

**Sample 3: This case has a space as the last character**

Please enter the message: ##777717771771011  
##SRQ  
Count: 5

**Sample 4**

Please enter the message: 2222122#220221#  
BB#B C#  
Count: 6

**Sample 5**

Please enter the message: 3333333333333333  
E  
Count: 1

**Sample 6**

Please enter the message: 806199992\*2#33444  
T MZA\*A#EI  
Count: 9

**Sample 7**

Please enter the message: 806199992\*2#33441  
T MZA\*A#EH  
Count: 9