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Hiding Text In Text By Using Multi Cryptography Algorithms

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Abstract

There are two principal ways to keep a message out of the enemy's hand's:

The first one you can conceal the message and hope that the enemy can't find it: this is known as steganography, the second you can scramble the message, and hop that (assuming that intercepted) the enemy is unable to unscramble [Bender *et.a1*. 1996; Kanh, 1996;Lin, 2003]. In this study we are mainly concerned with a cryptography, and a method of steganography that have been used or proposed, where we have been used plain text file in different length, and hidden it inside another text file which have been called cover file (storg file) also in different length, and then ciphering the text result which contains inside it the plain text by using three different methods. The dictionary method have been used to hide the plain text inside the cover file, this method depends on the choice of the repeated words in the cover file and replace them with synonomous, then take the code to each synonomous, finally, if there is matching between plain text bits and synonomous. To increase the security to the resulting file. Enciphering in three methods: the first one includes replacing the characters of result file with another character depending on the place of them. The second method depends on the character place in alphabet and it place in the resulting file, by using special to them. The third method takes the file result from second method and do some specific separation processes to generate new cipher text, but the decipher stage and the plain text retrieve include sequence of processes in the inverse direction to the above processes to obtain the plain text which is hidden in it, and decipher the cover text to ensure the truth of above processes.

الخلاصة

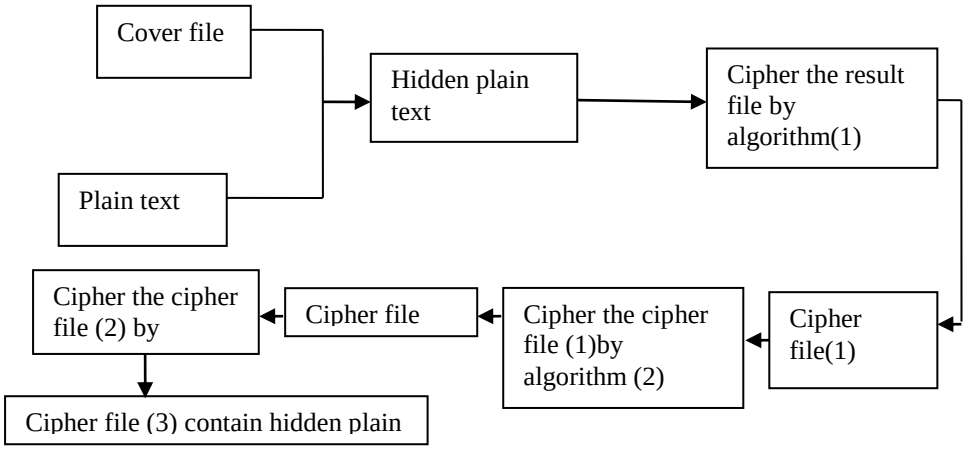
هنالك طريقتين مبدئية للحفاظ على الرسالة خارج نطاق ايدي اعدو: الاولى نستطيع الغاء الرسالة وتأمل ان العدو لايستطيع ايجادها وهذه تسمى steganography والثانية هي تغير هيئة الرسالة وتأمل ان العدو لاستطيع ان يغير معالم الرسالة المشفرة وفي هذا البحث يتعلق بصورة اساسية مع التشفير وطريقة الـ steganography التي تم استخدامها او اقتراحها. حيث تستخدم نص واضح وباطوال مختلفة ونخفي بداخله نص آخر والذي يسمى (التعب) الملف الغطاء. والذي يكون باطوال مختلفة وبعد ذلك نشفر النص الناتج والذي يحتوي على نص واضح بداخله باستخدام ثلاث طرق مختلفة. تستخدم طريقة القاموس لاخفاء النص الواضح بداخل الملف الغطاء وهذه الطريقة تعتمد على اختيار الكلمات المتكررة في الملف الغطاء وتعويضها بمرادفاتها وتأخذ شفرة كل مرادفة. واخيراً اذا نبحث كان هنالك تطابق بين بتات النص الواضح والمرادفات. ولزيادة الامنية في الملف الناتج نستخدم ثلاث طرق للتشفير. الاولى تتضمن تعويض حروف الملف الناتج بحروف اخرى بالاعتماد على موقع الحرف. الطريقة الثانية تعتمد على موقع الحرف في الهجائية والتعويض بها في الملف الناتج. الطريقة الثالثة تأخذ الملف الناتج من الطريقة الثانية ونعمل عملية فصل معينة لتوليد نص واضح جديد. ولكن خطوات فك الشفرة واستعادة النص الواضح يتضمن سلسلة من المعالجات في الاتجاه المعاكس للعمليات اعلاه للحصول على النص الواضح والمخفي في داخل اللف الغطاء وبعد ذلك فك شفرة الملف الغطاء لضمان صحة العمليات اعلاه.

