Cyber Security (CSE 4003)
Digital Assignment 1

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Question: Download, understand and modify the code available in scilab.in for security books / labs ---- develop any one program with perfect coding standard in scilab for security algorithms

Answer: I have used the code for encryption and decryption using **Caesar Cipher.** I have made the following modifications:

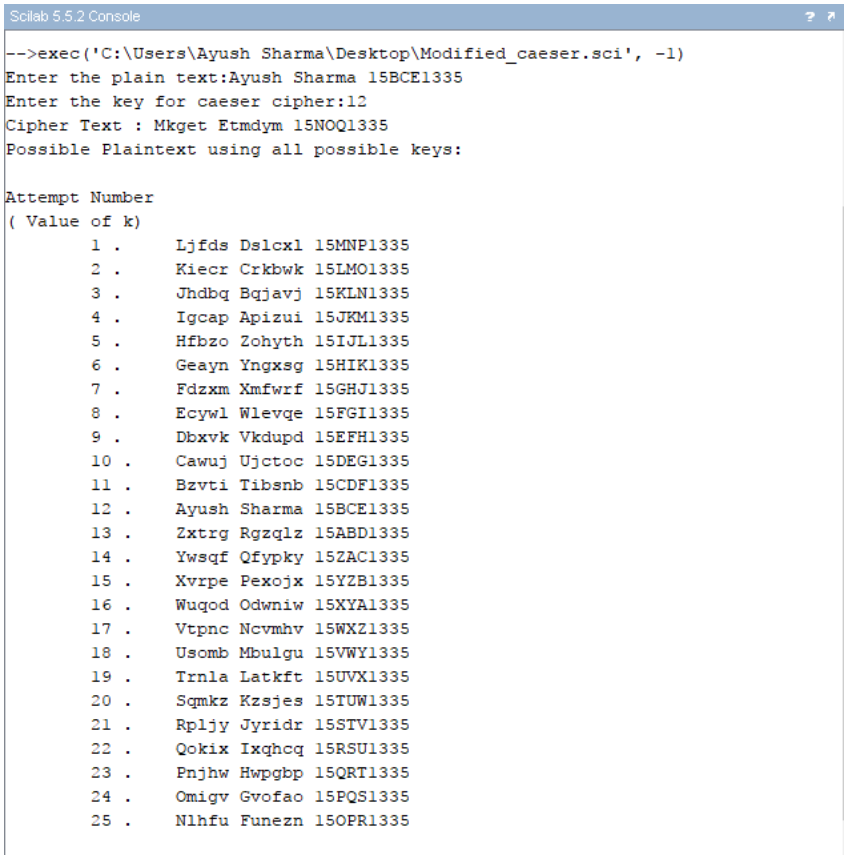
a. Encryption for custom Plain Text and Key
b. All possible decrypted text without the knowledge of the key
c. Uppercase and Lowercase support.

Code:

```
//Functions for encryption (param: Plain Text and Key)
function [ct]=encrypt_caesar_general(pt, key)
   a = ascii('A');
   l = length(pt);
   ct = zeros(l);

   for i =1:l
      if isletter(part(pt,i:i)) then
         if (ascii(part(pt,i:i))>96) then
            a = ascii('a');
         else
            a = ascii('A');
         end
         ct(i) = a + modulo( ascii(part(pt,i:i))+ key-a, 26 );
      else
         ct(i) = ascii( part(pt,i:i));
      end
   end
   ct = char(ct);
   ct = strcat(ct);
endfunction

//Functions for encryption (param: Cipher Text and Key)
function [pt]=decrypt_caesar_general(ct, key)
   a=ascii('A');
   key = 26-key;
   l = length(ct);
   pt = zeros(l);

   for i =1:l
      if isletter(part(ct,i:i)) then
         if (ascii(part(ct,i:i))>96) then
            a = ascii('a');
         else
            a = ascii('A');
         end
         pt(i) = a + modulo( ascii(part(ct,i:i))+ key-a, 26 );
      else
         pt(i) = ascii(part(ct,i:i));
```

```
        end
    end
    pt = char(pt);
    pt = strcat(pt);
endfunction

//Getting input from User (Upper and lowercase all supported)
pt = input("Enter the plain text:","string");
key = input("Enter the key for caeser cipher:");
ct = encrypt_caesar_general(pt,key);
printf("Cipher Text : %s\n",ct);
printf("Possible Plaintext using all possible keys:\n\t\n");
printf("Attempt Number\n( Value of k)\n");
for key = 1:25
    printf("\t%d . \t",key);
    printf("%s\n",decrypt_caesar_general(ct,key));
end
```

Screenshot:



```
Scilab 5.5.2 Console

-->exec('C:\Users\Ayush Sharma\Desktop\Modified_caeser.sci', -1)
Enter the plain text:Ayush Sharma 15BCE1335
Enter the key for caeser cipher:12
Cipher Text : Mkget Etmdym 15NOQ1335
Possible Plaintext using all possible keys:

Attempt Number
( Value of k)
        1 .     Ljfds Dslcxl 15MNP1335
        2 .     Kiecr Crkbwk 15LMO1335
        3 .     Jhdbq Bqjavj 15KLN1335
        4 .     Igcap Apizui 15JKM1335
        5 .     Hfbzo Zohyth 15IJL1335
        6 .     Geayn Yngxsg 15HIK1335
        7 .     Fdzxm Xmfwrf 15GHJ1335
        8 .     Ecywl Wlevqe 15FGI1335
        9 .     Dbxvk Vkdupd 15EFH1335
        10 .    Cawuj Ujctoc 15DEG1335
        11 .    Bzvti Tibsnb 15CDF1335
        12 .    Ayush Sharma 15BCE1335
        13 .    Zxtrg Rgzqlz 15ABD1335
        14 .    Ywsqf Qfypky 15ZAC1335
        15 .    Xvrpe Pexojx 15YZB1335
        16 .    Wuqod Odwniw 15XYA1335
        17 .    Vtpnc Ncvmhv 15WXZ1335
        18 .    Usomb Mbulgu 15VWY1335
        19 .    Trnla Latkft 15UVX1335
        20 .    Sqmkz Kzsjes 15TUW1335
        21 .    Rpljy Jyridr 15STV1335
        22 .    Qokix Ixqhcq 15RSU1335
        23 .    Pnjhw Hwpgbp 15QRT1335
        24 .    Omigv Gvofao 15PQS1335
        25 .    Nlhfu Funezn 15OPR1335
```

Explanation:

In the Plain text there are lowercase as well as uppercase alphabets with the presence of numeric characters also (i.e. Ayush Sharma 15BCE1335). The alphabets are shifted according to the user defined key and the numbers are kept as they are (i.e. Mkget Etmdym 15NOQ1335). Then a decryption function constructs all possible plain text using the cipher text from the encryption function (without any knowledge about the key) and as we can see the correct plain text corresponds to the user entered key (i.e. 17).