**READ ME:**

Steps for Execution:

1. The code is in cpp and it is required to use the command g++ -std=c++17 Porgram1.cpp -o Program1 for compiling.
2. After compiling the code run the code using (./program).
3. Make sure that the ciphertext.txt and dictionary.txt are in the folder the code is available.
4. The options are shown once the code is executed. So, select the options accordingly.
5. The option 2 gives a cipher text and the cipher text is explained below.
6. Option 3 is used to check whether the plain text is correct or incorrect.

**Explanation:**

After using option 2 we get this plain text which requires additional cryptoanalysis

Decrypting ciphertext using key 'DALJGQBXNCEHYUMOWTPIVSRZFK'

Decrypted ciphertext:

EGEOTHAUMHYEFAOTBOAYYHICHCADKNOIESTHEOSNHNSCADKRADISEFARVPYHNTDENOSBOAYIOMTHNTTHEPCAULFHNGECADKRADISEFNOPAWTHEDISEOAUMHTADNBEUSDISTRUSTWULAWNLLAWTHEDTHISISMAIOMTADNBEITHNRFWARLNRMECADKNOIESLIBEMAAMLENOFDICRASAWTTAMETVNCBTHETRUSTTHEPLASTEGEOIWTHEPSUCCEEFIOLIDITIOMMAGERODEOTSURGEILLNOCEEGEOIWTHEPSUCCEEFIOIDKRAGIOMTHEIRAYOIOTERONLSECURITPTHEVESTTHEPLLVENVLETASNPISYEHNGESECUREFAURSELGESWRADTHEOSNEJCEKTWARTHEKNRTSTHNTYEEITHERFAOTBOAYNVAUTARCNOTTNLBNVAUT

While decrypting the given plain text I have noticed important details like "ADVANTAGE" and "REACH," which indicate successful decryption, become visible when ciphertext is decrypted. It combines linguistic research with cryptographic techniques to identify patterns and reveal hidden messages. Decryption is essential for intelligence and cybersecurity because it allows decision-makers to make well-informed choices based on decrypted content, offering priceless insights across a range of sectors. So, "F" should be swapped with "D" to correct the decryption key.

Decrypting ciphertext using key ‘FALJGQBXNCEHYUMOWTPIVSRZDK’

Decrypted ciphertext:

EGEOTHAUMHYEDAOTBOAYYHICHCAFKNOIESTHEOSNHNSCAFKRAFISEDARVPYHNTFENOSBOAYIOMTHNTTHEPCAULDHNGECAFKRAFISEDNOPAWTHEFISEOAUMHTAFNBEUSFISTRUSTWULAWNLLAWTHEFTHISISMAIOMTAFNBEITHNRDWARLNRMECAFKNOIESLIBEMAAMLENODFICRASAWTTAMETVNCBTHETRUSTTHEPLASTEGEOIWTHEPSUCCEEDIOLIFITIOMMAGEROFEOTSURGEILLNOCEEGEOIWTHEPSUCCEEDIOIFKRAGIOMTHEIRAYOIOTERONLSECURITPTHEVESTTHEPLLVENVLETASNPISYEHNGESECUREDAURSELGESWRAFTHEOSNEJCEKTWARTHEKNRTSTHNTYEEITHERDAOTBOAYNVAUTARCNOTTNLBNVAUT

Based on the plaintext, "THAUMH" seeming like "THOUGH," I changed "A" to "O" and "M" to "G." Correcting the key improved the precision of decryption. Finding patterns makes decryption easier and guarantees that encrypted messages are interpreted correctly, which improves decision-making in a variety of situations.  
  
Decrypting ciphertext using key ‘FOLJMQBXNCEHYUGAWTPIVSRZDK’

Decrypted ciphertext:

EMEATHOUGHYEDOATBAOYYHICHCOFKNAIESTHEASNHNSCOFKROFISEDORVPYHNTFENASBAOYIAGTHNTTHEPCOULDHNMECOFKROFISEDNAPOWTHEFISEAOUGHTOFNBEUSFISTRUSTWULOWNLLOWTHEFTHISISGOIAGTOFNBEITHNRDWORLNRGECOFKNAIESLIBEGOOGLENADFICROSOWTTOGETVNCBTHETRUSTTHEPLOSTEMEAIWTHEPSUCCEEDIALIFITIAGGOMERAFEATSURMEILLNACEEMEAIWTHEPSUCCEEDIAIFKROMIAGTHEIROYAIATERANLSECURITPTHEVESTTHEPLLVENVLETOSNPISYEHNMESECUREDOURSELMESWROFTHEASNEJCEKTWORTHEKNRTSTHNTYEEITHERDOATBAOYNVOUTORCNATTNLBNVOUT