1-Introduction

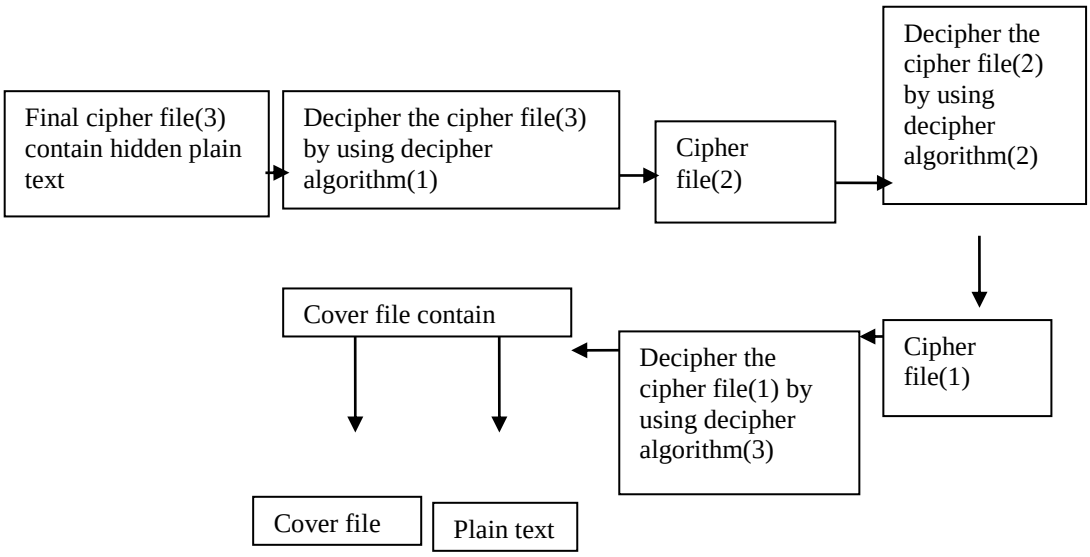
Cryptography and information security are considered on of important sciences in the worlds, especially after using the computers in these sciences.

On the other hand, the information and technology revolution and the armament race among the big countries give these science more priority, because these sciences play major rule in the espionage field, information thievery and policy for casting [Baker & Pipor, 1982; Bruce, 1996], also steganography is by no means a modern practice. Literally meaning "covered writing" it is the practice of hiding messages with in other messages in order to conceal the existence of the original [AU & Smith, 1998]. Examples of its use can be found throughout history, dating as far back as ancient Greece. However with the digital media formats in use for data exchange and communication today providing abundant hosts for steganographic communication, interest in this practice has increased [Pfitzman, 1999]. For the security professional,

this means that data you are paid to protect could be leaving your control without your knowledge. Conversely, one of the emerging uses for steganographic techniques is digital watermarking, which provides an organization with a way to ensure the integrity of data they wish to disseminate by embedding copy right or other information in digital file. Regardless of wether it is used for good or ill, an understanding of current methods of data hiding should be part of every security professional's knowledge base [Fabien *et al.,* 1999; Erin, 2003].



