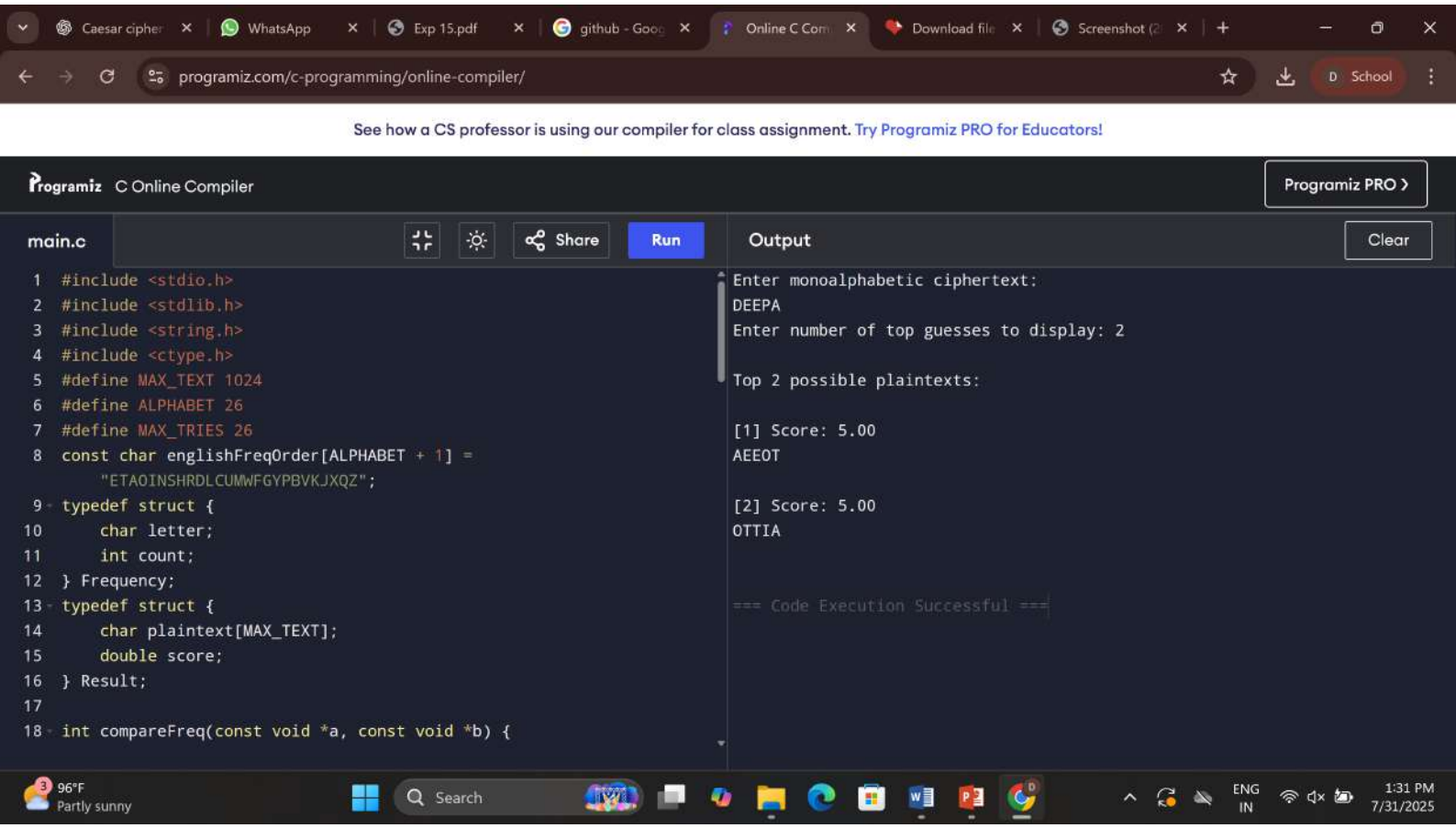
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Clear
#include <stdio.h>
#include <stdlib.h>
#include <string.h>
#include <ctype.h>
#define MAX_TEXT 1024
#define ALPHABET 26
#define MAX_TRIES 26
const char englishFreqOrder[ALPHABET + 1] =
"ETAOINSHRDLCUMWFGYPBVKJXQZ";
typedef struct {
char letter;
int count;
} Frequency;
typedef struct {
char plaintext[MAX_TEXT];
double score;
} Result;
int compareFreq(const void *a, const void *b) {
Enter monoalphabetic ciphertext:
DEEPA
Enter number of top guesses to display: 2
Top 2 possible plaintexts:
[1] Score: 5.00
AEEOT
[2] Score: 5.00
OTTIA
=== Code Execution Successful ===
