

Online C Compiler - Programiz

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main.c

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Run

```
1 #include <stdio.h>
2 #include <string.h>
3 #include <stdlib.h>
4 #include <ctype.h>
5 #define ALPHABET_SIZE 26
6 #define MAX_TEXT_LEN 1000
7 #define MAX_RESULTS 10
8 const char *englishFreq = "ETAOINSHRDLUMWFGYPBVKJXQZ";
9 typedef struct {
10     char letter;
11     int count;
12 } Frequency;
13 int compareFreq(const void *a, const void *b) {
14     return ((Frequency *)b)->count - ((Frequency *)a)->count;
15 }
16 void analyzeFrequency(const char *text, Frequency freq[]) {
17     for (int i = 0; i < ALPHABET_SIZE; i++) {
18         freq[i].letter = 'A' + i;
19         freq[i].count = 0;
20     }
21
22     for (int i = 0; text[i] != '\0'; i++) {
23         if (isalpha(text[i])) {
24             char ch = toupper(text[i]);
```

Output

Clear

```
Enter the ciphertext (uppercase or lowercase letters only):
DEEPA
Enter number of top possible plaintexts to display: 2

Top 2 possible plaintexts:

Option 1:
AEEOT

Option 2:
OTTIA

=== Code Execution Successful ===
```

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```
25     freq[ch - 'A'].count++;
26 }
27 }
28
29 qsort(freq, ALPHABET_SIZE, sizeof(Frequency), compareFreq);
30 }
31 void generateMapping(Frequency freq[], char map[26], int offset) {
32     for (int i = 0; i < ALPHABET_SIZE; i++) {
33         if (i + offset < ALPHABET_SIZE) {
34             map[freq[i].letter - 'A'] = englishFreq[i + offset];
35         } else {
36             map[freq[i].letter - 'A'] = freq[i].letter;
37         }
38     }
39 }
40 void applyMapping(const char *cipher, char *output, char map[26]) {
41     for (int i = 0; cipher[i] != '\0'; i++) {
42         if (isalpha(cipher[i])) {
43             char upper = toupper(cipher[i]);
44             char subst = map[upper - 'A'];
45             output[i] = islower(cipher[i]) ? tolower(subst) : subst;
46         } else {
47             output[i] = cipher[i];
48         }
49     }
50 }
```

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```
49 }
50 output[strlen(cipher)] = '\0';
51 }
52 int main() {
53     char ciphertext[MAX_TEXT_LEN];
54     int topN;
55     printf("Enter the ciphertext (uppercase or lowercase letters only):\n");
56     scanf("%s", ciphertext);
57     printf("Enter number of top possible plaintexts to display: ");
58     scanf("%d", &topN);
59     if (topN > MAX_RESULTS) topN = MAX_RESULTS;
60     Frequency freq[ALPHABET_SIZE];
61     char plaintext[MAX_TEXT_LEN];
62     char map[26];
63     analyzeFrequency(ciphertext, freq);
64     printf("\nTop %d possible plaintexts:\n", topN);
65     for (int i = 0; i < topN; i++) {
66         generateMapping(freq, map, i);
67         applyMapping(ciphertext, plaintext, map);
68         printf("\nOption %d: %s\n", i + 1, plaintext);
69     }
70     return 0;
71 }
```

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