The hidden and ciphering plain stages



The deciphering cover file and retrive the plain text stages

3-Study case

3-1The plain text(cover file):

hello father and mother iam fine my car are very good i buy a new car i buy a new house and the house is very big and my car is wonderfull father and mother are you ok i ask you about our house and i ask about our car father and mother why you dont sell your car and buy a new car like me father and mother why you dont sell our house and buy a new house like me because our house are very small my master are happy because her father and mother are fine and she have a new dog at last good bye and with all my love to you and be carefull hello father and mother iam fine my car are very good i buy a new car i buy a new house and the house is very big and my car is wonderfull father and mother are you ok i ask you about our house and i ask about our car father and mother why you dont sell your car and buy a new car like me father and mother why you dont sell our house and buy a new house like me because our house are very small my master are happy because her father and mother are fine and she have a new dog at hello father and mother iam fine my car are very good i buy a new car i buy a new house and the house is very big

3-2 The text to be hidden:

im happy

3-3 The result text after hidden:

hello dady and mamy iam well my car are very good i buy a new car i buy a new home and the home is very big and my car is nice father and mamy are you ok i ask you about our house and i ask about our autombile dady and mother why you dont sell your car and buy a new car like me dady and mother why you dont sell our home and buy a new home like me because our house are very small my teacher are happy because her father and mamy are fine and she have a new dog at last good bye and with all my love to you and be carefull hello father and mamy iam well my car are very good i buy a new car i buy a new home and the home is very big and my car is nice dady and mother are you ok i ask you about our home and i ask about our autombile father and mamy why you dont sell your autombile and buy a new autombile like me dady and mamy why you dont sell our house and buy a new house like me because our house are very small my teacher are happy because her father and mamy are fine and she have a new dog at hello father and mamy iam fine my autombile are very good i buy a new autombile i buy a new home and the home is very big

3-4 The result cipher text after using first cipher algorithms:

svool wzwb zmw nznb rzn dvoo nb xzi ziv evib tllw r yfb z mvd xzi r yfb z mvd slnv zmw gsv slnv rh evib yrt zmw nb xzi rh mrxv uzgsvi zmw nznb ziv blf lp r zhp blf zylfg lfi slfhv zmw r zhp zylfg lfi zfglnyrov wzwb zmw nlgsvi dsb blf wlmg hvoo blfi xzi zmw yfb z mvd xzi orpv nv wzwb zmw nlgsvi dsb blf wlmg hvoo lfi slnv zmw yfb z mvd slnv orpv nv yvxzfhv lfi slfhv ziv evib hnzoo nb gvzxsvi ziv szkkb yvxzfhv svi uzgsvi zmw nznb ziv urmv zmw hsv szev z mvd wlt zg ozhg tllw ybv zmw drgs zoo nb olev gl blf zmw yv xzivufoo svool uzgsvi zmw nznb rzn dvoo nb xzi ziv evib tllw r yfb z mvd xzi r yfb z mvd slnv zmw gsv slnv rh evib yrt zmw nb xzi rh mrxv wzwb zmw nlgsvi ziv blf lp r zhp blf zylfg lfi slnv zmw r zhp zylfg lfi zfglnyrov uzgsvi zmw nznb dsb blf wlmg hvoo blfi zfglnyrov zmw yfb z mvd zfglnyrov orpv nv wzwb zmw nznb dsb blf wlmg hvoo lfi slfhv zmw yfb z mvd slfhv orpv nv yvxzfhv lfi slfhv ziv evib hnzoo nb gvzxsvi ziv szkkb yvxzfhv svi uzgsvi zmw nznb ziv urmv zmw hsv szev z mvd wlt zg svool uzgsvi zmw nznb rzn urmv nb zfglnyrov ziv evib tllw r yfb z mvd zfglnyrov r yfb z mvd slnv zmw gsv slnv rh evib yrt

3-5 The result cipher text after using second cipher algorithm:

