2. Compressed Arrays

PROBLEM: Given a character string, calculate a compressed representation of the string using the following procedure:

1. Calculate the frequency of each letter and build a frequency list. Each term of the list is the frequency of the letter followed by the letter. The frequency list is kept in ascending order based on frequency and in alphabetical order within each frequency. See the list below.
2. Add the first two frequencies in the list and attach the letters keeping all of them in alphabetical order. For example, combining the strings 2EK and 3AT would become 5AEKT.
3. Delete these two terms from the list.
4. Add the new frequency term to the list using the rules above. Note: 2EH was inserted between 2AD and 2O so as to keep the list in frequency order and alphabetical order within that frequency.
5. Repeat from Step 2 until there is just one frequency in the list.

EXAMPLE: Consider the string HELLOAWORLD. The initial frequency list has 8 terms:

1A 1D 1E 1H 1R 1W 2O 3L

The algorithm works as follows:

Delete 1A and 1D, and insert 2AD into the list: 1E 1H 1R 1W **2AD** 2O 3L
Delete 1E and 1H, and insert 2EH into the list: 1R 1W 2AD **2EH** 2O 3L
Delete 1R and 1W, and insert 2RWinto the list: 2AD 2EH 2O **2RW** 3L
Delete 2AD and 2EH, and insert 4ADEH into the list: 2O 2RW 3L **4ADEH**
Delete 2O and 2RW, and insert 4ORW into the list: 3L 4ADEH **4ORW**
Delete 3L and 4ADEH, and insert 7ADEHL into the list: 4ORW **7ADEHL**
Delete 4ORW and 7ADEHL, and insert 11ADEHLORW into the list: **11ADEHLORW**

INPUT: There will be 10 lines of input. Each line will contain a string (all uppercase letters) and a frequency value.

OUTPUT: For each input line, perform the algorithm described above. Print all the letters that appear in the algorithm above with the given frequency value. These letters must be printed in alphabetical order with no spaces. If there are no strings with that frequency, then print NONE.

2. Compressed Arrays

SAMPLE INPUT

HELLOAWORLD 2
HELLOAWORLD 3
HELLOAWORLD 4
HELLOAWORLD 7
BARRINGTON 3
RHODEISLAND 4
ABACUSSPACES 3
ICECREAMICE 7
COFFEECUPS 4
ALLSTARSTUDENTS 5

SAMPLE OUTPUT

1. ADEHORW
2. L
3. ADEHORW
4. ADEHL
5. NONE
6. DHILNOR
7. AS
8. NONE
9. CEFOP
10. ANRU

2. Compressed Arrays

TEST DATA

TEST INPUT	TEST OUTPUT
SHESELLSSEASHELLSBYTHESEASHORE 4	1. BHLORT
THEBROWNFOXJUMPSOVERTHEDOG 8	2. FGHJMNOPRSU
ZYYXXXWWWWVVVVVUUUUUUTTTTTTT 6	3. UXYZ
ABRACADABRAKALAMAZOOTIMBUKTU 5	4. BU
SUPERCALIFRAGILISTICEXPIALLIDOCIOUS 4	5. EGLOPRTU
MISSISSIPPIMASSACHUSETTSMISSOURI 9	6. APRTU
ROGERWILLIAMSFOUNDEDRHODEISLAND 4	7. ADFGHMNSUW
PROGRAMMINGINPYTHONISPHANTASTIC 3	8. APT
AAAAABBBBCCCDDEDDCCCBBBBAAAAA 11	9. CDE
ALLSTARCONTESTINBARRINGTONRI 8	10. LNORT