American Computer Science League

2021-2022 ● Contest 2: Fibonacci Cypher ● Junior Division

PROBLEM: Use this Fibonacci cypher to encode a given message.

The Fibonacci sequence starts with two non-negative integers and every term after that is the sum of the two previous numbers. Therefore, for this problem, our Fibonacci sequence will be 1, 2, 3, 5, 8, 13, … so that all terms are unique numbers. A Fibonacci cypher uses these numbers and an inputted 'key' (a lower-case letter in the alphabet) to encode a message into a series of numbers. Another person can decipher the message by knowing the 'key' that was used. For each character in the message, integers are generated by using the following steps:

1. Find the Fibonacci number with the same index as the character (e.g. the 1st character in the inputted string uses the Fibonacci number 1 and the 5th character uses the number 8).
2. By using the inputted key, find a new letter that is offset by the Fibonacci number found in Step 1. Wrap around to the beginning of the alphabet if necessary (e.g. if the key = 'p' and the Fibonacci number is 21, then the new letter is 'k').
3. Find the encoded number for each letter in the message by adding the ASCII code of the character in the string and the ASCII code of the letter found in Step 2.

EXAMPLE: For the string "ACSL c2" and the letter 'h' the numbers are found as shown:

Fibonacci offset	Offset ASCII Code	String ASCII code	Calculation
h + 1 = i	i = 105	A = 65	65 + 105 = 170
h + 2 = j	j = 106	C = 67	67 + 106 = 173
h + 3 = k	k = 107	S = 83	83 + 107 = 190
h + 5 = m	m = 109	L = 76	76 + 109 = 185
h + 8 = p	p = 112	space = 32	32 + 112 = 144
h + 13 = u	u = 117	c = 99	99 + 117 = 216
h + 21 = c	c = 99	2 = 50	50 + 99 = 149

The encoded message is "170 173 190 185 144 216 149".

INPUT: There are 5 sets of data. Each set contains 2 data values: 1) a lower-case alphabetic character for the 'key' and 2) a string for the actual message to be encoded. We guarantee that the message will be no longer than 30 characters. Any typeable character on the keyboard except for double quotes may be included in the message.

OUTPUT: For each line of data, print the integers, each separated by a single space, that represent the encoded message.

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SAMPLE INPUT:

```
h ACSL c2
s Python Programming
a Fibonacci Numbers
j Help ME!
z It is 9:30 in the morning.
```

SAMPLE OUTPUT:

1. 170 173 190 185 144 216 149
2. 196 238 234 224 208 212 142 177 232 211 206 228 199 210 223 205 209 213
3. 168 204 198 213 215 207 217 204 205 140 189 239 219 207 223 222 222
4. 179 209 217 223 146 196 170 147
5. 170 214 131 206 219 141 174 162 150 155 142 226 219 140 237 211 207 149 210 233 215 211 211 221 224 156

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TEST DATA

TEST INPUT:

```
h ACSL Contest 2
b Madam, I'm Adam!
a Java programs are the best.
d What are we really doing?
g This is the Fibonacci Cypher!
```

TEST OUTPUT:

1. 170 173 190 185 144 184 210 222 223 216 233 219 149 166
2. 176 197 201 200 215 155 151 179 140 218 144 162 211 207 206 142
3. 172 196 218 199 137 222 232 216 203 222 208 231 225 141 219 222 208 150 218 201 203 134 205 213 237 227 156
4. 188 206 200 221 140 210 235 209 135 230 215 131 227 213 196 219 218 242 137 200 216 210 220 218 162
5. 188 209 211 223 143 221 213 143 222 218 218 134 186 220 200 225 223 195 207 202 213 140 180 239 214 221 217 218 150