tunom vzxa ylx mzoa rzo euno mb xzh yjv duha smkv r zgc y nud xzh r zgc y nud tmow ylx hrv tmow rh duha zsu ylx mb xzh rh nsww uzgtuh ylx mzoa yjv ame lo r yhp ame yxkff lgh tmegu ylx r yhp yxkff lgh ygglnyrpv vzxa ylx mmgtuh erc ame vmmh guno amei xzh ylx zgc y nud xzh ospw mu vzxa ylx mmgtuh erc ame vmmh guno lgh tmow ylx zgc y nud tmow ospw mu zuwygiw lgh tmegu yjv duha gnop mb huxrvi yjv tzljb zuwygiw tuh uzgtuh ylx mzoa yjv usmw ylx grv tzfw y nud vmu yf ozih smkv zbv ylx esgt ypn mb omfw hm ame ylx zu xzhwveop tunom uzgtuh ylx mzoa rzo euno mb xzh yjv duha smkv r zgc y nud xzh r zgc y nud tmow ylx hrv tmow rh duha zsu ylx mb xzh rh nsww vzxa ylx mmgtuh yjv ame lo r yhp ame yxkff lgh tmow ylx r yhp yxkff lgh ygglnyrpv uzgtuh ylx mzoa erc ame vmmh guno amei ygglnyrpv ylx zgc y nud ygglnyrpv ospw mu vzxa ylx mzoa erc ame vmmh guno lgh tmegu ylx zgc y nud tmegu ospw mu zuwygiw lgh tmegu yjv duha gnop mb huxrvi yjv tzljb zuwygiw tuh uzgtuh ylx mzoa yjv usmw ylx grv tzfw y nud vmu yf tunom uzgtuh ylx mzoa rzo usmw mb ygglnyrpv yjv duha smkv r zgc y nud ygglnyrpv r zgc y nud tmow ylx hrv tmow rh duha zsu

3-6 The result cipher text after using third cipher algirithm:

tnmvx yxmo roen m z j ua mv zcy u z zcy u mw l r mw hdh zuyxm z hnw zthyxmo yvael ypaeykflhteuyxr h xf g glyp za l mthecaevm gn ae xhyxzcy u z sw u za l mthecaevm gn lhto yxzcy u mw sw uzwgw g mg j ua no bh{ri j zj uyi thugu l za j sw l r zw ndvuy zh mv b l st p bof h m yxz zweptnmugu l za z uo bxhyvdh sk r g ndxhr g ndto yxhvto r ua s l bxhr sw vx yxmgu j m or h m xf g mw l ypykflhygnrvugu l za r m mh uo mi glyp l g ndygnrvop m vx yxmo ecaevm gn lhteuyxzcy u mg sw uzwgw g mg j ua no bh{ri j zj uyi thugu l za j sw l r zw ndvuy uo zthyxmo roum m glyp j ua mv zcy u glyp zcy u mw l r mw hdh zu s au r otvhxy otdn g rvrngydn g r ks hdvyvrngyb ws z az l ugumntf m u y ftvgxy muvy omxyhtz u wgwzbltvy vxu mpg hdvyuethl iyu m pouetdn g l gm g ou hm m r az l az u ws pylg u yczxyvrngy ea ng mveace omxyhtz pylg g fx h rxy othlfkyeapy leavyhtm l az wnh z mxyuz hdh wm r l wm u ycz z u ycz vm au j z m neor omxyhtz ou ovhxu l eam wm mny gexyvz ks iof m u y ftvgxy muvy omxyhtz u wgwzbltvy vxu mp{g hdvyuethl iyu m po otdn g l wm g ou hm m r ugmxy xv m pohxdn g l z im ou hm m r ugmxy xvvrngyhlfkypy l gm g fx m h ro m j az l ugu ws rhxb l s au r otvhxy otdn g rhxdn g r ks hdvyhxb ou z az l az ou

3-7 The result decipher text after using third dcipher algorithm:

tunom vzxa ylx mzoa rzo euno mb xzh yjv duha smkv r zgc y nud xzh r zgc y nud tmow ylx hrv tmow rh duha zsu ylx mb xzh rh nsww uzgtuh ylx mzoa yjv ame lo r yhp ame yxkff lgh tmegu ylx r yhp yxkff lgh ygglnyrpv vzxa ylx mmgtuh erc ame vmmh guno amei xzh ylx zgc y nud xzh ospw mu vzxa ylx mmgtuh erc ame vmmh guno lgh tmow ylx zgc y nud tmow ospw mu zuwygiw lgh tmegu yjv duha gnop mb huxrvi yjv tzljb zuwygiw tuh uzgtuh ylx mzoa yjv usmw ylx grv tzfw y nud vmu yf ozih smkv zbv ylx esgt ypn mb omfw hm ame ylx zu xzhwveop tunom uzgtuh ylx mzoa rzo euno mb xzh yjv duha smkv r zgc y nud xzh r zgc y nud tmow ylx hrv tmow rh duha zsu ylx mb xzh rh nsww vzxa ylx mmgtuh yjv ame lo r yhp ame yxkff lgh tmow ylx r yhp yxkff lgh ygglnyrpv uzgtuh ylx mzoa erc ame vmmh guno amei ygglnyrpv ylx zgc y nud ygglnyrpv ospw mu vzxa ylx mzoa erc ame vmmh guno lgh tmegu ylx zgc y nud tmegu ospw mu zuwygiw lgh tmegu yjv duha gnop mb huxrvi yjv tzljb zuwygiw tuh uzgtuh ylx mzoa yjv usmw ylx grv tzfw y nud vmu yf tunom uzgtuh ylx mzoa rzo usmw mb ygglnyrpv yjv duha smkv r zgc y nud ygglnyrpv r zgc y nud tmow ylx hrv tmow rh duha zsu