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Partly sunny
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ENG
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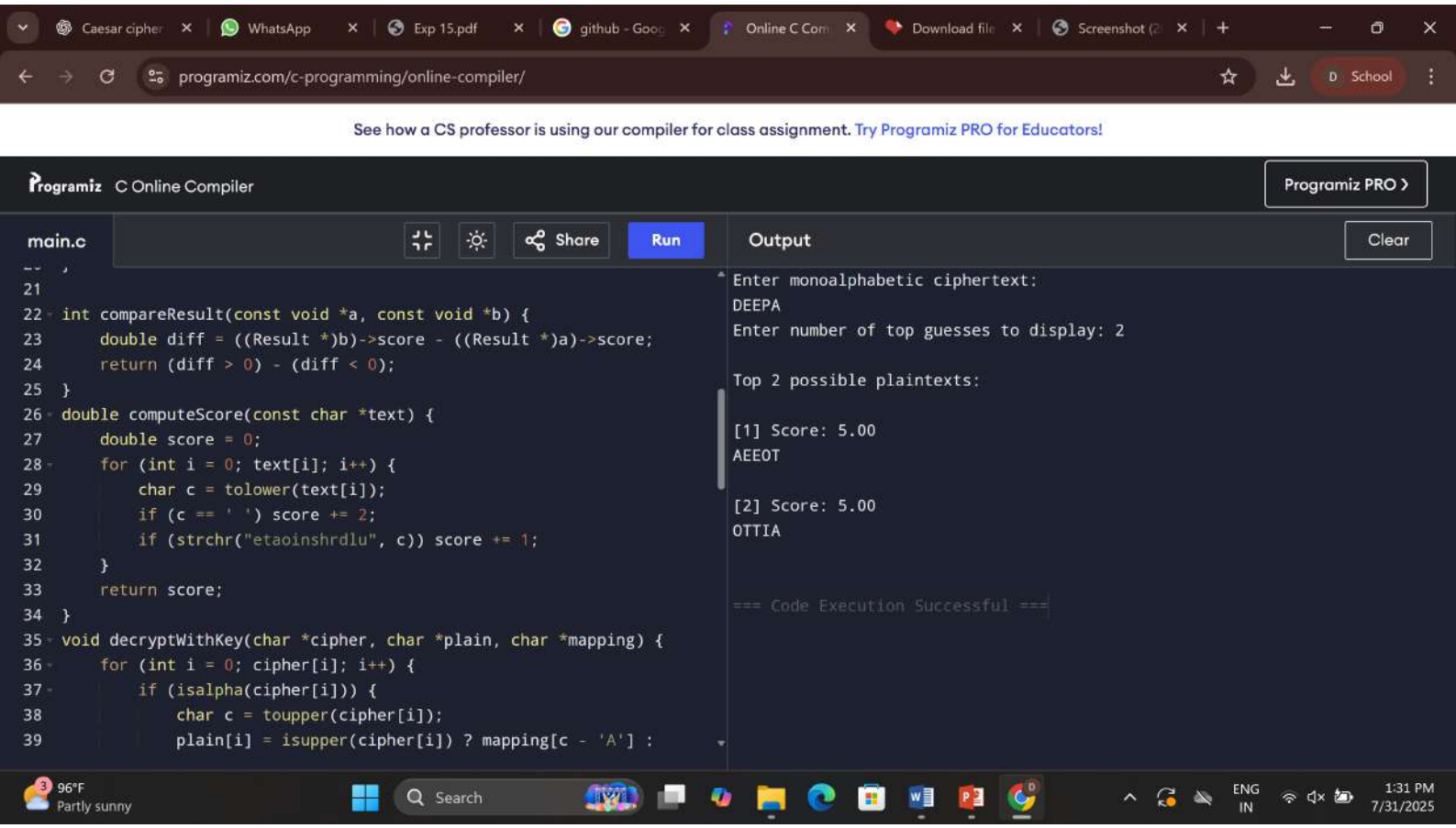
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21
22 int compareResult(const void *a, const void *b) {
23 double diff = ((Result *)b)->score - ((Result *)a)->score;
24 return (diff > 0) - (diff < 0);
25 }
26 double computeScore(const char *text) {
27 double score = 0;
28 for (int i = 0; text[i]; i++) {
29 char c = tolower(text[i]);
30 if (c == ' ') score += 2;
31 if (strchr("etaoinshrdlu", c)) score += 1;
32 }
33 return score;
34 }
