
LEVEL 3

CIA Agent: We can can use statistical analysis to figure out the encryption.

Your Task: Find a system to decrypt a message based on the histogram of the dictionary and the message.

You are given a message. A message is a sequence of words separated by spaces. The message has been encrypted with a [simple substitution cypher] which means that each letter is substituted with a different letter (can also be the same letter). Spaces will not be substituted.
You are given a dictionary that follows the rules outlined in level 2.

The order of the letters, sorted by frequency of occurrence, was the same in the message and the dictionary. But then the message got encrypted.
(Visualization can be found on the last slide)

Figure out the decryption table, that tells us for each letter which letter it has to be substituted with to get the decrypted message.

Sort the decryption table alphabetically based on the alien alphabet.

```
Notes: Letters will never have the same frequency of occurrence
```

	Input	Output
Format	message N word (line is repeated N times)	**cipherChar plainChar (line is repeated A times where A is the number of letters in the alien alphabet)**
Types	message (string): a sequence of encrypted words separated by spaces N (int): number of words in the dictionary word (String): a word in the alien language	**cipherChar (char): the letter in the ciphertext which has to be substituted** **plainChar (char): the letter that the ciphertext letter has to be substituted with**
Example	ABBAACBCB BBB BDBC CCACA DDBBBCDB BBBCCB BABC BADBCBCBB ABBBBCBDC CBABBBCA 20 CCC CCCCC CCCCCCA CCCAAC CB CBCA CBBDCBACD CDCCC CDCDCCAA CDCA CDBCACACC CAADCCAABB BBCCCABC DCCCCACBA DCCDDACAC DCCDA ACCAADCCC ACDCCCAD ACDDCA AADAD	C A B C D B A D Explanation: Each line in the output is sorted alphabetically based on the alien alphabet. Line two of the output says ‘B C’ which means each ‘B’ in the message has to be replaced with ‘C’ to produce the decrypted message. You will notice that with this decryption table, each word in the message will be a word in the dictionary when decrypted. You won’t have to check for that in this level, but it’s interesting to know.