3-8 The result decipher text after using second decipher algorithm:

svool wzwb zmw nznb rzn dvoo nb xzi ziv evib tllw r yfb z mvd xzi r yfb z mvd slnv zmw gsv slnv rh evib yrt zmw nb xzi rh mrxv uzgsvi zmw nznb ziv blf lp r zhp blf zylfg lfi slfhv zmw r zhp zylfg lfi zfglnyrov wzwb zmw nlgsvi dsb blf wlmg hvoo blfi xzi zmw yfb z mvd xzi orpv nv wzwb zmw nlgsvi dsb blf wlmg hvoo lfi slnv zmw yfb z mvd slnv orpv nv yvxzfhv lfi slfhv ziv evib hnzoo nb gvzxsvi ziv szkkb yvxzfhv svi uzgsvi zmw nznb ziv urmv zmw hsv szev z mvd wlt zg ozhg tllw ybv zmw drgs zoo nb olev gl blf zmw yv xzivufoo svool uzgsvi zmw nznb rzn dvoo nb xzi ziv evib tllw r yfb z mvd xzi r yfb z mvd slnv zmw gsv slnv rh evib yrt zmw nb xzi rh mrxv wzwb zmw nlgsvi ziv blf lp r zhp blf zylfg lfi slnv zmw r zhp zylfg lfi zfglnyrov uzgsvi zmw nznb dsb blf wlmg hvoo blfi zfglnyrov zmw yfb z mvd zfglnyrov orpv nv wzwb zmw nznb dsb blf wlmg hvoo lfi slfhv zmw yfb z mvd slfhv orpv nv yvxzfhv lfi slfhv ziv evib hnzoo nb gvzxsvi ziv szkkb yvxzfhv svi uzgsvi zmw nznb ziv urmv zmw hsv szev z mvd wlt zg svool uzgsvi zmw nznb rzn urmv nb zfglnyrov ziv evib tllw r yfb z mvd zfglnyrov r yfb z mvd slnv zmw gsv slnv rh evib yrt

3-9 The retrive text containing plain text after using first decipher algorithm:

hello dady and mamy iam well my car are very good i buy a new car i buy a new home and the home is very big and my car is nice father and mamy are you ok i ask you about our house and i ask about our autombile dady and mother why you dont sell your car and buy a new car like me dady and mother why you dont sell our home and buy a new home like me because our house are very small my teacher are happy because her father and mamy are fine and she have a new dog at last good bye and with all my love to you and be carefull hello father and mamy iam well my car are very good i buy a new car i buy a new home and the home is very big and my car is nice dady and mother are you ok i ask you about our home and i ask about our autombile father and mamy why you dont sell your autombile and buy a new autombile like me dady and mamy why you dont sell our house and buy a new house like me because our house are very small my teacher are happy because her father and mamy are fine and she have a new dog at hello father and mamy iam fine my autombile are very good i buy a new autombile i buy a new home and the home is very big

3-10 The original plain text :

im happy

3-11 The original cover text:

hello father and mother iam fine my car are very good i buy a new car i buy a new house and the house is very big and my car is wonderfull father and mother are you ok i ask you about our house and i ask about our car father and mother why you dont sell your car and buy a new car like me father and mother why you dont sell our house and buy a new house like me because our house are very small my master are happy because her father and mother are fine and she have a new dog at last good bye and with all my love to you and be carefull hello father and mother iam fine my car are very good i buy a new car i buy a new house and the house is very big and my car is wonderfull father and mother are you ok i ask you about our house and i ask about our car father and mother why you dont sell your car and buy a new car like me father and mother why you dont sell our house and buy a new house like me because our house are very small my master are happy because her father and mother are fine and she have a new dog at hello father and mother iam fine my car are very is very big.