35 void decryptWithKey(char *cipher, char *plain, char *mapping) {
36 for (int i = 0; cipher[i]; i++) {
37 if (isalpha(cipher[i])) {
38 char c = toupper(cipher[i]);
39 plain[i] = isupper(cipher[i]) ? mapping[c - 'A'] :
Enter monoalphabetic ciphertext:
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Top 2 possible plaintexts:
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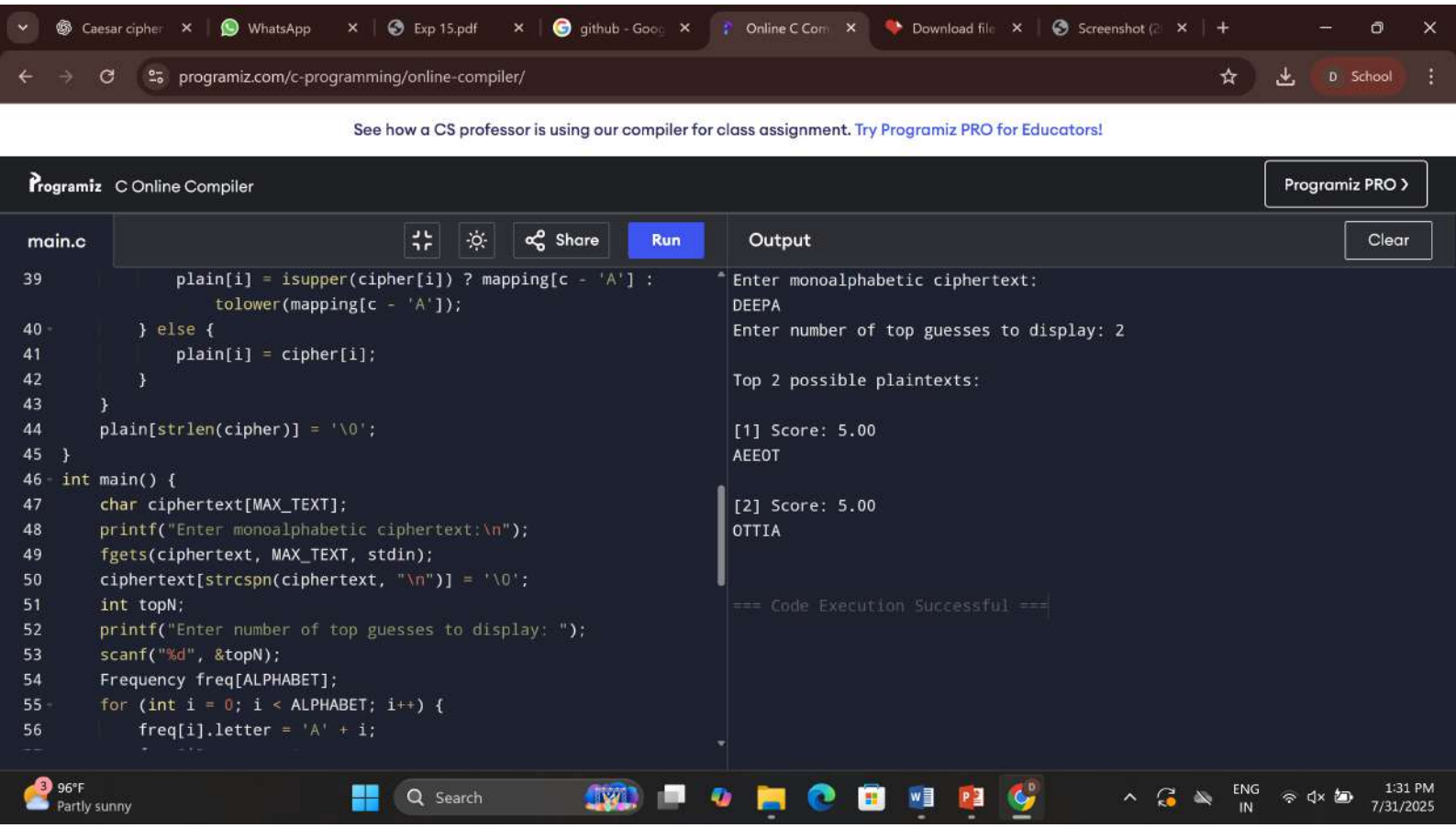
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plain[i] = isupper(cipher[i]) ? mapping[c - 'A'] : tolower(mapping[c - 'A']);
} else {
plain[i] = cipher[i];
}
}
plain[strlen(cipher)] = '\0';
}
int main() {
char ciphertext[MAX_TEXT];
