

## Q1 Commands

5 Points

List the commands used in the game to reach the first ciphertext.

climb  
read  
enter  
read



## Q2 Cryptosystem

5 Points

What cryptosystem was used in this level?

Substitution Cipher and Shifting of Digits were used in this level.



## Q3 Analysis

25 Points

What tools and observations were used to figure out the cryptosystem?  
(Explain in less than 100 words)

Tools :

For decryption of alphabets - Frequency Analysis and using basic Grammar.

For shift in digits - Forming Cases.

Observations :

Alphabets: The frequency in which letters appear in the given ciphertext was congruent with the first few letters of the English alphabet. Further decryption was done on the basis that they form the words that exist in an English Dictionary.

Punctuations weren't encrypted. Thus, a sentence between two punctuations should be complete and make sense.

Spaces: Spaces in cipher-text corresponded to spaces in plain-text. For

eg. the cipher-text "omkf pi hdn cmgef icphsck" had spaces according to "This is the first chamber".

Digits: If the digits are shifted by X, X will become 0 or 2X. Since 2 was given in the cipher-text, the possibilities were  $2X=2$  or  $2X=12$  (Because digits are taken from 0-9). Hence,  $X=1$  or  $X=6$ , but the word "places" proves that X cannot be 1, so the digits were shifted by 6.

## Q4 Mapping

10 Points

What is the plaintext space and ciphertext space?

What is the mapping between the elements of plaintext space and the elements of ciphertext space? (Explain in less than 100 words)

Plaintext space:

Understandable text in a known language which is not encrypted and can be read with little knowledge.

Ciphertext space:

Text one derives after implementing an encryption algorithm which to read, one needs to use some tools and observations to convert it back to plaintext. It is not understandable by human common sense.

Every element of the plaintext is mapped to a ciphertext element whose secret lies in a "key" used. The corresponding spaces and mapping were -

Plaintext Space - <abcdefghijklmnopqrstuvwxyz.,!635>

Ciphertext Space - <hnpyceaioudqgjxmkfvsr.,!291>

The mapping was in the same order as the above spaces. Eg. 'a' was mapped to 'h', 'b' to 'n' and so on.

## Q5 Password

5 Points

What is the final command used to clear this level?

iRqy3U5qdgt

## Q6 Codes

0 Points

Upload any code that you have used to solve this level

▼ freq.cpp

 Download

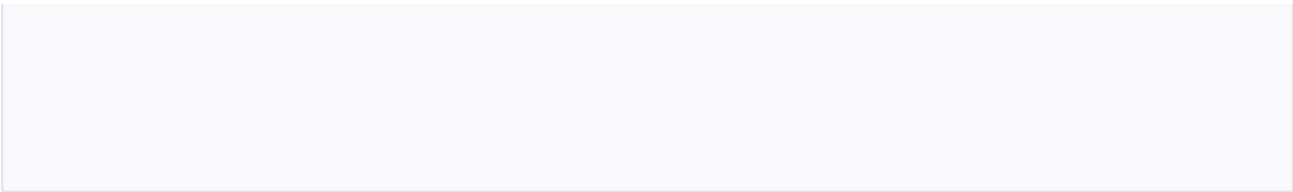
```
1  #include<bits/stdc++.h>
2  using namespace std;
3  int main(){
4
5      string s;
6      getline(cin,s);
7      int n=s.size();
8      int i=0;
9      float cnt=0;
10     float ch[26]={0};
11     while(i<n){
12         s[i]=tolower(s[i]);
13         if(s[i]<97 || s[i]>122){
14             cnt++;
15             i++;
16             continue;
17         }
18         ch[s[i]-'a']++;
19         i++;
20     }
21
22     vector<pair<float,char>> vp;
23     for(int i=0;i<26;i++){
24         float freq;
25         freq= (ch[i]/(n-cnt)*100);
26         char c= 'a'+i;
27         vp.push_back({freq,c});
28     }
29     sort(vp.begin(),vp.end());
30     for(int i=25;i>=0;i--){
31         cout<<vp[i].second<<" - ";
32         cout<<setprecision(4)<<vp[i].first<<endl;
33     }
34 }
35 }
```

## Q7 Team Name

0 Points

The\_Kryptonians






# Assignment 1

● GRADED

GROUP

Pranshu Gaur  
Maryam Raza Khan  
Maulik Singhal  
 View or edit group

TOTAL POINTS

50 / 50 pts

QUESTION 1

Commands 5 / 5 pts


QUESTION 2

Cryptosystem 5 / 5 pts

QUESTION 3

Analysis 25 / 25 pts

QUESTION 4

Mapping  10 / 10 pts

QUESTION 5

Password 5 / 5 pts

QUESTION 6

Codes 0 / 0 pts

QUESTION 7

Team Name 0 / 0 pts