Program :

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#include <stdlib.h>
#include <iostream>
#include <fstream>
#include <vector>
using namespace std;

void computeKeySpace(string str, int l, int r,vector<string>& keySpace)
{
   int i;
   if(l==r)
   {
      cout<<str<<endl;
      keySpace.push_back(str);
   }

   else
   {
      for(i=l;i<=r;i++)
      {
         swap(str[l], str[i]);
         computeKeySpace(str,l+1,r,keySpace);
         swap(str[l], str[i]);
      }
   }
}

int main()
{
   int i,n;
   fstream fs;
   vector<string> keySpace;
   string text;
   string uniq="";
   string key;
   string cipher="";

   //i.    Take input from file
   ifstream in( "plaintext.txt" );
   in>>text;                          //Taking input from file
   cout<<"Plain text : "<<text<<endl;

   //ii.   Compute Key Space
   n=text.length();
   for(i=0;i<n;i++)
      if(uniq.find(text[i])==-1)
         uniq.append(1,text[i]);
   cout<<"Unique Set : {"<<uniq<<"}"<<endl;
   cout<<"KEY SPACE : "<<endl;
   computeKeySpace(uniq,0,uniq.length()-1,keySpace);
```

```
    //iii.  Encryption
    srand(time(NULL));
    key=keySpace[rand()%keySpace.size()];   //Randomly select key from key space
    cout<<"Chosen Key : "<<key<<endl;
    for(i=0;i<n;i++)
    {
       cipher.append(1,key[uniq.find(text[i])]);
    }
    cout<<"Cipher Text : "<<cipher<<endl;
    ofstream out("cipher.txt");
    out<<cipher;

    //iv.   Calculate Frequency of Occurences of each alphabet
    int freq[uniq.length()];
    for(i=0;i<uniq.length();i++)
       freq[i]=0;                       //Initialise frequency to zero
    for(i=0;i<n;i++)
       freq[uniq.find(text[i])]++;
                                    //Display Frequency
    cout<<"FREQ\tPLAIN\tCIPHER"<<endl;
    for(i=0;i<uniq.length();i++)
       cout<<freq[i]<<"\t"<<uniq[i]<<"\t"<<key[i]<<endl;

     return 0;
}
```

Output :