Histogram visualizing example file

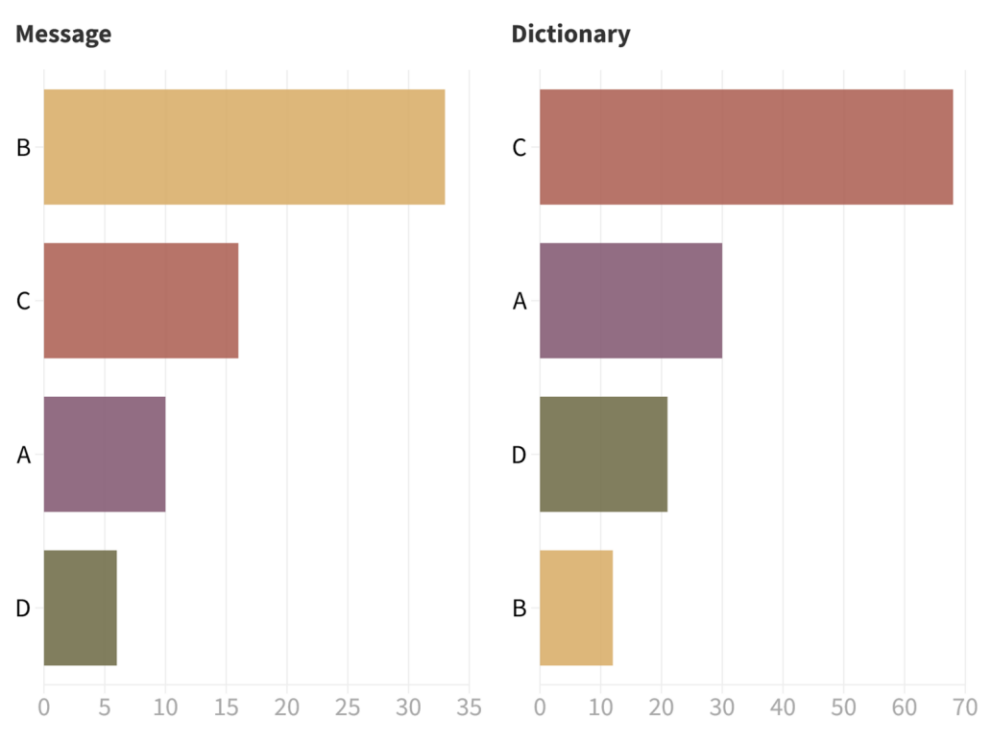
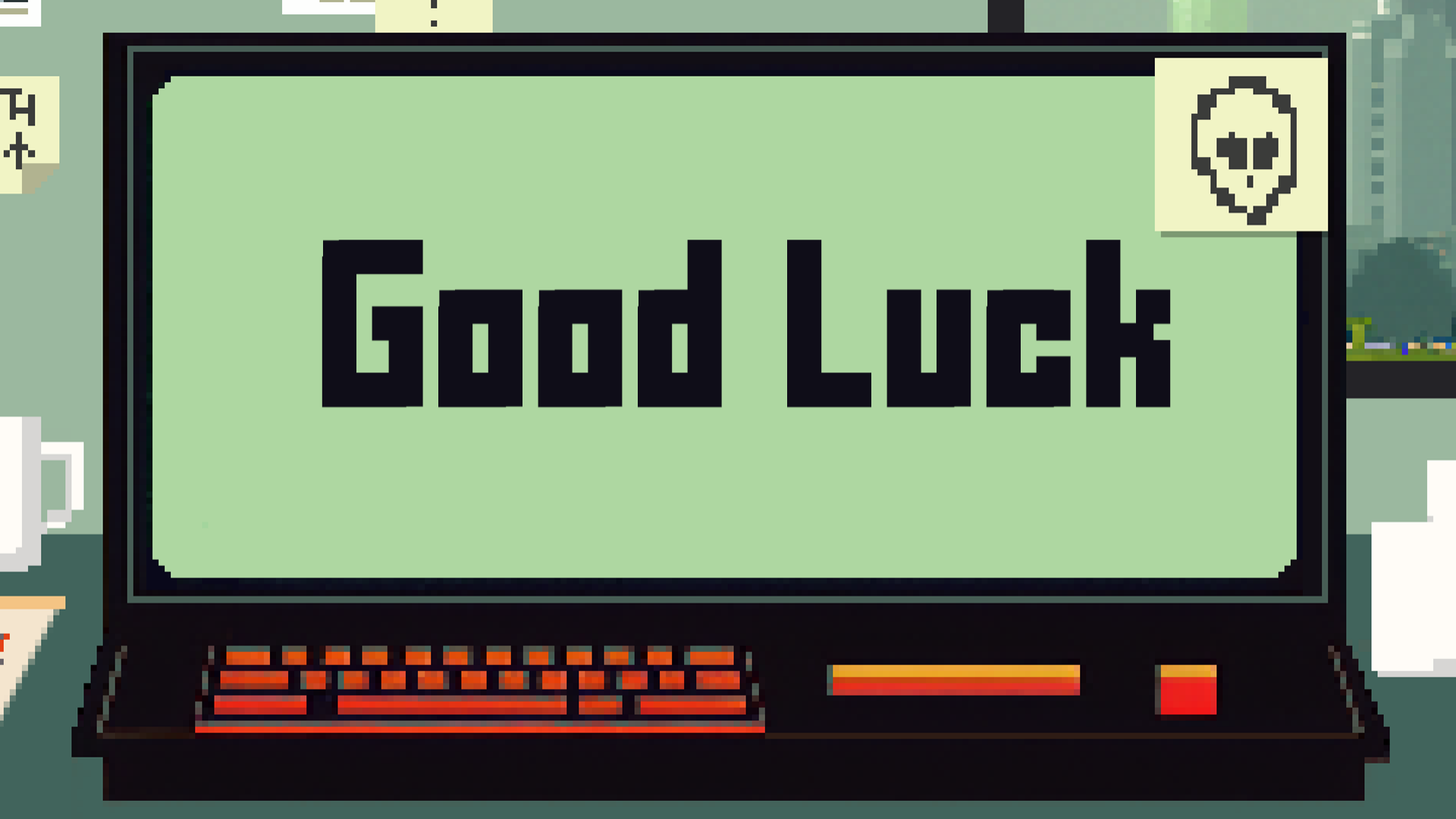


Diagram made with Flourish


Good Luck