4-Hidding plain text stages:

This stage includes hide the plain text into cover file by using synonymous to the repeated occurrence word in the cover file, then store them into the array (dictionary), and store the code of each word which it synonomous have been taken.

Follow the whole explanation to the file names, arrays which we used in this stage:

1-

a-two arrays, the first one is (dic) which is considered as a dictionary of word and synonomous, and the second is the (dno) which contains the codes of the words exist in the cover file , and the synonymous of it is dady. The code of it is 1.

b-the array (a), which contains the binary of the plain text.

2-The files which we were used:

a-h_story.text file: to save the cover text they work in it.

b-h-hidden.text file: which contains the plain text.

c-h_final: which contains the cover text containing plain text in it.

d-h1_hidden.text: which contains the retrive plain text.

e-hd2_final: contains the cover text after separate the original plain text.

f-hc3_final: contains the result cipher text from the third cipher algorithm.

g-hd_final: contains retrive cipher text to its original after cipher processin the third stage.

h-he2_final: contains the cipher text result from the second cipher algorithm.

i-hd1_final: contains the retrive text from the second cipher stage.

j-hd1_final: contains the cover file after ciphering by first algorithm.

At the beginning the program converts the plain text in the h_hidden to the binary and stores it in the array(a), after we have been used the function conv-to-lower to convert the capital letter to small letter, to uniform all the letters (the convert to binary depends on the sequence of the letter alphabet), then read the cover file (h-story) line after line, then cutting word word and search in the dictionary, if it is found in the dictionary, look to the bit in the array(a), if it equals the word code, these two conditions satisfied, then replace the word by its synonomous, and store the result in the h_final, but if one of two conditions is not satisfied then the word has been stored in the h_final as it.

5-function and procedures used as this stage:

The function conv-to-lower used to convert the capital letter to small letter, and if the letter is any symbol, then the function will return it as it:

```
If ch in ['A'..'Z'] then
Conv-to lower:=chr(ord(ch)+32)
Else
  Conv-to-lower:=ch;
```

The following part used to convert the read character to binary and store the result into the array(a)

```
Y:=1;
While not eof(f1) do
  Begin
      Read(f1,ch);
      Ch:=conv-to-lower(ch);
  If(ch<>' ') and (ch<>#13)then
    Begin
       C:=ord(ch);
       C:=c-97;
```

```
        For j:=5 down to I do
           Begin
              B[i]:=c mod 2;
            C:=c div 2;
           End;
  For i:=1 to 5 do
    Begin
       A[y]:=b[i];
        Y:=y+1;
    End;
End;
```

The following parts used to cut each line to word (token)

```
S:=' ';
While(s1[r]<>")and(r<=length(s1))do
  Begin
      S:=s+s1[r];
      R:=r+1;
   End;
```

But this part is used to check if the cutting word is found in the dictionary or not. If it is found then replace it by its synonomous and store it in h_final else store it direct in file.

```
T:=true;
For i:=1 to 18 do
If(s=dic[i])and(a[j]=dno[i]) then
Begin
    F:=false;
    Write(f2,dic[i+1]);
    Write(f2,' ');
     K:=k+1;
     Bit[k]:=a[j];
     J:=j+1;
  End;
If t then
 Begin
     Write(f2,s);
      Write(f2,' ');
  End;
```

5-1 The first stage of encryption (first algorithm):

In this step of encryption we make the following:

Take the text exist in the file h_final, read every character in it. If the read character is space, then store it as it in the file he_final, else if the character is small from a to z, then the code of the alphabet:

```
Cc:=ord (c);
Cc:=(cc-97)+1;
Cc:=(26-cc) mod 26;
Cc:=cc+97;
```

Then return this code to the character that is similar to it in the alphabet and store it in the he1_final.