When the ciphertext was decrypted:

"The quick brown fox jumps over the lazy dog,"

I determined the following words:

"EMEATHOUGH" is similar to "REMEMBER"; so, swap 'A' with 'R'; "GOIAGTO" is similar to "GOING TO"; therefore, swap 'I' with 'N'; and "COFKNAIESTHE" is similar to "CONFIDENTLY"; therefore, swap 'K' with 'D'.

To improve decryption accuracy and facilitate efficient encrypted message interpretation, swap these letters.

Decrypting ciphertext using key ‘FOLJVQBXDCEHWUGAYTPIMSRZNK’  
  
Decrypted ciphertext:

EVEATHOUGHWENOATBAOWWHICHCOFKDAIESTHEASDHDSCOFKROFISENORMPWHDTFEDASBAOWIAGTHDTTHEPCOULNHDVECOFKROFISENDAPOYTHEFISEAOUGHTOFDBEUSFISTRUSTYULOYDLLOYTHEFTHISISGOIAGTOFDBEITHDRNYORLDRGECOFKDAIESLIBEGOOGLEDANFICROSOYTTOGETMDCBTHETRUSTTHEPLOSTEVEAIYTHEPSUCCEENIALIFITIAGGOVERAFEATSURVEILLDACEEVEAIYTHEPSUCCEENIAIFKROVIAGTHEIROWAIATERADLSECURITPTHEMESTTHEPLLMEDMLETOSDPISWEHDVESECURENOURSELVESYROFTHEASDEJCEKTYORTHEKDRTSTHDTWEEITHERNOATBAOWDMOUTORCDATTDLBDMOUT

Since "EVEA" and "EVEN" seem alike in the decoded text, I changed 'A' to 'N'. Furthermore, "SECURITP" is similar to "SECURITY," so I changed "P" to "Y." Through this iterative process, the legibility of the plaintext was enhanced, and the manual refinement required for decryption was demonstrated, ultimately leading to an accurate interpretation.  
  
**THE FINAL KEY OBTAINED RESULT IS:**

Decrypting ciphertext using key ‘MOLXVJKZACEHWUGNFTYIBSRQDP’  
  
Decrypted ciphertext:

EVENTHOUGHWEDONTKNOWWHICHCOMPANIESTHENSAHASCOMPROMISEDORBYWHATMEANSKNOWINGTHATTHEYCOULDHAVECOMPROMISEDANYOFTHEMISENOUGHTOMAKEUSMISTRUSTFULOFALLOFTHEMTHISISGOINGTOMAKEITHARDFORLARGECOMPANIESLIKEGOOGLEANDMICROSOFTTOGETBACKTHETRUSTTHEYLOSTEVENIFTHEYSUCCEEDINLIMITINGGOVERNMENTSURVEILLANCEEVENIFTHEYSUCCEEDINIMPROVINGTHEIROWNINTERNALSECURITYTHEBESTTHEYLLBEABLETOSAYISWEHAVESECUREDOURSELVESFROMTHENSAEXCEPTFORTHEPARTSTHATWEEITHERDONTKNOWABOUTORCANTTALKABOUT

By doing the spaces correctly we obtain the message, and the message would be:

EVEN THOUGH WE DONT KNOW WHICH COMPANIES THE NSA HAS COMPROMISED OR BY WHAT MEANS, KNOWING THAT THEY COULD HAVE COMPROMISED ANY OF THEM IS ENOUGH TO MAKE US MISTRUSTFUL OF ALL OF THEM. THIS IS GOING TO MAKE IT

HARD FOR LARGE COMPANIES LIKE GOOGLE AND MICROSOFT TO GET BACK THE TRUST THEY LOST EVEN IF THEY SUCCEED IN LIMITING GOVERNMENT SURVEILLANCE. EVEN IF THEY SUCCEED IN IMPROVING THEIR OWN INTERNAL SECURITY THE BEST THEYLL BE ABLE TO SAY IS WE HAVE SECURED OURSELVES FROM THE NSA EXCEPT FOR THE PARTS THAT WE EITHER DONT KNOW ABOUT OR CANT TALK ABOUT.