printf("Enter monoalphabetic ciphertext:\n");
fgets(ciphertext, MAX_TEXT, stdin);
ciphertext[strcspn(ciphertext, "\n")] = '\0';
int topN;
printf("Enter number of top guesses to display: ");
scanf("%d", &topN);
Frequency freq[ALPHABET];
for (int i = 0; i < ALPHABET; i++) {
freq[i].letter = 'A' + i;
Enter monoalphabetic ciphertext:
DEEPA
Enter number of top guesses to display: 2
Top 2 possible plaintexts:
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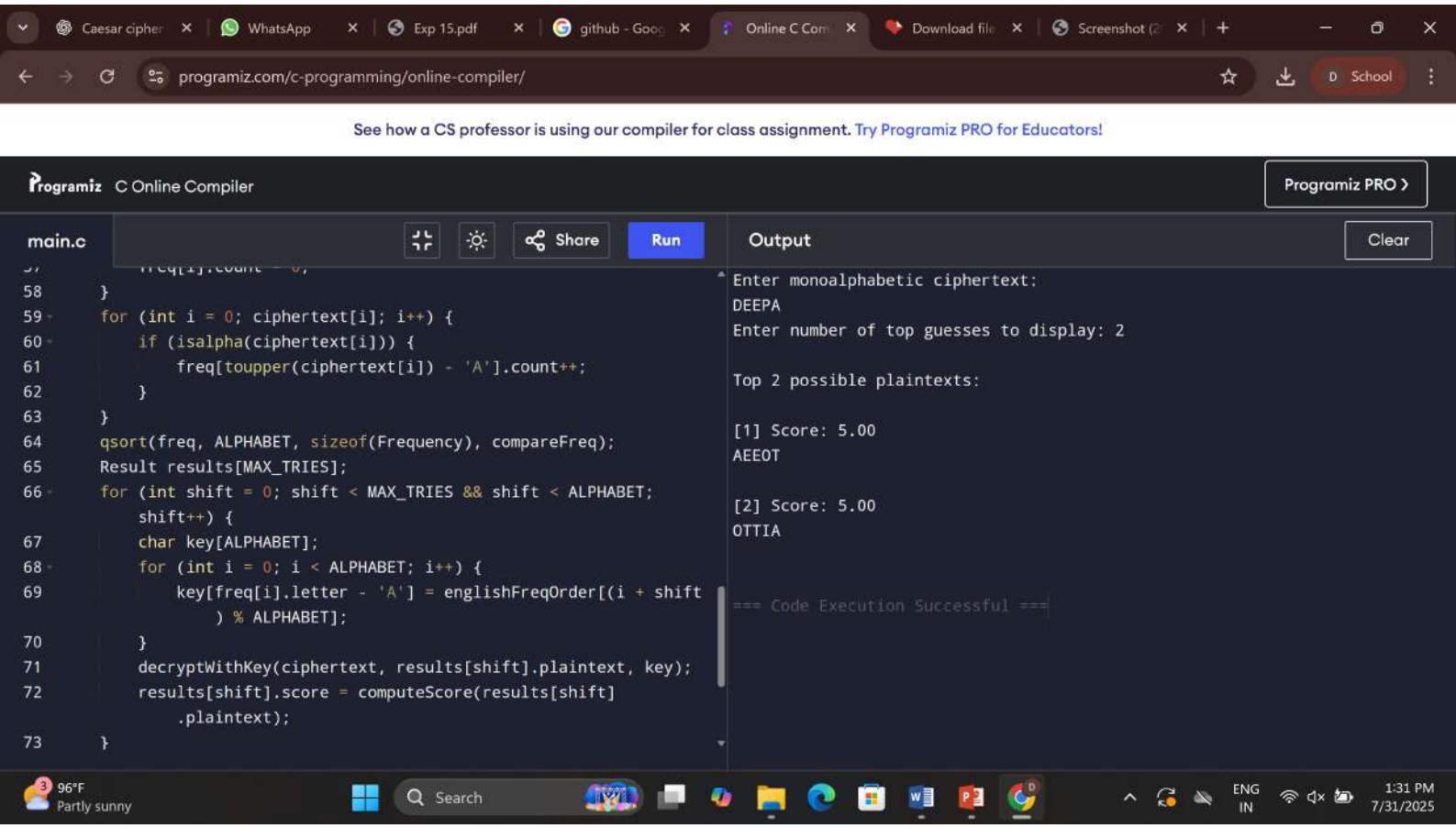
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}
for (int i = 0; ciphertext[i]; i++) {
if (isalpha(ciphertext[i])) {
freq[toupper(ciphertext[i]) - 'A'].count++;
}
}