5-2The second stage of encryption (second algorithms):

At this stage, the result file(he1_final) from step one has been opened, and read every character in it, if the reading character is space, then store it as it in the he2_final, else if the character is small letter then we take the code of each character as in:

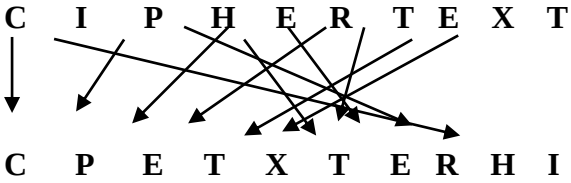
```
Repeat
X:=character order in alphabet +character in the word;
Y:=x mod 3;
If y=0 then
  Same plain text
If y=1 then
  Right of plain text
If y=2 then
  Left pf plain text
Until no plain text
```

Then return the character from the code obtained above and save it in the he2_final.

5-3 the third stage of encryption (third algorithm):

At this stage, the plain text character saved in the file he2_final separated depending on the place character.

Where the first character placed in the first place in the file he3_final, where as the second character placed in the last place in the cipher text and so on.



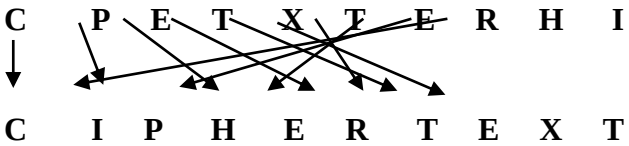
The following paragraph explain the third encryption program.

```
Begin
   For I:=1 to length(edit1.text)do
     Begin
        If(I mod 2=1) then
          Edit2.text=edit2.text+edit1.text[i]
        Else
          C:=c+edit1.text[I]
      End
  For I;=length (c) down to 1 do
    Edit2.text:=edit2.text+c[I]
End
```

6-The procedures and functions used in decryption stage:

6-1 The first step of decryption:

At this stage, the text exists in the file he2_final has been returned by inverse the process of cipher text exist in the final file he3_final. The first character returns to the original place, the last character returns to the second place, and so on (this process is the inverse of the third algorithm of ciphering).



Then the result text saved in the hd_final file.

The following paragraph explains the decipher program

```
Begin
   I:=1;
J:=length(edit1.text);
If(i<j) then
  Begin   Edit3.text=edit3.text+edit2.text[I]+edit2.text[J];
      I:=I+1;
      J:=J-1;
   End;
If(i=j) then
 Edit3.text:=edit3.text+edit2.text[I];
End.
```

6-2 The second decipher algorithm:

We take the file hd_final, and the inverse cipher process have been made as follows:

X=character order in alphabetic and of word;
Y=x mod 3;
If y=0 then
  Cipher itself
If y=1 then
  Right of cipher in alphabetic
If y=2 then
  Left of the cipher in alphabetic

6-3 The third decipher algorithm:

The file hd1_final has been taken, and process of decipher has been done, to return the character to the original place as follows:

P:=ord(p);
P:=(p-97)+1;
P:=(26-p)mod 26;
P:=p+97;

At this stage, the covered file which contains the plain text has been retrived .To return the plain text from the file hd2_final. The file reads line after line and then cut the word word, then compare each word of this text with synonomous word in the array dic, if it is matching, this means exchange has been made, the word retrive to the text and put it in the h1_hidden.

7-Conclusion

1- The used of dictionary method for hiding plain text in covered text increases the randomness and contains the plain text through the using of synonomous to the repeated word, and using the code to every repeated word, also the convert the plain text to binary and compare it with the code of each word, hidden according matching condition satisfied.

All above work increase the security of plain text has been sent through the channel.

2-The used of the encryption method study gives additional strong more security to the plain text.

3-The difficult and complexity of the suggested system are increasing the size of the plain text, cover file increasing the repeated word, finding the synonomous to them and save them in the dictionary, and the matching process between the code repeated word and the plain text.

4-The three cipher and decipher algorithm depends on this paper.Each one of them depends on ascii code of the plain text character and the sequence of the character in the alphabet. In the second algorithm depends on the character position in the

word and the position in the plain text by using specific function. The third algorithm depends on specific separation mapping pf plain text characters and generates word using the first character after separation.

8-Refernces

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