qsort(freq, ALPHABET, sizeof(Frequency), compareFreq);
Result results[MAX_TRIES];
for (int shift = 0; shift < MAX_TRIES && shift < ALPHABET; shift++) {
char key[ALPHABET];
for (int i = 0; i < ALPHABET; i++) {
key[freq[i].letter - 'A'] = englishFreqOrder[(i + shift) % ALPHABET];
}
decryptWithKey(ciphertext, results[shift].plaintext, key);
results[shift].score = computeScore(results[shift].plaintext);
}
Enter monoalphabetic ciphertext:
DEEPA
Enter number of top guesses to display: 2
Top 2 possible plaintexts:
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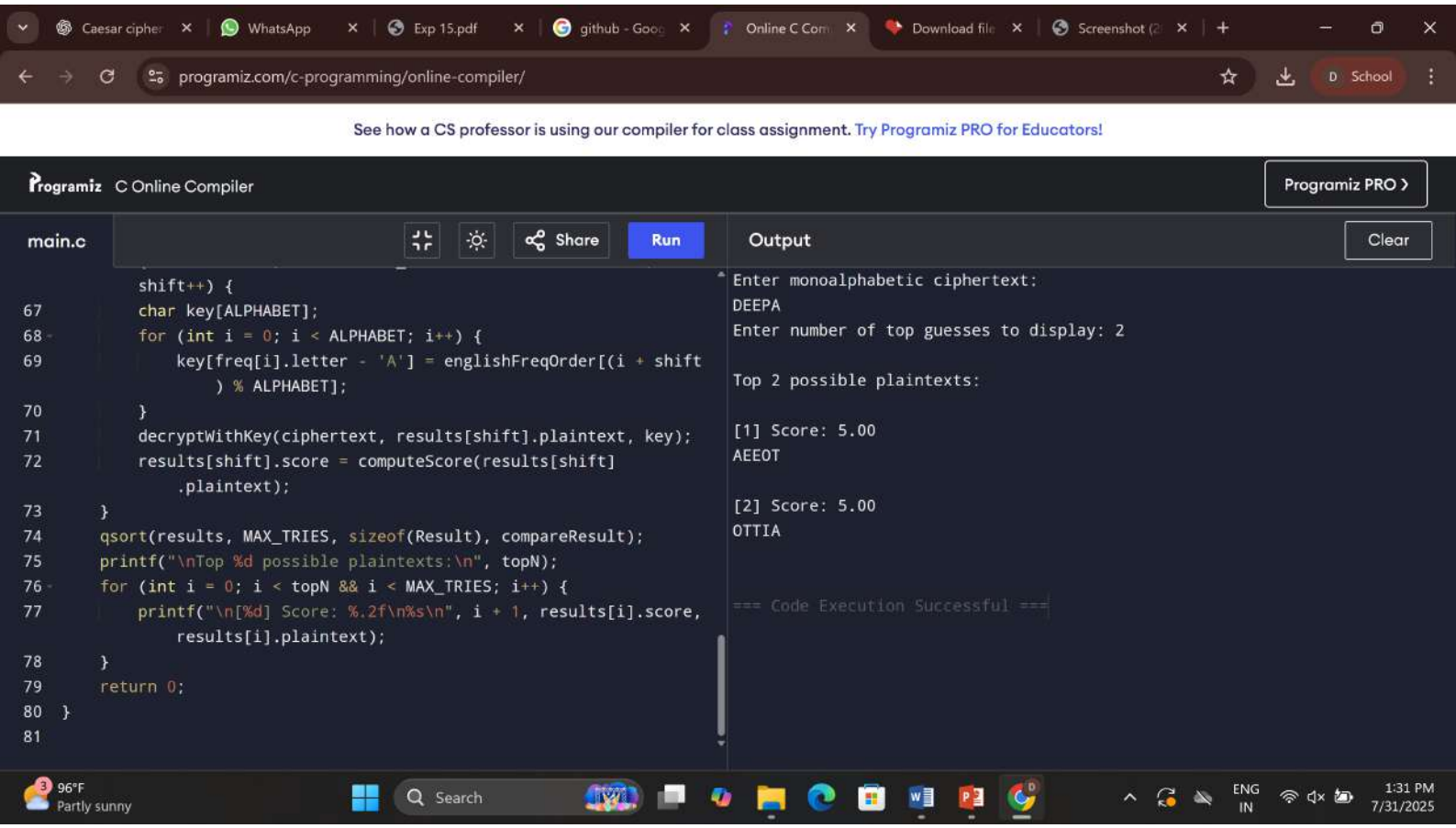
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shift++) {
char key[ALPHABET];
for (int i = 0; i < ALPHABET; i++) {
key[freq[i].letter - 'A'] = englishFreqOrder[(i + shift
) % ALPHABET];
}
decryptWithKey(ciphertext, results[shift].plaintext, key);
results[shift].score = computeScore(results[shift]
.plaintext);
}
qsort(results, MAX_TRIES, sizeof(Result), compareResult);
printf("\nTop %d possible plaintexts:\n", topN);
for (int i = 0; i < topN && i < MAX_TRIES; i++) {
printf("\n[%d] Score: %.2f\n%s\n", i + 1, results[i].score,
results[i].plaintext);
}
return 0;
}
Enter monoalphabetic ciphertext:
DEEPA
Enter number of top guesses to display: 2
Top 2 possible plaintexts:
[1] Score: 5.00
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